KİMYAGERLER DERNEĞİ

TOKAT GAZİOSMANPAŞA ÜNİVERSİTESİ

ÇANAKKALE ONSEKİZ MART ÜNİVERSİTESİ 1992

Universität Regensburg

6.EBAT

EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS

24-27 OCTOBER 2024 TOKAT

ABSTRACT BOOK

6th EBAT Congress was supported by TUBITAK with 2223-B Support Program for Scientific Activities

TÜBİTAK

Distinguished participants and esteemed colleagues,

It is our great honor and privilege to organize 6th Eurasia Biochemical Approaches & Technologies Congress in the historic city of Tokat, with a collaborative effort involving Tokat Gaziosmanpasa University, Çanakkale 18 Mart University and Regensburg University.

This year's 6th EBAT congress was held on 24-27 October 2024 at the congress center in Tokat Gaziosmanpaşa University Campus and 7 invited speakers, 4 of whom were foreign, contributed with their presentations. In addition, 103 presentations were made from 38 different universities, one of which was from India. 20 of these presentations were oral presentations, 30 were short oral presentations and 53 were poster presentations. 160 people attended the congress. The congress topics were biosensors, fight against cancer, enzymes and their alternative uses, medically important microorganisms and plants. This congress was not just about sharing knowledge but also about building connections—between disciplines, sectors, and regions. It was a unique opportunity for all of us to learn from one another, exchange ideas, and push the boundaries of what is possible in the field of biochemistry.

I would like to take this moment to express my heartfelt thanks to the organizing committee, sustainability committee, scientific committee and Turkish Chemist Society, and congress coordination unit of Tokat Gaziosmanpasa University with all staff of it, who have worked tirelessly to bring this event to life. I also want to acknowledge our partners, TUBITAK, Tokat Municipality, Tokat Foundations Provincial Directorate, TOGU Scientific Research Projects Coordination, and all those whose support has made this congress possible. Apart from these, we thank Özkaleli Gıda for their gifts, and Tokat Women Entrepreneurs contributed to promoting Tokat by exhibiting products belonging to the Tokat region.

Part of the abstract submissions of our convention participants will be provided with the opportunity to present a full-text article in the journals "The Protein Journal", "Biotech Studies" and "European Chemistry and Biotechnology Journal (EurochembioJ)" with the choice of the authors. With this abstract book, we will apply to get ISBN number to Ministry of Culture and Tourism.

Thank all participants once again for being at Tokat and for your continued dedication to advancing the field of biochemistry. I look forward to the collaborations that emerge from the insightful presentations and discussions. Finally, I hope you all took the time to enjoy the beauty of Tokat, a city that has witnessed centuries of history and progress.

Best wishes,

Prof. Dr. Bilge Hilal ÇADIRCI Chair of the Congress
Prof. Dr. Okan ACAR Vice-chair of the Congress
Prof.Dr. Reinhard STERNER Vice-chair of the Congress

6th EBAT Congress was supported by Tokat Gaziosmanpasa University Scientific Research Projects Commision (TOGU-BAP) with a project number of 2024/63.

October2024, Tokat

COMMITTEES

Congress Chair

Prof. Dr. Bilge Hilal CADIRCI (Tokat Gaziosmanpasa University, Turkiye)

Congress Vice-Chair

Prof. Dr. Okan ACAR (Çanakkale 18 Mart University, Turkiye)

Prof. Dr. Reinhard STERNER (Regensburg University, Germany)

Honorary Chair

Prof.Dr. Fatih YILMAZ (Rector of Tokat Gaziosmanpasa University, Turkiye)

Prof.Dr. R. Cüneyt ERENOĞLU (Rector of Canakkale 18 Mart University, Turkiye)

Prof. Dr. Udo HEBEL (President of Universitat Regensburg, Germany)

Congress Secretary

Assist Prof. Hakan KARADAG (Tokat Gaziosmanpasa University, Turkiye)

Advisory Board

Prof. Azmi TELEFONCU (Ege University (Retired))

Prof. Ö. İrfan KUFREVIOGLU (Atatürk University)

Prof. Seyhan TUKEL (Çukurova University (Retired))

Scientific Committee

Prof.Dr. Atac UZEL (Ege University, Turkiye)

Prof. Aylin ŞENDEMİR (Ege Üniversitesi, Turkiye)

Prof. Ayşe DİNÇER (Manisa Celal Bayar University, Turkiye)

Prof. Azra BOZCAARMUTLU (Bolu İzzet Baysal University, Turkiye)

Prof. Burhan ATEŞ (İnönü Üniversitesi,Turkiye)

Prof. Deniz AKTAŞ UYGUN (Aydın Adnan Menderes University, Turkiye)

Prof. Deniz EKİNCİ (Ondokuz Mayıs University,Turkiye)

Prof. Dilek ALAGÖZ (Çukurova University,Turkiye)

Prof. Dilek BATTAL (Mersin University,Turkiye)

Prof. Dilek ODACI (Ege Üniversitesi, Turkiye)

Prof. Dzmitry SHCHARBIN (National Academy of Science of Belarus, Belarus)

Prof. Ekrem KÖKSAL (Erzincan Binali Yıldırım University,Turkiye)

Prof. Elif ÖZYILMAZ (Selçuk University,Turkiye)

Prof. Emel EMREGÜL (Ankara University,Turkiye)

Prof. Ercan BURSAL (Muş Alparslan University,Turkiye)

Prof. Figen ZİHNİOĞLU (Ege University,Turkiye)

Prof. Frank HOLLMANN (Delft University of Technology, Netherlands)

Prof. Franz THEURING (University of Charite, Germany)

Prof. Gizem DÖNMEZ YALÇIN (Aydın Adnan Menderes University, Turkiye)

Prof. Gözde BAYDEMİR PEŞİNT (Adana Science and Technology University, Turkiye)

Prof. Gregor ANDERLUH (Slovenia National Institute of Chemistry, Slovenia)

Prof. Dr. Guven OZDEMIR (Ege University, Turkiye)

Prof. Hamdullah KILIÇ (Atatürk University, Turkiye)

Prof. Harun BUDAK (Atatürk University, Turkiye)

Prof. Hasan TÜRKEZ (Atatürk University, Turkiye)

Prof. Hülya YAĞAR (Trakya University, Turkiye)

Prof. Hüseyin ŞEKER (Birmingham City University, United Kingdom)

Prof. İbrahim Tarık ÖZBOLAT (Penn State University, USA)

Prof. İhsan YAŞA (Ege Üniversitesi, Turkiye)

Prof. İlhami GÜLÇİN (Atatürk University, Turkiye)

Prof. İsmail KIRAN (Eskişehir Osman Gazi University, Turkiye)

Prof. İsmail ÖÇSOY (Erciyes University, Turkiye)

Prof. İsmail ÖZMEN (Süleyman Demirel University, Turkiye)

Prof. İsmet YILMAZ (İnönü University, Turkiye)

Prof. Kadriye Arzum ERDEM GÜRSAN (Ege University, Turkiye)

Prof. Levent ÇAVAŞ (Dokuz Eylül University, Turkiye)

Prof. Lokman UZUN (Hacettepe University, Turkiye)

Prof. Mehmet DOĞRU (Dicle University, Turkiye)

Prof. Mehmet Hüseyin ALKAN (Dicle University, Turkiye)

Prof. Mehmet ODABAŞI (Aksaray University, Turkiye)

Prof. Melike YILDIRIM AKATIN (Karadeniz Teknik University, Turkiye)

Prof. Muhammet Şaban TANYILDIZI (Fırat University, Turkey, Turkiye)

Prof. Murat ÇAKICI (Atatürk University, Turkiye)

Prof. Murat ÇANKAYA (Sakarya Uygulamalı Bilimler University, Turkiye)

Prof. Murat KUCUK (Karadeniz Technical University, Turkiye)

Prof. Müge ANDAÇ (Hacettepe University, Turkiye)

Prof. Nagihan SAĞLAM ERTUNGA (Karadeniz Technical University, Turkiye)

Prof. Nalan ÖZDEMİR (Erciyes University, Turkiye)

Prof. Nazlı ARDA (İstanbul University, Turkiye)
Prof. Ramazan ERENLER (Igdır University, Turkiye)

Prof. Raziye ÖZTÜRK ÜREK (Dokuz Eylül University, Turkiye)

Prof. Rita CASADIO (University of Bologna, Italia)

Prof. Sandra CITI (University of Geneva, Switzerland)

Prof. Serap EVRAN (Ege University, Turkiye)

Prof. Sibel ÖZKAN (Ankara University, Turkiye)

Prof. Sinan AKGÖL (Ege University, Turkiye)

Prof. Şebnem Selen İŞBİLİR (Trakya University, Turkiye)

Prof. Şenol ALPAT (Dokuz Eylül University, Turkiye)

Prof. Şükrü BEYDEMİR (Bilecik Şeyh Edebali University, Turkiye)

Prof. Taha Abdulkadir ÇOBAN (Erzincan Binali Yıldırım University, Turkiye)

Prof. Veysel ÇOMAKLI (Ağrı İbrahim Çeçen University, Turkiye)

Assoc Prof. Aykut ÖZTEKİN (Ağrı İbrahim Çeçen University, Turkiye)

Assoc. Prof. Ahu Arslan YILDIZ (İzmir Institute of Technology, Turkiye)

Assoc. Prof. Barbaros DİNÇER (R. Tayyip Erdoğan University, Turkiye)

Assoc. Prof. Burak DERKUŞ (Ankara University, Turkiye)

Assoc. Prof. Demet ERDÖNMEZ (Düzce University, Turkiye)

Assoc.Prof. Dr. Derya BERİKTEN (Kütahya Sağlık Bilimleri University, Turkiye)

Assoc. Prof. Deryanur KILIÇ (Atatürk University, Turkiye)

Assoc. Prof. Dilek GÖKTÜRK (Adana Alparslan Türkeş Science and Technology University, Turkiye)

Assoc. Prof. Fatih INCI (Bilkent University, Turkiye)

Assoc. Prof. Fevzi TOPAL (Gümüşhane University, Turkiye)

Assoc.Prof. Hatice İmge OKTAY BAŞEĞMEZ (Adana Alparslan Türkeş Science and Technology University, Turkiye)

Assoc. Prof. İhsan ALACABEY (Mardin Artuklu University, Turkiye)

Assoc. Prof. Melek ÇOL AYVAZ (Ordu University, Turkiye)

Assoc. Prof. Mine AKSOY (Atatürk University, Turkiye)

Assoc. Prof. Ramazan KALIN (Erzurum Technical University, Turkiye)

Assoc. Prof. Sibel ÖZDAŞ (Adana Alparslan Türkeş Science and Technology University, Turkiye)

Assoc. Prof. Tuğba TAŞKIN TOK (Gaziantep University, Turkiye)

Assos. Prof. Tugba GURKOK TAN (Çankırı Karatekin University, Turkiye)

Assoc. Prof. Ümit Hakan YILDIZ (İzmir Institute of Technology, Turkiye)

Assoc. Prof. Veyis KARAKOÇ (Çankırı Karatekin University, Turkiye)

Assist Prof. Dr. Ahmet TULEK (Igdir University, Turkiye)

Assist. Prof. Ali ATASEVER (Atatürk University, Turkiye)

Assist. Prof. Çağlar ELBÜKEN (Bilkent University, Turkiye)

Assist. Prof. Hasan DEMİRCİ (Koç University, Turkiye)

Assist. Prof. Rahime Ozlem Oztopuz (Canakkale 18 Mart University)

Assist. Prof. Yeşeren SAYLAN (Hacettepe University, Turkiye)

Organizing Committee

Prof. Mustafa Kemal SEZGİNTURK (Canakkale 18 Mart University, Turkiye)

Prof. Serdar KARAKURT (Selçuk University, Turkiye)

Assoc. Prof. Derya BERİKTEN (Kütahya Sağlık Bilimleri University, Turkiye)

Assoc. Prof. Mehtap TUGRAK SAKARYA (Tokat Gaziosmanpasa University, Turkiye)

Assist Prof. Ali Erkan AŞCI (Tokat Gaziosmanpasa University, Turkiye)

Assist Prof. Arwa M. AMIN (Tokat Gaziosmanpasa University, Turkiye)

Assist Prof. Figen GUZELGUL (Tokat Gaziosmanpasa University, Turkiye)

Assist Prof. İbrahim Serkan AVSAR (Tokat Gaziosmanpasa University, Turkiye)

Assist Prof. Metin CAPA (Tokat Gaziosmanpasa University, Turkiye)

Assist Prof. Ahmet TULEK (Igdir University, Turkiye)

Lec. Murat UNALMIS (Amasya University, Turkiye)

Gamze OZTURK (Tokat Gaziosmanpasa University, Turkiye)

Cihat ZULFUOGULLARI (Tokat Provincial Health Directorate)

Hakan YILMAZER (Chamber of Pharmacists) CCY Sustainability Committee

Ousmane KOSSI MAHAMAT (Tokat Gaziosmanpasa University, Turkiye)

Numan AASHIQ WANİ (Tokat Gaziosmanpasa University, Turkiye)

Abdelrahman MOHAMED ABDELAZIZ (Tokat Gaziosmanpasa University, Turkiye)

Kübra Nur KÖSTEK (Tokat Gaziosmanpasa University, Turkiye)

Zeynep Dila YANAR (Tokat Gaziosmanpasa University, Turkiye)

İrem Gül ÇİNİKAYA (Tokat Gaziosmanpasa University, Turkiye)

Ceylin ORAKCI (Tokat Gaziosmanpasa University, Turkiye)

Şule CEBESOY (Tokat Gaziosmanpasa University, Turkiye)

Seda KIRAN (Tokat Gaziosmanpasa University, Turkiye)

Esma İŞİM (Tokat Gaziosmanpasa University, Turkiye)

Ayşegül PALA (Tokat Gaziosmanpasa University, Turkiye)

Elifnaz BUYUKKALE (Tokat Gaziosmanpasa University, Turkiye)

Feyza GÜR (Tokat Gaziosmanpasa University, Turkiye)

Ahmet Emirhan ACAR (Tokat Gaziosmanpasa University, Turkiye)

Sustainibility Committee

Prof. Ahmet COLAK (Karadeniz Technical University, Turkiye)

Prof. Ali KILINC (Ege University, Turkiye)

Prof. Ali ALKAN (Karadeniz Technical University, Turkiye)

Prof. Hasan OZDEMIR (Atatürk University, Turkiye)

Hakan GUNER (on Behalf of Turkish Chemist's Society)

Congress Owner

Chem. İkram CENGIZ (Head of Turkish Chemist's Society)

6 EBAT EURASIA BIOCHEMICAL APPROACHES& TECHNOLOGIES CONGRESS
24-27 OCTOBER 2024 TOKAT

KİMYAGERLER DERNEĞİ

TOKAT GAZİOSMANPAŞA ÜNİVERSİTESİ

6th EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIESCONGRESS SCIENTIFIC PROGRAMME

October 24, 2024 Thursday		
13:00-15:00	Registration	Registration Desk
15:00-15:30	15 Temmuz Kongre Merkezi Milli İrade Salonu	
	Opening Ceremony	
Session 1- Chair-Prof. Mehmet ODABAŞI		Milli İrade Salonu
15:30-16:05	**Invited Speaker (IS1) Prof. Sibel Ayşıl ÖZKAN**	
	Recent advances in molecularly imprinted polymer-based electrochemical sensors and their future prospects	
16:05-16:20	Oral Presentation (OP01)	Hamza HALICI
	Bee Venom as A Potential Therapeutic Agent Against Human Chronic Myeloid Leukemia Cells	
16:20-16:35	Oral Presentation (OP02)	Murat KÜÇÜK
	New Approaches in DPPH Radical Scavenging Method	
18:00-20:00	Dinner (Liva Restaurant)	

October 25, 2024 Friday		
Session 2- Chair-Prof. Harun BUDAK		Milli İrade Salonu
09:30-10:05	**Invited Speaker (IS3) Prof. Leena LATONEN**	
	Unraveling prostate cancer drug responses and treatment resistance through multimodal proteomics	
10:05-10:20	Oral Presentation (OP03)	Serdar KARAKURT
	Exploring the Anti-Cancer Potential of Animal Venoms in Colorectal Carcinoma Treatment	
10:20-10:35	Oral Presentation (OP04)	Zeynep KARAKÖY
	The Effect of Inhaled Ozone Therapy in Two-Hit Rat Model of Lipopolysaccharides-Induced Acute Lung Injury and Bleomycin-Induced Pulmonary Fibrosis	
	Great Filtration Efficiency and In vitro Efficacy of Cellulose Acetate Nanofiber Filters for CBRN Protection	
10:50:11:20	Coffee Break	
Session 3- Chair-Prof. Serdar KARAKURT		Milli İrade Salonu
11:20-11:55	**Invited Speaker (IS4) Prof. Elif CADIRCI**	
	5-HT7 receptors as new therapeutic targets	
11:55-12:10	Oral Presentation (OP06)	Caglar BERKEL
	Differential expression of certain members of the gasdermin family among breast cancer subtypes in terms of receptor status	
12:10-12:25	Oral Presentation (OP07)	Ozlem OZTOPUZ
	Necrotizing enterocolitis: From the intestine to the lungs	
12:25-12:40	Oral Presentation (OP08)	Tünay KARAN
	Cytotoxic and Apoptotic Effect on Various Cell Lines of Glycyrrhiza glabra var. Glandulifera	
12:40-14:30	Lunch	
Session 4- Chair-Prof. Okan ACAR		Milli İrade Salonu
14:00-14:35	**Invited Speaker (IS4) Prof. Jesus LACAL**	

	Reproducing RASopathy patient-specific DNA variants for in vitro cellular and molecular analysis	
14:35-14:50	Oral Presentation (OP09)	Tuğba AĞBEKTAŞ
	Analysis of the Molecular-Level Effects of PDL-1 Gene Silencing on the MAPK Signaling Pathway in Colon Cancer Cells	
14:50-15:05	Oral Presentation (OP10)	Seda AŞKIN
	Promoting effect of Berberis vulgaris leaf extract on second-degree burn wound-healing through Tgf-ß1 and Vegf-α regulation	
15:05-15:20	Oral Presentation (OP11)	Elif ÇADIRCI
	Bromelain, a Group of Pineapple Proteolytic Complex Enzymes (Ananas comosus), alleviates Contrast Media Nephropathy	
15:20-16:00	**Poster Presentations**	
16:00-20:00	**Social Programme (City Tour and Mevlevi Ceremony)**	

October 26, 2024 Saturday		
Session 5 Chair-Prof. Serap EVRAN		Milli İrade Salonu
09:30-10:05	**Invited Speaker (IS5) Prof. Reinhard STERNER**	
	Retracing the Rapid Evolution of an Herbicide-Degrading Enzyme by Protein Engineering	
10:05-10:20	Oral Presentation (OP12)	Marwa ABDELMAGEED
	Evaluation of Copeptin Levels in COVID-19-Recovered Patients with and without Insomnia	
10:20-10:35	Oral Presentation (OP13)	Melek KAYA
	Carbonic Anhydrase Inhibition by Green Tea Extracts Prepared at Different pH's	
10:35-10:50	Oral Presentation (OP14)	Arda AYTİMUR
	Production of Antimicrobial Nanocomposite Films with Silver Nanoparticles using the Green Synthesis Method	
10:50:11:20	Coffee Break	
Session 6- Chair-Prof. Gözde BAYDEMİR PEŞİNT		Milli İrade Salonu
11:20-11:55	**Invited Speaker (IS6) Prof. Gulberk Ucar**	
	Targetting Epithelial-Mesenchymal transition. (EMT) in Cancer Treatmen	
11:55-12:10	Oral Presentation (OP15)	Emir Enis YURDGÜLÜ
	Effects of Boron Nitride-Cyclodextrin Complex-Based Nanosuspensions on A549 Cells and In-Vitro Characterization	
12:10-12:25	Oral Presentation (OP16)	Neşe Başak TÜRKMEN
	Reproductive Toxicity Of Paclitaxel And Protective Effect Of Nerolidol	
12:25-12:40	Oral Presentation (OP17)	Kemal BAŞ
	Antibacterial PVA-AgNP Hydrogel Synthesis, In Vitro Cytotoxic Effect and Wound Healing Potential	
12:40-14:00	Lunch	
Session 7- Chair-Prof. Murat KÜÇÜK		
14:00-14:35	**Invited Speaker (IS7) Prof. Winfried Hausner**	
	Transcriptional regulation in Archaea	
14:35-14:50	Oral Presentation (OP18)	Narasimha Rao DESİRAZU

	Methylome and Acetyl-proteome Profiling of *Helicobacter pylori*	
14:50-15:05	Oral Presentation (OP19)	Özkan FİDAN
	Microbial production of carotenoids in engineered endophytic *Pseudomonas sp.* 102515	
15:05-15:20	Oral Presentation (OP20)	Ramazan ERENLER
	Synthesis of Silver Nanoparticles using *Trifolium pratense* L. Leaves: Characterisation and Evaluation of Biological Activity	
15:20-16:00	**Poster Presentations**	
16:00-19:00	**Social Programme (Ballıca Cave Tour)**	

October 27, 2024 Sunday		
	Short Oral Presentations	
	Chair: Prof. Ali DİŞLİ	Chair: Prof. Nagihan SAĞLAM ERTUNGA
	Şehitler Salonu	Milli İrade Salonu
09:30:09:35	Oral Presentation (OP21) Aysun İNAN GENÇ	Oral Presentation (OP36) Atike DOĞAN
	Modulation of Short-Chain Fatty Acid Metabolism in COVID-19 Patients	Investigation of Synergistic Effects of Resveratrol and PEMF exposure on Caspase-12 Gene Expression in Glioblastoma Cells
09:35-09:40	Oral Presentation (OP22) Esra SEYRAN	Oral Presentation (OP37) Ali Arda CİRİTCİOĞLU
	Mapping of Aspirin-Dependent Acetylation on Von Willebrand Factor	Ag Coated Quantum Dot Off-On Mechanism Based Detection for Accurate and Quick Folic Acid Assays
09:40-09:45	Oral Presentation (OP23) Rahime Şeyma KOÇAK	Oral Presentation (OP38) Nurdan AKDOĞAN
	Synthesis, Characterization and Investigation of Antiproliferative Activities on Different Cancer Cell Lines of Imine Compounds	Synthesis of Tetrazole-linked Phenothiazines as Cholinesterase Inhibitors: In vitro Approach Combined with Molecular Docking
09:45-09:50	Oral Presentation (OP24) Eda GÜNAY	Oral Presentation (OP39) Begüm DÖNMEZ
	The Biochemical Effects of Nitric Oxide and Brassinosteroid on Two Wheat Varieties Under Drought Stress	Synthesis, Characterization and Investigation Biological Activities of Schiff Base Metal Complexes
09:50-09:55	Oral Presentation (OP25) Müge TEKER YILDIZ	Oral Presentation (OP40) Meryem Şenay ŞENGÜL DEMİRAK
	Comparison of Two *Bacillus* Species Isolated from Çanakkale Lapseki Coastal Zone on Barley under Salt Stress	Odorant Binding Protein Based Biosensors Mimicking the Mosquito Olfactory System

09:55-10:00	Oral Presentation (OP26) Oktay BIYIKLIOĞLU	Oral Presentation (OP41) Pırıl ARISOY
	Determination of bioactivity properties of some honeys produced in the Western Black Sea region.	Development of Column Packing Material with Monosize Spheres for the Determination of Ergosterol in Foods
10:00-10:05	Oral Presentation (OP27) Serhat KARABICAK	Oral Presentation (OP42) Gamze BALTACIER
	Determination of bioactivity properties of some propolis produced in the Western Black Sea region.	Effect of Hydrogen Sulfide on Antioxidant Capacity in Barley Under Drought Stress
10:05-10:10	Oral Presentation (OP28) Şeydanur AVCI	Oral Presentation (OP43) Mehmet Hüseyin ALKAN
	Anti-inflammatory Activities of Carvedilol and/or Melatonin on A549 Cells	Determinatıon of Antıdiabetic Propertıes of *Salvia multicaulis* Vahl. Species Collected from Different Localities
10:10-10:15	Oral Presentation (OP29) Büşra İrem ŞİMŞEK	Oral Presentation (OP44) Onur Cem ALTUNOLUK
	Effects of GS-441524 on Cell Viability in Lung Cancer Cells (A549)	Newly synthesized 1,4–naphthoquinone derivative molecule based potentiometric sensor and its greenness assessment
10:15-10:20	Oral Presentation (OP30) Yusuf Anıl AY	Oral Presentation (OP45) Didem MİMİROĞLU
	Effects of Sodium Borate Nanoemulsions on A549 Cell Line and In-Vitro Characterization	The Dual Effect of Topography and Electrical Conductivity Enhances Neural Cell Activity
10:25-10:30	Oral Presentation (OP31) Emirhan KIVANÇ	Oral Presentation (OP46) Kağan KILINÇ
	Evaluating the Antiproliferative Effects of Propolis Nanoemulsions on A549 Cells	Protective Effect of *Rosa canina* L Against Cisplatin Induced Nephrotoxicity and Hepatotoxicity
10:30-10:35	Oral Presentation (OP32) Aylin AYDIN	Oral Presentation (OP47) İlke KARAKAŞ
	The Potential Anticancer Activity of Hordenine Against Metastasis and Cell Migration in MCF-7 Cells	Determination of Antibiotic Resistance Profiles of Bacteria Isolated from Gökçeada Salt Lake Soil Samples
10:35-10:40	Oral Presentation (OP33) İnci Uludağ ANIL	Oral Presentation (OP48) Şükran GÜNAYDIN
	Electrochemical Aptasensor for Sensitive Detection of Food Allergen ARAH1	As natural antimicrobial agents: Cell-free culture filtrate of *Aspergillus niger* and *Rhizomucor pusillus*
10:40-10:45	Oral Presentation (OP34) Nurşah Hüma TATOĞLU	Oral Presentation (OP49) İlke KARAKAŞ
	Bacterial Cellulose Production and Characterization	Antioxidant Activity Potentials of Olive Mill Waste Water and Pomace in Çanakkale Province
10:45-10:50	Oral Presentation (OP35) Melek ÇOL AYVAZ	Oral Presentation (OP50) Osman Nuri ASLAN

	Antimicrobial and Antioxidant Evaluations of Festuca lazistanica subsp. giresunica	Synthesis and biological evaluation of rhodanine analogues containing sulfonate groups as potential aldose reductase inhibitors
10:50-12:00	Closing Session	
	Awards for Poster Presentations	
	Closing Ceremony	

POSTER PRESENTATIONS

PP01	**Adam Mougou MAHAMAT**
	Green Synthesis of Silver Nanoparticles and Their Application: Antimicrobial Activity
PP02	**Bahar YAVUZ**
	Investigation of Antibiotic Adsorption Potential of Agricultural Waste-Based Activated Carbon
	Measurement of Cytottoxic Effect of Selenium Nanoparticles on Human Thyroid Cancer Cells
PP04	**Sude KOCABIYIK**
	Protein-rich Macrovipera Lebetinus Snake Venom from Turkiye Inhibits Proliferation, Migration and Invasion of Colon Cancer
PP05	**Seher GULER**
	Extraction of Juglans Sporopollenin Exine Capsules, Removal of Allergenic Content and Use in Drug Delivery
PP06	**Yeliz DEMİR**
	Investigation of In Vitro Effects of Carboxylic Acid Derivatives Containing Pyrazole Group on NADPH-Dependent Aldose Reductase Enzyme
PP07	**Cenk ERDOĞAN**
	Antifouling and Anticorrosive Properties of Poly(N-methylaniline) film Containing of Different Concentrations of ZnO Nanoparticles on Stainless Steel
PP08	**Büşra ÇEVİK**
	Effects of Heavy Metal Stress on Seedling Growth and Antioxidant Enzymes in Sorghum (Sorghum bicolor (L). Moench)
PP09	**Veyis KARAKOÇ**
	Design of a new dialysis membrane for removal of Fe 3+ ions from thalassemia patients
PP10	**Fatıma Zehra YILMAZ**
	Effects of the Plant Phenolic Compound Resveratrol on Prostate Cancer and Glutathione S-Transferase Enzyme Involved in the Metabolism of Chemotherapeutic Drugs
PP11	**Elif BOZKIR**
	Investigating the Molecular Effects of Resveratrol on Prostate Cancer and Its Influence on the CYP3A4 Isoform Involved in Chemotherapeutic Drug Metabolism
PP12	**Sena ÖZYİĞİT**
	Mapping Regulatory Networks and Discovering Drug Candidates in Pediatric Retinoblastoma
PP13	**Sueda Nur ELLİALTIOĞLU**
	Saffron Pigments as a Natural Staining Agent for Saccharomyces cerevisiae Cell Wall Analysis Using Fluorescence Microscopy

PP14	**Elif BEKMEZCİ**
	Resveratrol's Impact on Prostate Cancer: Inhibition of Metastasis and Colony Formation via NQO1 Modulation
PP15	**Nilay TUFAN**
	Investigation of the Cytotoxic Effects of Silver Zeolite Nanofibers Produced by Electrospinning Method on HaCaT Cell Line
PP16	**Ali DİŞLİ**
	Synthesis, Characterization, and Anticancer Activity of New Purine Derivatives
PP17	**Muhammed Yusuf ZORLU**
	Synthesis, Structural Characterization and In Silico Approaches of New Drug Candidate Molecules
PP18	**Nagihan SAĞLAM ERTUNGA**
	DNA Binding Studies of Three New Bis(azo-imine) Based Transition Metal Complexes
PP19	**İsmail KIZMAZ**
	Investigation of Enzyme Activities of Enzyme-Inorganic Hybrid Nanoflowers (Ei-hNFs) Synthesized by Different Methods
PP20	**Melisa Şima YÜKSEL**
	Determination of the Antioxidant Properties of Papaveris Folium Ethanol Extract
PP21	**Seyit Batuhan DUDAK**
	The Effect Of Bio-Priming Applications With Rhizobacteria (PGPR) And Salicylic Acid Derivative On Germination and Seedling Growth In Wheat Plant Under Salt Stress
PP22	**Esma Kübra KAĞAN YENİÇERİ**
	Investigation of Anticancer and Antioxidant Properties of Potentilla recta Plant on Different Cancer Cell Lines
PP23	**İkra PİRBUDAK**
	Exploring the Cytotoxic and Antioxidant Properties Hedysarum candisissimum on the A549 Cell Line.
PP24	**Kardelen Damla ALKIM**
	Investigation of Anticancer and Antioxidant Potentials of Pastinaca erzincanensis on HeLa Cell Line
PP25	**SAYGIN ALTÜRK**
	Development of L-Proline Imprinted Nanofilm-Coated Surface Plasmon Resonance Sensors for Diagnosis and Monitoring of Esophageal Cancer and Hyperprolinemia
PP26	**Sinan KANDIR**
	Extremely Low-Electromagnetic Field: Friend or Foe against the Neurons? A Scoping Review of Last Decade (2014-2024) from Omics Perspective
PP27	**Mehmet Hüseyin ALKAN**
	Determination of Essential Oil and Aroma Content of Origanum onites L. by GC-MS
PP28	**Melike YILDIRIM AKATIN**

	DNA Interaction and α-Glucosidase Inhibition Potential of a Newly Synthesized Zn(II) Phthalocyanine Complex
	Decolorization of Congo Red Dye with HRP Enzyme Purified by Aminobenzohydrazide-based Affinity Chromatography
PP30	**Şebnem SELEN İŞBİLİR**
	Synthesis of Silver Nanoparticle Using Olive Leaves (Domat var.)
PP31	**Hava İLKAYA**
	Preparation and Characterization of Magnetic Enzyme-Inorganic Hybrid Nano Flowers
PP32	**Ebrar GEZER**
	Molecular Signatures of Polycystic Ovarian Syndrome Identified by Integrative Bioinformatics Approach
PP33	**Onur Cem ALTUNOLUK**
	Selective and fast potentiometric determination of local anesthetic procaine in pharmaceutical samples
PP34	**Tuğba GÜRKÖK TAN**
	Identification of Salt and Drought Stress Related Hub Genes in Arabidopsis thaliana
PP35	**Zeynebe BİNGÖL**
	Determination of Antioxidant Capacity of Waxflower Plant and Examination of Inhibition Effect on Carbonic Anhydrase Isoenzymes
PP36	**Emrah DEMİRBAŞ**
	Development of Bone Biomarker Biosensor for Diagnosis and Monitoring of Some Bone Diseases
PP37	**Caglar BERKEL**
	The synthesis, anti–bacterial and sensor properties of newly synthesized rhodanine derivative molecules
PP38	**Ahmet CETİNKAYA**
	Fabrication of MXene-supported molecularly imprinted polymer-based electrochemical sensor for specific recognition and determination of uracil
PP39	**Pınar TAŞER GÜLLER**
	In vitro and In silico Evaluation of the Inhibitory Effect of 4-nitro-N-(furan-2-ylmethyl)-N-(3-nitrophenyl)benzamide on Acetylcholinesterase and Butyrylcholinesterase
PP40	**Uğur GÜLLER**
	Antioxidant Activities of Clli 1392, Crystal, and Clark Flaxseed (Linum Usitatissimum L.) Species
PP41	**Behiye TAŞER**

	Investigation of Antibacterial Activity of 4-Ethylresorcinol and 2,5-Dimethylresorcino
PP42	**Nisanur KARACA**
	Combinatorially Synthesized Triazole and Benzenesulfonamide Hybrid Carbonic Anhydrase Inhibitors
PP43	**Selenay SADAK**
	Design and Applications of Electrochemical Nanozyme Platform Consisting of Magnetic Nanomaterials and Inorganic Nanomaterials
PP44	**Meraki Gülsüm ECE**
	Preparation of MIP-Based Electrochemical Sensor Surfaces: Utilization in the Selective Detection of L-Citrulline Amino Acid
PP45	**Oktay BIYIKLIOĞLU**
	Determination of bioactivity properties of some bee breads produced in the Western Black Sea region
PP46	**Bengi USLU**
	Electrochemical And Spectroscopic Approaches On The Interaction Of Nabumetone With Double-Stranded Dna
PP47	**Cigdem KANBES-DİNDAR**
	Novel Nano Plasma Carbon Decorated Electrochemical Sensor For Highly Selective Determination of Salicylic Acid
PP48	**Cigdem KANBES-DİNDAR**
	Evaluating the Interaction Between the Antiviral Drug Entecavir and Double-stranded DNA Using Electrochemical and Spectroscopic Methods
PP49	**Ipek KUCUK**
	Investigation of Electrochemical Properties Associated with the Sensitive and Selective Quantification of Cinecalcet Using a Sensor Based on Molecularly Imprinted Polymer
PP50	**Serhat KARABICAK**
	Determination of bioactivity properties of some bee pollens produced in the Western Black Sea region.
PP51	**Kübra TURAN**
	Development of a Novel Electrochemical MIP-based Sensor for Early Diagnosis of Alzheimer's Disease
PP52	**Nazlıcan CANDAŞ**
	Ultrasensitive Electrochemical Detection of Hepatocellular Carcinoma Biomarker Alpha-fetoprotein

PP53	**Kübra ASLAN**
	Evaluation of the anti-oxidant, anti-diabetic anticholinergic, and anti-glaucoma effect of Hackberries (Celtis australis) from the western region of Türkiye

INVITED SPEAKERS ABSTRACTS

IS01

Recent advances in molecularly imprinted polymer-based electrochemical sensors and their future prospects

Sibel A. Ozkan

Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, Ankara, Türkiye

**sibel.ozkan@pharmacy.ankara.edu.tr*

Molecular imprinting technology, which forms molecularly imprinted polymers (MIPs), is a creative method that enables synthetic biorecognition gaps to imitate real biological derivatives like antibodies, receptors, enzymes, etc,. After removing the target analyte, synthetic cavities enable the recognition and selective rebinding of the template. In this case, molecular imprinting technology offers biosimilar receptors with higher specific affinities and better stability than natural receptors and biomolecules[1]. Although stable and durable MIPs seem relatively easy to create to achieve maximum efficiency, some optimization parameters should be considered, such as appropriate functional monomer and crosslinker and optimal ratios between functional monomer, template, and crosslinker[2]. The optimization process can vary based on the polymerization technique (electropolymerization, photopolymerization, and thermal polymerization). It was reported that template monomer interactions are realized through non-covalent interactions such as van der Waals forces, hydrogen bonds, and dipolar interactions. Among them, MIP-based electrochemical sensors have a significant place because, with MIPs, it is possible to overcome the lack of selectivity issue in electrochemical sensors.

Nanomaterials, famous for their prominent electron transfer capacity and specific surface area, are increasingly employed in modifications of MIP sensors. Unlike traditional electrochemical sensors, nanomaterials-based MIP sensors have excellent sensing and recognition capabilities. Nanomaterial embeded MIP-based electrochemical sensors and miniature electrochemical transducers can detect target analytes in situ. Thanks to superior chemical and physical stability, low-cost manufacturing, high selectivity, and fast response, MIPs have become an interesting field recently. Moreover, without requiring time-consuming preparation procedures, these sensors have been successfully used in biological fluids and pharmaceutical samples.

The text of abstract should be formatted as follow: Calibri, 11 pt, regular, 1.15 line spacing, justified. Citations should be numbered in the text, indicated by superscript after punctuation. The list of references at the end of the abstract should be given in order of their first appearance in the text. For example; Text.[1 or 2-4]

References:

1) L. Uzun, A.P.F. Turner, Molecularly-imprinted polymer sensors: realising their potential, Biosens. Bioelectron. 76 (2016) 131e144.

2) A.M. Mostafa, S.J. Barton, S.P. Wren, J. Barker, Review on molecularly imprinted polymers with a focus on their application to the analysis of protein biomarkers, TrAC Trends Anal. Chem. 144 (2021) 116431.

IS02

Unraveling prostate cancer drug responses and treatment resistance through multimodal proteomics

Leena Latonen

Institute of Biomedicine, Department of Medicine and Faculty of Health Sciences, University of Eastern Finland, Kuopio, Finland

leena.latonen@uef.fi

Prostate cancer is one of the leading male cancers worldwide. While efficient treatment modalities exist for primary, organ-confined prostate cancer, no curative treatments currently exist for metastatic and treatment resistant forms of the disease. Genetic aberrations occurring in prostate cancer have been thoroughly described, however, these efforts have been insufficient to reveal predictive subgroups or efficient additional therapy options to support current androgen receptor (AR)-targeted therapies.

To identify molecular pathways underlying prostate cancer treatment resistance, we have performed multimodal molecular analysis of patient samples of primary and treatment resistant prostate cancer. Comparing genetic, epigenetic, transcriptomic and proteomic information from the same tumors we have found that, in addition to genetic aberrations and transcriptional changes, also significant changes in the proteomes of prostate cancer occur during formation of treatment resistance. Further, we have performed bulk and single cell proteomics of prostate cancer cells to identify activated pathways and kinetics of events in prostate cancer cell drug responses. We utilize mass spectrometry-based SWATH, Tims-TOF, and SCoPE-single cell proteomics, and we have found that, especially, multiple RNA regulatory pathways are associated with prostate cancer drug responses and resistance. We are studying multiple RNA binding proteins (RBPs) further for their roles in prostate cancer cells to identify potentially targetable factors for development of future therapeutics.

IS03

5-HT7 receptors as new therapeutic targets

Elif ÇADIRCI

Atatürk University, Faculty of Medicine, Department of Pharmacology, Erzurum, Turkiye

elifcadirci@gmail.com

Serotonin (5-hydroxytryptamine, 5-HT) is a biological amine and the presence of 14 different receptor subtypes makes it easy to explain the broad physiological effects of this neurotransmitter. Serotonin plays a role in the pathophysiology of many diseases such as depression, anxiety, circadian rhythm, schizophrenia, bulimia nervosa, anorexia nervosa, asthma, inflammation, etc. It is known that chronic inflammation has a vital role in tumor carcinogenesis and tumor development[1]. 5-HT7 is also one of the most recently discovered but least characterized receptors for serotonin. The effects of 5-HT7 receptors on the peripheral expression of these receptors are very limited. In peripheral tissues, 5-HT7 receptor mRNA has been demonstrated in the ileum, spleen, endocrine glands, and arteries. Because of their presence on smooth muscles in the periphery, their possible effects have been investigated and it has been shown to play a role in irritable bowel syndrome[2].

The roles of these receptors in inflammatory processes, whose peripheral effects are less studied than their central effects, were studied by our research group[3]. It has been shown in our laboratories that an increase in 5-HT7 receptor mRNA expression has been shown in liver damage induced by different chemicals such as paracetamol, ethanol and carbon tetrachloride, and it has been shown that both the damage and this expression increase regress when a 5-HT7 receptor agonist is applied[4]. An increase in the expression of 5-HT7 receptors was observed in these cancers, and a significant anticancer effect was demonstrated in the treatment with a receptor antagonist. Thus, it has been shown that 5-HT7 receptors are involved in the development and treatment of cancer as well as playing a role in many physiological mechanisms in the central nervous system. The expression of these receptors was higher in breast, prostate and gastric cancerous tissues compared to healthy tissues[3-4]. The increased expression of 5-HT7 receptors in cancer tissues suggested that these receptors may be increased to contribute the bad prognosis in cancer and/or rebound mechanism of the defense system.

Acknowledgment: These studies were supported by TÜBİTAK-112S627 and TÜBİTAK-214S006.

References:

1). Coussens LM, Werb Z. Inflammation and cancer. Nature. 2002;420(6917):860-7.
2) Hedlund PB. The 5-HT7 receptor and disorders of the nervous system: an overview. Psychopharmacology. 2009;206(3):345-54.
3) Albayrak A, Halici Z, Cadirci E, Polat B, Karakus E, Bayir Y, et al. Inflammation and peripheral 5-HT7 receptors: the role of 5-HT7 receptors in carrageenan induced inflammation in rats. European journal of pharmacology. 2013;715(1-3):270-9.
4. Cinar I, Sirin B, Halici Z, Palabiyik-Yucelik SS, Akpinar E, Cadirci E. 5-HT7 receptors as a new target for prostate cancer physiopathology and treatment: an experimental study on PC-3 cells and FFPE tissues. Naunyn-Schmiedeberg's archives of pharmacology. 2021;394(6):1205-13.

IS04

Reproducing RASopathy patient-specific DNA variants for in vitro cellular and molecular analysis

Jesus LACAL

Functional Genetics of Rare Diseases Laboratory Biomedicine of Rare Diseases Division of Genetics - University of Salamanca (USAL)

Institute of Biomedical Research of Salamanca (IBSAL), Campus Unamuno, Edificio Departamental – 324, 37007, Salamanca (Spain)

jlacal@usal.es

RASopathies, including Neurofibromatosis type 1 (NF1), Legius syndrome (LS), and Noonan syndrome (NS), are a group of rare genetic diseases caused by germline mutations in the RAS/MAPK signaling pathway. Our laboratory is dedicated to understanding the molecular mechanisms behind these conditions. We work with DNA from pediatric patients identified at the Rare Disease Unit of the University Hospital of Salamanca. Through genetic engineering, we reproduce patient-specific DNA variants in lentiviral vectors, followed by extensive cell and molecular analysis. This study specifically aims to elucidate the molecular mechanisms of LS, focusing on genotype-phenotype correlations and cancer risk. Using in silico analysis of SPRED1 variants from databases we examined the mutational landscape of SPRED1. Eleven variants, including two from our patients, were analyzed in vitro to assess their impact on SPRED1 protein levels and their effect on ERK, AKT, p38, and p53 expression and activation. The study highlights the dysregulation of the RAS/MAPK pathway in LS and suggests potential links to other signaling pathways, offering new insights into the disease's molecular underpinnings.

IS05

Retracing the Rapid Evolution of an Herbicide-Degrading Enzyme by Protein Engineering

Reinhard Sterner

Institute of Biophysics and Physical Biochemistry, Regensburg Center for Biochemistry, University of Regensburg, D-93040 Regensburg, Germany.

reinhard.sterner@ur.de

The mechanisms underlying the rapid evolution of novel enzymatic activities from promiscuous side activities are poorly understood. Recently emerged enzymes catalyzing the catabolic degradation of xenobiotic substances that have been spread into the environment only during the last decades provide an exquisite opportunity to study these mechanisms. A prominent example is the herbicide atrazine (2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine), which is degraded by several consecutive enzymatic reactions, constituting the Atz pathway. We analyzed the evolution of the hydroxyatrazine ethylaminohydrolase AtzB, a Zn(II)-dependent metalloenzyme that adopts the popular amidohydrolase fold and catalyzes the second step of the Atz pathway. We started by searching for promiscuous side activities of AtzB, which might point to the identity of its progenitor. These investigations revealed that AtzB has a low promiscuous guanine deaminase activity. Furthermore, we found that the two closest AtzB homologues, which have not been functionally annotated up to now, are guanine deaminases with modest promiscuous hydroxyatrazine hydrolase activity. Based on sequence comparisons with the closest AtzB homologues, the guanine deaminase activity of AtzB could be increased by three orders of magnitude by only four active site mutations. Interestingly, the inverse four mutations introduced into AtzB homologues resulted in a hydroxyatrazine hydrolase activities that in one case even equaled that of wild-type AtzB. Molecular dynamics simulations elucidated the structural and molecular basis for the mutation-induced activity changes. The example of AtzB highlights that novel enzymes with high catalytic proficiency can evolve from low promiscuous side activities by only few mutational events within a short period of time.

References:

Markus R. Busch, Lukas Drexler, Dhani Ram Mahato, Caroline Hiefinger, Sílvia Osuna & Reinhard Sterner (2023). *ACS Catalysis* **13**, 15558-15571.

IS06

Targetting Epithelial-Mesenchymal Transition (EMT) in Cancer Treatment

Gulberk UÇAR[1], Burçin ÖZÇELİK[2], Seyhan TURK[1], İpek BAYSAL[3], Açelya ERİKÇİ[4], Bercis İmge Uçar GÖKER[5], Alper Bektaş İSKİT[6].

[1] *Department of Biochemistry, Faculty of Pharmacy, Hacettepe University, Ankara, Türkiye*
[2]*Department of Molecular Biology and Genetics, Hitit University, Corum, Türkiye*
[3]*Department of Pharmacy Services, Hacettepe University, Ankara, Türkiye*
[4]*Department of Biochemistry, Faculty of Pharmacy, Lokman Hekim University, Ankara, Türkiye*
[5]*Department of General Surgery, Faculty of Medicine, Kutahya Health Sciences University, Türkiye*
[6]*Department of Medical Pharmacology, Faculty of Medicine, Hacettepe University, Ankara, Türkiye*
gulberk.ucar@gmail.com

Cancer, a leading global health concern, is characterized by uncontrolled cell proliferation, resulting in a myriad of complications. The identification of specific molecular markers associated with various cancer types has paved the way for targeted therapies and personalized medicine. Among these markers, the epithelial-mesenchymal transition (EMT) has garnered significant attention due to its pivotal role in cancer metastatic spread and treatment resistance.

EMT is a complex process involving a cascade of molecular events wherein epithelial cells undergo a transformation. Since EMT involves a comprehensive reprogramming of epithelial cells, leading to a loss of their characteristic cellular adhesion and polarity, while simultaneously acquiring mesenchymal traits, it is intricately linked to invagination, migration, plasticity, and malignancy. EMT is instrumental in the malignant progression of neoplasms, contributing significantly to the increased metastatic potential and therapy resistance in cancer cells. Interaction among cancer cells in the tumor microenvironment has been shown to induce EMT by auto- and ⁄ or paracrine secretion of mediators such as growth factors, cytokines, and ECM proteins.The understanding EMT will enable elucidation of the complex molecular and cellular dynamics underlying tumor progression and will also pave the way for new and more effective therapeutic approaches. Recently, addressing EMT represents a significant challenge in the development of advanced cancer therapeutics.

Colorectal cancer (CRC) is the second-leading cause of cancer-related death in the World. EMT has become a hot issue in CRC because strong inducers of EMT (such as TGF-β) can initiate EMT and regulate metastasis, microenvironment, and immune system resistance in CRC. Despite advances in cytotoxic and targeted therapy, resistance to chemotherapy remains as one of the greatest challenges in long-term management of incurable metastatic CRC. Although EMT has been found to play a critical role in CRC drug resistance and metastasis, the nature of the intrinsic links remains unclear. Current strategies for targeting EMT is to inhibit the EMT to prevent metastasis and invasionand to reverse the EMT to restore the epithelial characteristics of cancer cells, making them more sensitive to treatment.

Present study delves into the multifaceted factors that influence EMT regulation in cancer progression, metastasis and drug resistance, and summarizes the studies conducted by our cancer research group on targeting of EMT in cancer, especially colorectal cancer.

IS07

Transcriptional regulation in Archaea

Winfried Hausner

Institute of Microbiology and Archaea Centre, University of Regensburg, 93053 Regensburg, Germany

winfried.hausner@biologie.uni-regensburg.de

Archaeal transcription relies on a single RNA polymerase that is highly homologous to eukaryotic RNA polymerase II. Furthermore, the need for a TATA box binding protein, transcription factor B and transcription factor E in combination with a promoter consisting of a TATA box and a TFB recognition element for initiation maintain the close relationship to eukaryotic transcription. In contrast, the regulation of this process is mainly achieved by bacterial-like transcriptional regulators. Positive or negative regulation is mediated by binding of these transcription factors to promoter regions to allow transcriptional regulation of specific genes. We are interested in mechanistic details of such regulons using the hyperthermophilic euryarchaeon Pyrococcus furiosus as a model organism.

ORAL PRESENTATION ABSTRACTS

OP01

Bee Venom as A Potential Therapeutic Agent Against Human Chronic Myeloid Leukemia Cells

Hamza Halici[1], Harun Un[2], Saffet Celik[3], Zeynep Karaköy[4], Zafer Bayraktutan[5], Can Ozlu[6], Elif Cadirci[7*], Zekai Halici[7], Alptug Atila[8], Filiz Mercantepe[9]

[1]Department of Hınıs Vocational Training School, Ataturk University, Erzurum/ Turkey
[2]Department of Biochemistry; Agri Ibrahim Cecen University, Faculty of Pharmacy, Ağrı / Turkey
[3]Trakya University, Technological Research, Development and Design Application and Research Center, Edirne/Turkey
[4]Department of Pharmacology; Erzincan Binali Yıldırım University; Faculty of Pharmacy; Erzincan/Turkey
[5]Department of Biochemistry; Faculty of Medicine; Ataturk University; Erzurum/Turkey
[6]Department of Internal Medicine; Division of Hematology; University of Health Sciences, Kütahya / Turkey
[7] Department of Pharmacology, Faculty of Medicine, Ataturk University, Erzurum/ Turkey
[8]Department of Analytical Chemistry, Ataturk University Faculty of Pharmacy; Erzurum/ Turkey.
[9]Department of Internal Medicine; Division of Endocrinology; Ataturk University, Faculty of Medicine, Erzurum / Turkey
**ecadirci@atauni.edu.tr*

Honey, a bee and bee product, as old as human history; is seen that it was used as a healing source in many inscriptions and ruins in every period of its history. Propolis, pollen, royal jelly and beeswax, which are the honey and products they produce, have been used by people for thousands of years to treat many diseases [1].The antiproliferative effects of bee venom on K-562 chronic myeloid leukemia cells were researched in this study. The cells proliferated in the incubator were firstly counted with a cell counter. Afterward, these cells were performed culture to 96-well cell plates for MTT testing, in a way to $1x10^4$ cells / 100µl medium to per well and $1x10^5$ cells / 500µl medium to per well of 24-cell plates for the drug-cell interaction test. Later, drugs were given to the wells in determining doses. The effects of bee venom on cell viability at 24th, 48th and 72nd hours and on drug-cell interaction were researched. According to MTT results, it was found that bee venom decreased K-562 cell viability in all hours depending on the dose. It was found that cell numbers decreased at 48th and 72nd hours after drug applications. Nonetheless, it was found that the cell numbers increased during 72 hours in the control group that was not administered a medication. When the drug interactions were analyzed, it was found that the cell surfaces, which were plain and clear before the medicine was administered, gradually distorted and began to shrink after that time the medicine was administered. As a result, it has been found that bee venom has a strong antiproliferative effect in K-562 chronic myeloid leukemia cell lines with increasing doses.

References:

1) Kocot J, Kiełczykowska M, Luchowska-Kocot D, Kurzepa J and Musik I. Antioxidant potential of propolis, bee pollen, and royal jelly: Possible medical application. Oxidative Medicine and Cellular Longevity. 2018: (2018).

OP02

New Approaches in DPPH Radical Scavenging Method

Murat Küçük[a,*], Melek Kaya[b], Ovijet Chandra Kuri[a], Hacer Doğan[c]

[a] *Department of Chemistry, Faculty of Science, Karadeniz Technical University, Trabzon.*

[b] *Kocaeli University, Hereke Asım Kocabıyık Vocational School, Department of Chemistry and Chemical Processing Technologies, Cosmetic Technology Program, Hereke, Kocaeli.*

[a] *HÜBTUAM Scientific Technical Application and Research Center, Hitit University, Çorum.*

**Corresponding author's email: mkucuk@ktu.edu.tr*

The DPPH (1,1-diphenyl-2-picrylhydrazyl) scavenging antioxidant assay is the most widely used method to evaluate the antioxidant capacity of various substances, including plant extracts, synthetic compounds, and food products[1]. The assay is based on the ability of antioxidants to reduce the stable DPPH radical, resulting in a measurable decrease in absorbance at 517 nm. As a simple and rapid spectrophotometric method, it has become a standard procedure in antioxidant investigations.

Recent developments in DPPH assays include the incorporation of high-throughput screening techniques, enabling simultaneous analysis of multiple samples, advancements in instrumentation, such as the use of microplate readers, modifications to the traditional DPPH assay, such as the use of on-line approaches with HPLC.

New developments to DPPH scavenging activity method have been achieved in our group within several theses and research. One of them is the correction of errors in different experimental results in terms of IC_{50} values resulting from the use of different final concentrations of DPPH (25 µM, 50 µM, etc.). In another study we developed new approaches in the evaluation of radical scavenging activity by using spectrum or a two point measurement of absorbance instead of single point measurement at 517 nm. In a third study, we developed a totally different assay by including substrate in the test medium, making the method as one of substrate based antioxidant/antiradical methods.

All of the newly developed approaches in DPPH test were succesfuly applied on standard antioxidants and plant extracts.

Reference:

1) Gülçin, İ.; Alwasel, S. H., DPPH Radical Scavenging Assay, *Processes* 2023, *11*(8), 2248.

OP03

Exploring the Anti-Cancer Potential of Animal Venoms in Colorectal Carcinoma Treatment

Serdar KARAKURT

Selcuk University, Faculty of Science, Department of Biochemistry, Konya, Turkiye

**kserdar1@yahoo.com*

Venom from organisms such as scorpions, snakes, and bees has garnered significant interest in cancer research due to its potential therapeutic applications [1]. These natural toxins contain a complex mixture of bioactive molecules, including peptides, proteins, and enzymes, which exhibit diverse biological activities. Among their most notable properties is the ability to target and modulate cancer cell growth, making them valuable candidates for cancer treatment. Bioactive compounds such as peptides and proteins play a crucial role in their efficacy. For example, chlorotoxins in scorpion venom selectively inhibit the growth of cancerous cells, melittin in bee venom disrupts cancer cell membranes, induces apoptosis, and inhibits metastasis, while disintegrins and metalloproteinases interfere with cancer cell adhesion, migration, and invasion[2]. We investigated the venoms of *Macrovipera lebetinus* (snake), *Scorpio fuscus* (scorpion), and *Apis mellifera anatoliaca* (honeybee) against the proliferation of human colorectal carcinoma cells. The venoms dose-dependently inhibited the proliferation of colorectal carcinoma cells, with IC50 values of 6.12 µg/mL, 14.8 µg/mL, and 10.5 µg/mL, respectively. Additionally, the venoms inhibited cell migration and new colony formation in these cells. The mRNA expressions of 86 genes involved in the apoptotic pathway and colorectal carcinoma pathway were also investigated using pathway panels. Flow cytometric analysis demonstrated that the venoms specifically increased early apoptosis in the cells. In conclusion, the venoms of Macrovipera lebetinus, Scorpio fuscus, and Apis mellifera anatoliaca demonstrate significant anti-cancer properties against human colorectal carcinoma, warranting further investigation for potential therapeutic applications.

Keywords: Venom, Colorectal Carcinoma, *Macrovipera lebetinus* (snake), *Scorpio fuscus* (scorpion), and *Apis mellifera anatoliaca*

Acknowledgement: This study was supported by TUBITAK (Project No: 120Z942) and Selcuk BAP Project No: 24201004).

References:

1) Li L, Huang J, Lin Y. *Toxins (Basel).* **2018**, 10(9), 346.
2) Wehbe R, Frangieh J, Rima M, El Obeid D, Sabatier JM, Fajloun Z. Molecules. **2019,** 24(16), 2997.

OP04

The Effect of Inhaled Ozone Therapy in Two-Hit Rat Model of Lipopolysaccharides-Induced Acute Lung Injury and Bleomycin-Induced Pulmonary Fibrosis

Mine Celik[*1], Mehmet Koca[2], Zekai Halici[3], Taha Tavaci[4], Hamza Halici[5], Mustafa Ozkaraca[6], Zeynep Karaköy[7], Zafer Bayraktuttan[8]

[1] *Department of Anesthesiology and Reanimation, Istanbul Provincial Health Directorate, Istanbul Haseki Education And Research Hospital, Istanbul, Turkey*
[2] *Management Services General Directorate, Republic of Turkey Ministry of Health, Ankara, Turkey*
[3] *Department of Pharmacology, Faculty of Medicine, Ataturk University, Erzurum, Turkey*
[4] *Department of Pharmacology, Faculty of Medicine, Sakarya University, Sakarya 54050, Turkey*
[5] *Department of Hınıs Vocational Training School, Ataturk University, Erzurum 25600, Turkey*
[6] *Department of Pathology, Faculty of Veterinarian, Cumhuriyet University, Sivas 58070, Turkey*
[7] *Department of Pharmacology; Erzincan Binali Yıldırım University; Erzincan,Turkey*
[8] *Department of Biochemistry; Faculty of Medicine, Ataturk University; Erzurum/Turkey*

**mine.celik74@gmail.com*

Considering the limited treatment options for acute lung injury (ALI) and pulmonary fibrosis (PF), ozone treatment may be promising as a new immunological agent with its ability to modulate cytokines and interferons [1-2]. We aimed to investigate the effects of inhaled ozone therapy on both ALI and PF in rat models. A total of 48 albino Wistar male rats were included in the study. Lipopolysaccharide (LPS) was used to induce the ALI model, and bleomycin was used for the PF model. The effects of inhaled ozone (O3) were investigated using the ELISA method. Hematoxylin&eosin staining, Masson's trichrome staining, and immunohistochemical methods were used for histopathological evaluation. The cytokine levels in the ALI+0.08 ppm O3, ALI+0.12 ppm O3, PF+0.08 ppm O3, and PF+0.12 ppm O3 groups statistically decreased to the same extent and approached the levels of control animals. It was observed that cytokine levels in lung tissues were significantly and dose-dependently decreased compared to the untreated PF and ALI groups, respectively. While fibrosis was severe in the PF+0.08 ppm O3 group, it decreased to more moderate levels in the PF+0.12 ppm O3 group. The cytokine levels confirmed that inhaled ozone protected the lungs from both ALI and the development of PF.

References:

1) Zhu, W., Zhang, Y., & Wang, Y. (2022). Immunotherapy strategies and prospects for acute lung injury: Focus on immune cells and cytokines. *Frontiers in Pharmacology*, *13*, 1103309.
2) Ghonim MA, Boyd DF, Flerlage T, Thomas PG. Pulmonary inflammation and fibroblast immunoregulation: from bench to bedside. J Clin Invest. 2023 Sep 1;133(17):e170499. doi: 10.1172/JCI170499. PMID: 37655660; PMCID: PMC10471178.

OP05

Great Filtration Efficiency and *In vitro* Efficacy of Cellulose Acetate Nanofiber Filters for CBRN Protection

Irem Mukaddes BILGISEVEN[a], Serdar KARAKURT[a,b]

[a]*Institute of Health Sciences, Department of Chemical, Biological, Radiological and Nuclear Defense, Selcuk University, Türkiye*
[b]*Faculty of Science, Department of Biochemistry, Selcuk University, Türkiye*
irembilgiseven@gmail.com

CBRN threats, which include chemical and biological agents, are dangerous substances that can have fatal effects on living things. One of the highest exposures for both chemical warfare agents and biological warfare agents occurs through respiration. Biodegradable nanofiber filters developed for this purpose are of great interest in reducing plastic waste and promoting sustainability. Considered an almost inexhaustible source of raw materials with the increasing need for biodegradable biocompatible materials, cellulose is a potential candidate for green nanofiber air filter application[1]. For this purpose, cellulose acetate (CA) filter and CA + polyvinylpyrrolidone (PVP) filter were produced using the electro-spinning technique. The air permeability and filtration efficiency of filters were investigated using a permeability tester and an automatic filter tester. The filtration efficiency of CA nanofiber filters was 89.69%, and the filtration efficiency of CA + PVP nanofibers increased to 93.19%. The *in vitro* efficacy of the nanofibrous filters was investigated on healthy bronchial epithelial cells (BEAS-2B) so it was investigated whether they had a toxic effect on healthy cells by the Alamar Blue method. In addition, when the filters were exposed to formaldehyde vapor, a toxic effect was observed on the cells. The damage to cell morphology on BEAS-2B cells caused by filters exposed to formaldehyde vapor was photographed, thus determining that the filters retained formaldehyde. Nanofiber filters produced in the light of these data are a potential filtration candidate that can be used not only for air filtration but also for face masks, which are personal protective equipment.

Keywords: CBRN, Nanofiber filter, Cellulose acetate, Filtration efficiency, Toxicity

References

1) Tarrés, Q.; Boufi, S.; Mutjé, P.; Delgado-Aguilar, M. *Cellulose*, **2017**, *24*, 3943.

OP06

Differential expression of certain members of the gasdermin family among breast cancer subtypes in terms of receptor status

Caglar BERKEL[a]

[a]*Department of Molecular Biology and Genetics, Tokat Gaziosmanpasa University, TÜRKİYE*

**caglar.berkel@gop.edu.tr*

Breast cancer is the most common malignancy in women globally, with its incidence expected to increase by around 50% by 2040 compared to the present day[1]. This malignancy is classified into diverse molecular subtypes based on the status of estrogen receptor (ER), progesterone receptor (PR) and HER2 (ERBB2)[1]. These subtypes have large differences in terms of both treatment response and prognosis. TNBC (triple-negative breast cancer) is the most lethal among these subtypes[3]. Pyroptosis is a highly regulated pro-inflammatory cell death mechanism resulting in the formation of membrane pores mediated by gasdermin (GSDM) proteins[4]. Here, I first studied how the transcript levels of gasdermin family of genes (6 members present in humans: GSDMA-E and PJVK) differ between TNBC and non-TNBC. I found that the expression of GSDMC and GSDME was increased; whereas the expression of GSDMD was decreased in TNBC compared with non-TNBC. Later, I investigated ER-, PR-, and HER2-dependent changes in the expression of GSDMC, GSDMD and GSMDE. I found decreased GSDMC mRNA expression in breast tumors with ER-positive and PR-positive status than in those with ER-negative and PR-negative status, respectively. In contrast, HER2-positive breast tumors had higher expression of GSDMC compared to HER2-negative breast tumors. Unlike GSDMC, the expression of GSDMD was higher in ER-positive and PR-positive breast cancer samples than in ER-negative and PR-negative samples, respectively. I found that GSDME expression was lower in ER-positive breast tumors compared to ER-negative breast tumors. Finally, I found that breast tumors from premenopausal women had slightly higher transcript levels of GSDME than breast tumors from postmenopausal women. Combined, this study points to the possible differences in pyroptotic cell death between TNBC and non-TNBC, and also between different breast cancer subgroups defined based on receptor status (ER, PR or HER2).

References

1) Bray F, et al. CA A Cancer J. Clin. **2018.** 68, 394–424.
2) Turashvili G, Brogi E. Front. Med. **2017.** 4, 227.
3) Fallahpour S, et al. CMAJ Open **2017.** 5, E734–E739.
4) Berkel C, Cacan E. Inflammation. **2021.** 44(6):2203-2216.

OP07

Necrotizing Enterocolitis: From the Intestine to the Lungs

Mehmet Akif Ovalı*[1], Özlem Öztopuz[2], İhsan Karaboğa[3]

[1]*Çanakkale Onsekiz Mart University, Faculty of Medicine, Department of Physiology*

[2]*Çanakkale Onsekiz Mart University, Faculty of Medicine, Department of Biophysics*

[3]*Kırklareli University, Faculty of Medicine, Department of Histology and Embryology*

**Corresponding author's email address:maovali@hotmail.com*

The connection between gut microbiota and lung disease is described as the gut-lung axis, these organ systems are somehow interrelated in both homeostasis and disease development[1]. In newborns, the most important gastrointestinal complication of prematurity, necrotizing enterocolitis, and the pulmonary complication, bronchopulmonary dysplasia[2], both cause significant systemic morbidity. This creates a proinflammatory response that leads to mucosal damage. It has been determined that the expression level of the LPS receptor TLR4 in the intestinal epithelium increases in the development of NEC[2]. In this study, we aimed to investigate the mechanisms leading to the development of lung disease in neonatal rats in which we established an experimental necrotizing enterocolitis model and the protective effect of Sildenafil on the development of the disease. 15-day-old Wistar Albino rat pups were randomly divided into six groups as control (n=3), NEC (n=3), SF+DMSO (n=3), Sil_1mg (n=5), Sil_5mg (n=5), Sil_10mg (n=5). As a result of the NEC model experiment, histological examination was performed with hematoxylin& eosin, masson trichrome staining in lung samples taken from neonatal rats in all groups and the expression levels of proinflammatory cytokines (TNF-α and IL-6) were analyzed. Alveolar edema and hemorrhage findings were observed in the lung tissue of the NEC group. Interstitial edema and hemorrhage findings were reduced in the groups treated with sildenafil compared to the NEC group.

References

1.Willis, K. A., & Ambalavanan, N. (2021). Necrotizing enterocolitis and the gut-lung axis. In *Seminars in perinatology* (Vol. 45, No. 6, p. 151454). WB Saunders.

2. Reynolds, R. M., & Thureen, P. J. (2007, February). Special circumstances: trophic feeds, necrotizing enterocolitis and bronchopulmonary dysplasia. In *Seminars in Fetal and Neonatal Medicine* (Vol. 12, No. 1, pp. 64-70). WB Saunders.

3. Jia, H., Sodhi, C. P., Yamaguchi, Y., Lu, P., Martin, L. Y., Good, M., ... & Hackam, D. J. (2016). Pulmonary epithelial TLR4 activation leads to lung injury in neonatal necrotizing enterocolitis. *The Journal of Immunology*, *197*(3), 859-871.

OP08

Cytotoxic and Apoptotic Effect on Various Cell Lines of *Glycyrrhiza glabra* var. *glandulifera*

Tunay KARAN[a*], Busra MORAN BOZER[b]

[a]*Department of Genetics, Faculty of Veterinary, Yozgat Bozok University, Yozgat, Turkey*

[b]*Scientific Technical Research and Application Center, Hitit University, Çorum, Turkey*

**Corresponding author's email address (tunay.karan@bozok.edu.tr)*

Plants have been used for many years in the treatment of various diseases and also as drug candidates.[1] *Glycyrrhiza glabra* var. *glandulifera* is a perennial shrub consisting of elliptical and lance-shaped leaves belonging to the Fabaceae family and used in medicine and sweetener production. *G. glabra* var. *glandulifera* was collected from Van province in July. The water extract was prepared by grinding the aerial part of the plant into small pieces with a grinder. In this study, the cytotoxicity of the extract was studied at different concentrations in human pancreatic adenocarcinoma cell line (Capan-1), human breast adenocarcinoma (MCF-7), colorectal cancer cells (DLD-1), human lung cancer cell line (H1299) and mouse fibroblast cell line (L929) by MTT tests. The best result was detected in the Capan-1 cancer cell line with 15.2% and 13.1% cell viability at concentrations of 0.5 and 1 µg/mL, respectively. In DLD-1, H1299 and MCF-7 cancer cell lines, the percent viability was 34.82, 38.6 and 39.3%, respectively. In the normal cell line L929, cell viability was 70.1% at 0.5 µg/mL and it was found to be toxic at higher concentration. Apoptosis and necrosis index studies were calculated by cell counting of randomly selected areas. The apoptotic index was higher than the necrosis index in all applied cancer lines, which indicates that *G. glandulifera* extract may be effective in various cancer treatments by inducing apoptosis.

References:

1) Shakya, A. K., Medicinal plants: Future source of new drugs. *International journal of herbal medicine*, *4*(4), 59-64, 2016.

OP09

Analysis of the Molecular-Level Effects of *PDL-1* Gene Silencing on the MAPK Signaling Pathway in Colon Cancer Cells

Tugba AGBEKTAS[1], Zuhal TUNÇBİLEK[2], Gonca KABAK[3], Ayca TAS[4], Yavuz SILIG[3]

[1]*Department of Food Processing Technologies, Yıldızeli Vocational School, Sivas Cumhuriyet University, Sivas, Türkiye*

[2]*Department of Chemistry and Chemical Processing Technologies, Yıldızeli Vocational School, Sivas Cumhuriyet University, Sivas, Türkiye*

[3]*Department of Biochemistry, Sivas Cumhuriyet University, Faculty of Medicine, Sivas, Türkiye*

[4]*Department of Nutrition and Diet, Faculty of Health Sciences, Sivas Cumhuriyet University, Türkiye*

Corresponding Author: Gonca KABAK

Recent research has made significant advancements in the development of RNAi-based cancer therapies[1]. The targeting of immune checkpoint molecules using siRNAs has the potential to activate immune cells and diminish their suppression by tumor cells[2]. In this study, the interactions between the PD-L1 protein and the proteins of the Wnt signaling pathway were elucidated. Following this, the PD-L1 gene was silenced in cell lines using siRNA. RNA was isolated from HT-29 and CCDCo-18 cell lines, where PD-L1 gene silencing was performed, in accordance with the kit protocol. cDNA was synthesized from the isolated RNAs following the kit protocol. The expression levels of the Wnt pathway and PD-L1 gene were analyzed using the 2-ΔΔCT method in the RT-PCR system. Additionally, the String v11 program was employed to ascertain the interactions of the proteins involved in the Wnt pathway with each other and with the PD-L1 gene. In the colon cancer cell line, it was observed that the expression of the PD-L1, DUSP1, DUSP2, and DUSP6 genes was significantly elevated compared to the control group, while the expression of the DUSP4 and DUSP10 genes also showed an increase relative to the control group. Conversely, in healthy colon epithelial cells, the expression of PD-L1 and genes associated with the Wnt pathway was found to be reduced compared to the control group.

References

1) Elbashir, S. M., J. Harborth, W. Lendeckel, A. Yalcin, K. Weber and T. Tuschl (2001). "Duplexes of 21-nucleotide RNAs mediate RNA interference in cultured mammalian cells." nature 411(6836): 494-498.

2) Jagani, H., J. Rao, V. Palanimuthu, R. Hariharapura and S. Gang (2013). "A nanoformulation of siRNA and its role in cancer therapy: in vitro and in vivo evaluation." Cellular and Molecular Biology Letters 18(1): 120-136.

OP10

Promoting effect of *Berberis vulgaris* leaf extract on second-degree burn wound-healing through Tgf-β1 and Vegf-α regulation

Seda Askin[a]

[a]*Ataturk University, Health Services Vocational School, Erzurum, Turkey*

**seda.askin@atauni.edu.tr*

Berberis vulgaris leaf extract (BVE), has been widely concerned for its anti-oxidant, anti-inflammatory, and neuroprotective effects[1]. The potential therapeutic effect of BVE on burn injury was investigated, and its possible mechanisms were explored. 48 male Wistar rats were randomly assigned to one of the four groups, each group 12 rats. Experimental groups were assigned to Healthy control (HC), Burn control (BC), Silver Sulfadiazine (SS) and BVE. A deep second degree burn was induced on the lower back and upper back of each rat under standard burning procedure, respectively. Hematoxylin-eosin (HE) staining was performed to detect burn severity, and then biological tissues were biopsied on days 3, 7, 14 and 21 after administration. In skin tissue samples, Transforming Growth Factor Beta 1 (Tgf-β1) and Vascular Endothelial Growth Factor alfa (Vegf-α) mRNA expression levels were determined using real-time polymerase chain reaction (RT-PCR). Furthermore, the skin wound healing at different time points was monitored by macroscopic observation. HE showed that after 21-day BVE treatment, the morphology of the skin tissue showed a significant improvement. Macroscopic data monitoring indicated that the decrustation and fur growing time was shortened. Meanwhile, the rate of wound healing increased after BVE treatment. The RT-PCR showed that after BVE treatment, expression of Tgf-β1 and Vegf-α increased sharply on day 7, maintaining a high level until day 14, showing a downward trend and approaching normal levels on day 21. The results obtained from the BBV application and the results obtained from the SS application group were close to each other. BVE showed a significant promoting effect on rat second-degree burn model, which might be associated with the upregulation of the gene expression levels of Tgf-β1 and Vegf-α.

References:

1) Cicero AF, Baggioni A. Berberine and Its Role in Chronic Disease. Adv Exp Med Biol. 2016;928:27-45. doi: 10.1007/978-3-319-41334-1_2. PMID: 27671811.

OP11

Bromelain, a Group of Pineapple Proteolytic Complex Enzymes (*Ananas comosus*), alleviates Contrast Media Nephropathy

Can SEVINC[a], Pinar TOSUN TASAR[a], Taha TAVACI[c], Cihad OZCELIK[b], Elif DEMIRCI[d], Elif CADIRCI[b], Zekai HALICI[b*],

[a] *Atatürk University Faculty of Medicine Department of Internal Medicine*

[b] *Atatürk University Faculty of Medicine Department of Pharmacology*

[c] *Sakarya University Faculty of Medicine Department of Pharmacology*

[d] *Atatürk University Faculty of Medicine Department of Pathology*

**hzekai@gmail.com; hzekai@atauni.edu.tr*

Contrast nephropathy is a common and serious adverse complication caused by intravascular injection of contrast material. Contrast nephropathy is more common in patients with existing kidney disease, hyperuricemia, diabetes mellitus, congestive heart failure, and in patients who undergo arterial and venous interventional contrast imaging procedures with large amounts of contrast material. One of the most debated issues in the pathophysiology of contrast nephropathy is oxidant molecules. Studies have shown that oxidant substances begin to be produced in the body as soon as the contrast material enters the circulation. These reactive oxygen products cause damage to the kidneys at the cellular level with their toxic and ischemic effects and by stimulating various immune functions. Bromelain is a phyto-therapeutic drug and a proteolytic enzyme extract (1, 2). Bromelain prevents edema formation; reduces existing edema in patients; accelerates wound healing and also has anti-inflammatory and immunomodulatory effects. In our study, we investigated the possible protective effects of Bromelain, a powerful antioxidant substance, in rats with contrast agent nephropathy using various molecular, biochemical and histopathological methods. When we examined our results, we observed that Bromelain reduced the severity of contrast agent nephropathy in a dose-dependent manner. This effect was observed with both biochemical parameters SOD, GSH, MDA and Creatinine levels; and it was also shown by histopathological methods that it reduced the damage in the kidney. As a result of our evaluation, Bromelain is a drug that is likely to be used in the clinic in the future due to its ability to prevent contrast agent nephropathy.

References:

1) Hossain M.F., Akhtar S., Anwar M. Nutritional value and medicinal benefits of pineapple. Int. J. Nutr. Food Sci. 2015;4:84–88. doi: 10.11648/j.ijnfs.20150401.22.
2) Tochi B.N., Wang Z., Xu S.Y., Zhang W. Therapeutic application of pineapple protease (bromelain): A review. Pak. J. Nutr. 2008;7:513–520.

OP12

Evaluation of Copeptin Levels in COVID-19-Recovered Patients with and without Insomnia

Figen Güzelgül[a], Marwa Abdelmageed[b*], Handan Inönü Köseoğlu[c], Esma Akpınar Aslan[d]

[a]*Tokat Gaziosmanpsa University, Faculty of Pharmacy, Biochemistry Department*

[b] *Tokat Gaziosmanpsa University, Faculty of Medicine, Medical Biochemistry Department*

[c] *Tokat Gaziosmanpsa University, Faculty of Medicine, Chest Diseases Department*

[d] *Tokat Gaziosmanpsa University, Faculty of Medicine, Mental Health Diseases Department*

**Corresponding author's email address: marwaali3483@gmail.com*

Several studies reported the association between COVID-19 and stress-related psychological problems both during infection and after recovery[1]. Insomnia is one of the most common symptoms experienced (5.4%–64%) among COVID-19-recovered patients[2]. The present study aimed to investigate the possible relationship between copeptin and melatonin levels and post-COVID insomnia[3,4]. To our knowledge, this is the first research examining this association. Thirty COVID-19-recovered patients (13 males and 17 females) and fifteen healthy individuals (6 males and 9 females), with no history of COVID-19 infection or insomnia, were included in the study. COVID-19-recovered patients were divided into two groups: individuals with post-COVID insomnia (insomnia severity index (ISI) above 15, n=10) and those without post-COVID insomnia (n=20). Patients with insomnia were given Trazodone 50 mg or Mirtazapine 15 mg as sleep disturbance treatment once a day for three months. Serum copeptin and melatonin were compared between the study groups and before/after treatment in the insomnia group. Melatonin levels showed no significant differences. However, copeptin was statistically significant between the study groups (P=0.035). Comparing treated and untreated groups, serum copeptin levels decreased significantly after treatment (p=0.008), while no significant differences were observed regarding melatonin levels. Despite the limited sample size, our findings suggest a potential relationship between serum copeptin and insomnia among COVID-19-recovered patients. Further studies with larger cohorts could investigate the probability of using copeptin as a predictive biomarker for post-COVID insomnia.

References:

1) Nonglait PL, Madhu SV, Raizada N, Aggarwal A, Ahmed R, Aslam M. High level of psychological stress in COVID-19 recovered individuals: role of copeptin as a potential biomarker. Front Psychol. 2023;14:1253396.

2) Pataka A, Kotoulas S, Sakka E, Katsaounou P. Sleep Dysfunction in COVID-19 Patients : Prevalence , Risk Factors , Mechanisms , and Management. 2021;

3) Abdelmageed M, Güzelgül F. Copeptin: Up-to-date diagnostic and prognostic role highlight. Anal Biochem. 2023;115181.

4) Blask DE. Melatonin, sleep disturbance and cancer risk. Sleep Med Rev. 2009;13(4):257–64.

OP13

Carbonic Anhydrase Inhibition by Green Tea Extracts Prepared at Different pH's

Melek KAYA[a]*, Murat KÜÇÜK[b], Uğur KARDİL[c]

[a]*Kocaeli Unıversity, Hereke Asım Kocabıyık Vocational School, Department of Chemistry and Chemical Processing Technologies, Cosmetic Technology Program, Hereke, Körfez, Kocaeli*

[b]*Karadeniz Technical University, Faculty of Science, Department of Chemistry, Trabzon*

[c]*Gümüşhane University, Gümüşhane Health Services Vocational School, Medical Services and Technologies Department, Medical Laboratory Technologies Program, Gümüşhane*

**kaya.melek@kocaeli.edu.tr*

The effects of phytochemicals on enzymes are among the bioactivity study topics. Carbonic anhydrase enzyme is a very effective biocatalyst for the conversion of carbon dioxide to bicarbonate. Therefore, investigating the efficient extraction of phenolics requires evaluation at various temperatures and different solvent pH values[1].

For the extraction processes, solid-liquid extraction was performed with green tea plant prepared with buffers of different pHs. In this way, extracts were prepared in four different pHs in water (acidic pH 2, neutral pH 7 and basic pH 10, distilled water). Prepared extracts were adjusted to their storage pH (acidic pH 2, neutral pH 7 and basic pH 10). Solutions were prepared for bovine carbonic anhydrase (bCA) esterase activity. After the solutions were prepared, esterase activity was determined using the ¼ dilution of the adjusted extracts and bCA enzyme to determine the inhibition effects, and the % inhibition values were calculated from the absorbances determined at 342 nm.

In the study, the effect of pH differences during extraction and incubation was investigated. According to the bCA inhibition results of green tea, the highest inhibition was achieved in with the extract prepared at pH 10 and adjusted to pH 2. The lowest inhibition values were observed in the adjustments made with pH 10. Thus, pHs of extraction and incubation is important.

Reference:

1) Ruenroengklin, N.; Zhong, J.; Duan, X.; Yang, B.; Li, J.; and Jiang, Y. Effects of various temperatures and pH values on the extraction yield of phenolics from litchi fruit pericarp tissue and the antioxidant activity of the extracted anthocyanins. Int. J. Mol. Sci., 9(7), **2008**,1333-1341.

OP14

Production of Antimicrobial Nanocomposite Films with Silver Nanoparticles using the Green Synthesis Method

Büşra ŞENSOY GÜN[a,b]*, Arda AYTİMUR[a], Çetin KARAGÖL[a], Rafig GURBANOV[a.c]

[a]*Bilecik Şeyh Edebali University, Central Research Laboratory Application and Research Center (BARUM), Bilecik, Türkiye*

[b]*Burdur Mehmet Akif Ersoy University, Faculty of Arts and Sciences, Department of Nanoscience and Nanotechnology, Burdur, Türkiye*

[c]*Bilecik Şeyh Edebali University, Faculty of Engineering, Department of Bioengineering, Bilecik, Türkiye*

**busra.sensoygun@bilecik.edu.tr*

In this study, antimicrobial films containing quince seed extract and silver nanoparticles (AgNPs) were produced using the green synthesis method. Natural and biologically derived reactants were preferred to minimize the environmental risks and health risks of traditional chemical synthesis methods. Quince seed extract has an excellent biocatalytic effect thanks to its polyphenols and pectin content, and it was used as a biocatalyst in the experiments. Quercetin supported nanoparticle synthesis with its antioxidant properties.[1,2] During the synthesis process, quince seed extract and quercetin solutions were reacted with silver nitrate ($AgNO_3$) to obtain a nanocomposite film containing AgNPs. The obtained nanocomposite film was characterized by a Fourier Transform Infrared Spectrometer (FT-IR), an X-Ray Diffractometer (XRD), a Scanning Electron Microscope (SEM) with an Energy Dispersive X-Ray Spectrometer (EDX), and a Zetasizer particle size analyzer. Antimicrobial properties of the nanocomposite films against *E. coli ATCC35218, S. aureus ATCC, P. aeruginosa ATCC27853 and C. albicans ATCC 10231* were tested using the well diffusion test. The EDX and XRD results confirmed that the nanocomposite films contain silver particles. The SEM and Zetasizer (particle size analyzer) results proved that the silver particles are nano-sized. According to the well diffusion test results, the synthesized nanocomposite films showed antimicrobial effects against the pathogens used in the test. The results of this study show that green synthesis approaches offer great advantages in terms of industrial and environmental sustainability and that natural resources can be used effectively in the production of innovative materials.

References :

1) Oliveira, G. A., Costa, A. F. F., & Soares, R. J. M. (2017). Green synthesis of nanoparticles using plant extracts: A review. Materials Science and Engineering: C, 80, 165–175.
2) Shah, S. M. Z. H., Khana, A. M., & Ahmed, R. N. (2019). Characterization and applications of silver nanoparticles synthesized by green methods. Journal of Nanoscience and Nanotechnology, 19(3), 1243–1253.

OP15

Effects of Boron Nitride-Cyclodextrin Complex-Based Nanosuspensions on A549 Cells and *In-Vitro* Characterization

Emir Enis Yurdgülü *[a], Yusuf Anıl Ay [a], Emirhan Kıvanç [a], Abdulmecit Albayrak [b], Emrah Özakar [c], Rukiye Sevinç-Özakar [c], Yasin Bayır [a]

[a] *Department of Biochemistry, Faculty of Pharmacy, Atatürk University, Erzurum/Türkiye*

[b] *Department of Pharmacology, Faculty of Medicine, Atatürk University, Erzurum/Türkiye*

[c] *Department of Pharmaceutical Technology, Atatürk University, Erzurum/Türkiye*

** emir.yurdgulu@atauni.edu.tr*

Nanotechnology has emerged as a significant tool in recent years for developing promising new strategies for cancer treatment and other biomedical applications. One of the key advantages of this technology is its ability to enhance drug efficacy and minimize side effects by enabling controlled release to targeted areas. Inclusion complexes formed between boron nitride (BN) and biocompatible carrier molecules such as cyclodextrin (CD) can enhance the bioavailability of nanomaterials. CD is a compound that can typically encapsulate hydrophobic guest molecules, thereby increasing their solubility in aqueous environments[1]. This study investigates the characterization of nanosuspensions created using BN and CD, exploring the potential of these new formulations in biomedical applications. In this work, boron nitride-cyclodextrin complexes were prepared in nanosuspension form, and their characterization was conducted. The physical properties of the prepared nanosuspensions, such as particle size, zeta potential, and polydispersity index (PDI), were determined. The antiproliferative effects were measured using the MTT assay with the A549 cell line. The effects on cell migration were analyzed through *in-vitro* wound healing assays. Cell viability was examined using Calcein AM-Propidium Iodide dual staining with a fluorescence microscope. The nanosuspensions exhibited a homogeneous particle distribution, an appropriate PDI, and a suitable zeta potential. In cell culture experiments, it was found that BN-CD nanosuspensions demonstrated a significant antiproliferative effect on the A549 cell line. In wound healing assays, the effects of BN-CD complexes on wound healing were observed, and their inhibitory effects on cell migration were identified. Calcein AM-PI staining revealed a notable reduction in cell viability, paralleling the results from the MTT assay, which indicated that the nanosuspensions exert antiproliferative effects on cells. The results obtained demonstrate that BN-CD nanosuspensions exhibit significant antiproliferative effects on lung cancer cells. Furthermore, the wound healing assays suggest that these nanosuspensions may possess properties that inhibit cell migration. These findings indicate the potential of the BN-CD complex as a therapeutic agent in biomedical applications and provide insights for future studies in cancer treatment.

References :

Bose, R., Jayawant, M., Raut, R., Lakkakula, J., et al., (2023). Cyclodextrin nanoparticles in targeted cancer theranostics. Frontiers in pharmacology, 14, 1218867. https://doi.org/10.3389/fphar.2023.1218867

OP16

Reproductive Toxicity Of Paclitaxel And Protective Effect Of Nerolidol

Neşe Başak Türkmen[a], İdris Ayhan[b], Osman Çiftçi[b]

[a]*Inonu University,Faculty of Pharmacy,Department of Pharmaceutical Toxicology,Malatya*

[b]*Pamukkale University,Faculty of Medicine,Department of Medicinal Pharmacology,Pamukkale*

**nese.basak@inonu.edu.tr*

Paclitaxel (PAC), isolated from the trunk bark of the Taxus brevifolia tree, is used in the treatment of solid tumor types such as prostate, breast, ovarian, lung, colon, head and neck cancers and brain tumors.[1] Although paclitaxel has powerful antitumor activity, its negative effects limit the effectiveness of PAC-based therapies. One of these negative effects is reproductive system damage, which includes sperm parameters. There is evidence that oxidative stress plays a critical role in the generation of toxic effects of paclitaxel. Nerolidol (NRL) is a naturally occurring sesquiterpene alcohol found in the essential oils of many floral-odour plants. The antioxidant and radical scavenging effects of nerolidol have been demonstrated in various studies, but there is no study investigating its effects on paclitaxel-induced reproductive damage. We investigated the reproductive toxic effects of paclitaxel in a rat model and whether nerolidol ameliorated these effects.

Forty healthy adult male Spraque Dawley rats were randomly divided into four equal groups (Control, PAC, NRL, PAC+NRL). Paclitaxel was given intraperitoneally at a dose of 2 mg/kg once a week for four weeks. NRL was given orally at a dose of 100 mg/kg/day for four weeks. The vehicles of PAC and NRL were given to the control group same as in the experimental groups. After 4 weeks the testis tissue samples were taken under mild anesthesia. Tissue malondialdehyde, antioxidant parameters and cytokines levels were determined.

PAC administration led to a significant increase in TBARS levels and a significant decrease in CAT, SOD and GPx levels compared to control. NRL administration significantly prevented PAC-induced changes in TBARS, CAT, SOD and GPx levels. Similarly, PAC administration significantly increased IL-1, IL-6, TNF-α levels and decreased IL-10 level, and this effect was blocked by NRL in the PAC+NRL group.

It was concluded that PAC has a toxic effect on the reproductive system by causing oxidative stress and NRL can ameliorate this effect with its antioxidant activity.

References

1) Beth A.Weaver.How Taxol/paclitaxel kills cancer cells.Mol Biol Cell. 2014 Sep 15; 25(18): 2677–2681.

OP17

Antibacterial PVA-AgNP Hydrogel Synthesis, *In Vitro* Cytotoxic Effect and Wound Healing Potential

Kemal BAS[a], Serdar KARAKURT[b]

[a]Selcuk University, Institute of Health Sciences, Department of Chemical Biological Radiological Nuclear Defense, Konya, Turkey

[b]Selcuk University, Faculty of Science, Department of Biochemistry, Konya, Turkey.

**kemal.bas@selcuk.edu.tr*

Wound healing is a highly complex system involving many cell types, cytokines, growth factors, and interactions. For this reason, natural and synthetic polymer-gel-like structures (film, membrane), composites, and micro/nanoparticles that support this complex system and accelerate the process are mainly used in wound healing. In this study, PVA/AgNP hydrogel with antibacterial properties was synthesized by dispersing silver nanoparticles in polyvinyl alcohol using a freeze-thaw procedure. UV-VIS Spectrophotometer, FT-IR, and SEM performed characterization of PVA/AgNP hydrogel. The cytotoxic effect of PVA-AgNP hydrogel on keratinocyte (HaCaT) cell line was determined by Alamar Blue method and Wound-healing experiment was performed to investigate *in vitro* cell migration.[1] According to FTIR results, the symmetric and non-symmetric voltages of the CH_2 band in the PVA structure are located at 2945 cm^{-1} and 2912 cm^{-1}, respectively. The peak at 1088 cm^{-1} represents the C-OH bond in the PVA matrix. PVA/AgNP spectrum, the main characteristic peaks of PVA were detected with some modifications. Compared to the PVA spectrum, the peak of O-H stretching at 3250 cm-1 was shifted to a higher wave number (3269 cm^{-1}), and 1141 cm^{-1} peak disappeared. Additionally, new peaks (1653 cm^{-1}, 1740 cm^{-1}) were detected in the PVA-AgNP gel. When IC_{50} values were examined, the cytotoxic effect of PVA-AgNP hydrogel was detected higher than 300 µg/mL in HaCaT cell line. At the end of 72 hours, 84.18% of the wound was closed in the NT group, while 92.97% was closed in the hydrogel group. Research results show that PVA-AgNP hydrogel plays an important role *in vitro* wound healing and the addition of AgNPs has been found to provide antibacterial properties.

References

1) Karakurt, Serdar. Modulatory effects of rutin on the expression of cytochrome P450s and antioxidant enzymes in human hepatoma cells. *Acta Pharmaceutica*, 2016, 66.4: 491-502.alin, J. H.; Bergman, J. A. *J. Med. Chem.* **2013**, *56*, 6297.

OP18

Methylome and Acetyl-proteome Profiling of *Helicobacter pylori*

Amrendra Kumar[a], Sumith Kumar[a] and Desirazu Narasimha Rao[a]*
[a] *Department of Biochemistry, Indian Institute of Science*
Bangalore 560 012, INDIA
**dnrao@iisc.ac.in*

Helicobacter pylori is a Gram negative bacteria that colonizes stomach of more than half of the world human population and causes peptic ulcers, gastritis and gastric cancer. Restriction - modification (R-M) systems of *H. pylori* exist as a main barrier to natural transformation of incoming DNA. More than 20 putative R-M systems, comprising more than 4% of the total genome (1,64-1.67 Mb) have been identified in all completely sequenced strains, based on sequence similarities. *H. pylori* genome is rich in DNA methyltransferases and notable for its low abundance of global transcriptome regulators. Methods have been developed for the genome-wide detection of methylated cytosines or adenines which enable capture of genome-wide profiling of DNA methylation. We observed that the deletion of the only N^4-cytosine MTase, M2.HpyAII, from H. pylori 26695 led to several distinct changes in host-interaction such as lower adherence to host AGS cells, reduced potential to induce inflammation and reduced apoptosis.. Single molecule real time (SMRT) sequencing revealed that the deletion of M2.HpyAII completely removed all N4-cytosine methylation signals (m4C) from the genome.[1] RNA-Seq and proteomic analysis revealed that the loss of m4C modification resulted in differential expression of several genes associated with virulence, ribosome assembly and cellular components.

Acetylome analysis of different strains of *H. pylori* showed the presence of prominent and strain specific protein acetylation. Mass-spectrometry based analysis showed that acetylated proteins participate in biological processes such as metabolic pathways, transcription, translation, cell signalling and motility. In addition, acetylome analysis showed that two cag pathogenicity island proteins. Cag 7, Cag 14, a DNA repair pathway protein, HPUvrD helicase, and an N6 adenine methyltransferase, M1.HPyAVIA, were acetylated. HP0935, a putative N-acetyltransferase belonging to the GNAT superfamily was identified as possible protein acetyltransferase. It was observed that ATPase and helicase activity of HPUvrD was regulated by both enzymatic (HP0935) and non-enzymatic (Ac-CoA) acetylation whereas, M1.HPyAVIA methyltransferase activity was enhanced only by enzymatic (HP0935) acetylation. These observations suggest acetylation as a major regulatory machinery in *H. pylori's* physiology.

References

1) Kumar, S., Karmakar,B.C.,Nagarajan,D., Mukhopadhyay., Morgan, R.D and Rao, D.N. **2018** 46,3429

OP19

Microbial production of carotenoids in engineered endophytic *Pseudomonas* sp. 102515

Ozkan Fidan[1]*, Nuriye Arslansoy[1]

[1]*Abdullah Gül University, Faculty of Natural and Life Sciences, Department of Bioengineering, Kayseri, Türkiye*

**Corresponding author's email address: ozkan.fidan@agu.edu.tr*

Carotenoids are natural pigments primarily found in photosynthetic organisms such as plants, algae, certain bacteria, and fungi. Since humans and animals cannot synthesize them, carotenoids must be obtained through the diet. In photosynthetic cells, they play key roles in light harvesting and photoprotection. Additionally, carotenoids exhibit strong antioxidant activity by quenching singlet oxygen and scavenging free radicals. Due to these properties, carotenoids also demonstrate anticancer, neuroprotective, and anti-atherosclerotic activities.[1] Consequently, they are widely used as natural colorants in the food and feed industries, antioxidants in food and cosmetics, and as photoprotective agents in the cosmetic industry, making carotenoids valuable natural products. Currently, carotenoids are sourced from plants through extraction or synthesized via chemical reactions for certain types. However, these methods have limitations, including high costs, time-consuming processes, non-environmentally friendly solvents, and susceptibility to climate change. Microbial biosynthesis presents a biotechnological solution that addresses these drawbacks and is suitable for industrial-scale production. In this research, the aim was to biosynthesize four high-value carotenoids (lycopene, β-carotene, zeaxanthin, and astaxanthin) from an endophytic bacterium through genetic engineering. The native carotenoid-producing *Pseudomonas* sp. 102515, isolated from *Taxus chinensis* leaves, naturally produces zeaxanthin diglucoside.[2] The genome of *Pseudomonas* sp. 102515 was edited using the CRISPR-Cas9 system, generating Δ*crtX*, Δ*crtY*, and Δ*crtZ* mutant strains that biosynthesize zeaxanthin, lycopene, and β-carotene, respectively. Knockouts of the target genes *crtX*, *crtY*, and *crtZ* were confirmed via PCR. Additionally, an overexpression plasmid carrying the *crtW* gene was constructed and transformed into *Pseudomonas* sp. 102515Δ*crtX* to produce astaxanthin. Carotenoids extracted from the knockout and overexpression strains were analyzed using TLC and HPLC to confirm the biosynthesis of the corresponding carotenoids. As a result, this research opened new avenues for the biosynthesis of high-value carotenoids in the engineered endophytic bacteria.

References:

1) Arslansoy, N.; Fidan O., Carotenoids and Their Antioxidant Power in *The Power of Antioxidants - Unleashing Nature's Defense Against Oxidative Stress* (eds. Barros, A. N. & Santos Abraão, A. C.), IntechOpen, Rijeka, Croatia, 2024.
2) Fidan O.; Zhan J., Discovery and engineering of an endophytic Pseudomonas strain from Taxus chinensis for efficient production of zeaxanthin diglucoside. *J Biol Eng*. **2019**, 13(1):66. doi:10.1186/s13036-019-0196-x

OP20

Synthesis of Silver Nanoparticles using *Trifolium pratense* L. Leaves: Characterisation and Evaluation of Biological Activity

Ramazan Erenler

Research Laboratory Practice and Research Center, Iğdır, Turkiye

rerenler@gmail.com

Aromatic and medicinal plants play a significant role in drug development stage due to their bioactive compound contents.[1] Silver nanoparticles (AgNPs) have been increasing utilized in many fields, including food, pharmaceutical, cosmetics, electronic and industrial due to their unique chemical and physical properties. Biological effects of AgNPs depend on some features such as size distribution, size, surface chemistry, shape, particle morphology, particle composition, coating, agglomeration, dissolution rate, particle reactivity in solution, efficiency of ion release, and type of reducing agents.[2] In this study, AgNPs were synthesized using the leaves of *Trifolium pratense.* The leaves (5.0 g) were heated in deionized water (100 mL) for 2 hours at 40 ^{o}C. After filtration, the solution was treated with the silver nitrate solution (100 mL, 0.1 mM) for 2 hours at 50 ^{o}C. The reaction mixture was centrifugated at 10000 rpm for 15 minutes. AgNPs were lyophilized for 10 hours to dry. The green synthesized AgNPs were characterized by extensive analytical techniques. The function groups of natural compounds responsible for reducing agent were determined by Fourier-transform infrared Spectroscopy (FTIR), XRD analysis exhibited the nanoparticles to be face-centered cubic crystalline structures. The absorption at 419 nm in the UV-Vis measurement proven the formation of nanoparticle structure. Spherical-shaped particle with sizes ranging from 10 nm to 30 nm were shown by Transmission electron microscope (TEM) analysis. The stability of AgNPs was presented by zeta potential with the value of -25.8 mV. The antioxidant effect of extract and nanoparticles was performed by ABTS radical cation, and DPPH free radical scavenging assays. Nanoparticles revealed outstanding ABTS activity.

References

[1] Demirtas, I.; Erenler, R.; Elmastas, M.; Goktasoglu, A. *Food Chem.* **2013**, *136*, 34.
[2] Erenler, R.; Gecer, E. N. *J. Nano Res.* **2022,** *75,* 17.

OP21

Modulation of Short-Chain Fatty Acid Metabolism in COVID-19 Patients

Sevinç Karaçam Koş[a,b], Aysun İnan Genç[c*], Rafig Gurbanov[a,d]

[a]*Central Research Laboratory, Bilecik Şeyh Edebali University, Bilecik, 11100, Türkiye*
[b]*Department of Biotechnology, Bilecik Şeyh Edebali University, Bilecik, 11100, Türkiye*
[c]*Department of Biology, Kastamonu University, Kastamonu, 37150, Türkiye*
[d]*Department of Bioengineering, Faculty of Engineering, Bilecik Şeyh Edebali University, Bilecik, Türkiye*
* ainangenc@kastamonu.edu.tr

Purpose: Short-chain fatty acids (SCFAs) are metabolic byproducts of gut microbiota and play crucial roles in regulating immune responses and inflammation.[1] Recent studies have highlighted the altered SCFA profiles in patients with severe infections, including COVID-19, suggesting their potential involvement in the pathophysiology of the disease. [2] This study aimed to quantify and compare SCFA levels in the serum of three distinct sub-groups of COVID-19 patients using Gas Chromatography-Flame Ionization Detector (GC/FID) method. Methods & Data Collection:Blood samples from 30 patients were collected and serum was separated immediately by centrifugation (3000 rpm. For 10 min.) Serum samples were processed for SCFA extraction using GC/FID method. The SCFA profiles were analyzed using a silica-coated Supelco 24107 Nukol capillary column on GC/FID, with retention times compared to a VFA 46975-U Supelco standard. Standard curves were constructed for each fatty acid based on reference standards, and SCFA concentrations were calculated from chromatograms.[3] Results: The results revealed significant differences in SCFA concentrations between the patient groups. Intubated patients showed markedly higher levels of acetic acid (0.180 mM), approximately ten times higher than recovered patients (0.018 mM). Valeric acid (0.023 mM) and propionic acid (0.0015 mM) were also elevated in intubated patients. The butyric acid (0.000217 mM) was only detected in intubated patients and absent in the non-intubated group. The concentrations of caproic and heptanoic acids were found to be highest in the non-intubated group (0.0044 mM and 0.037 mM, respectively) and lowest in the recovered patients (0.00089 mM and 0.021mM, respectively). Conclusion: This study highlights a distinct SCFA profile associated with the severity of COVID-19 infection. Obtained results suggest that SCFAs may serve as biomarkers for COVID-19 cases and offer insights their potential involvement in the pathophysiology of the disease. Further research is warranted to elucidate the role of SCFAs in modulating immune responses in COVID-19 patients.

References:

1) Ramos Meyers, G., Samouda, H. & Bohn, T. Short Chain Fatty Acid Metabolism in Relation to Gut Microbiota and Genetic Variability. *Nutrients* vol. 14 Preprint at https://doi.org/10.3390/nu14245361 (2022).
2) Włodarczyk, J., Czerwiński, B. & Fichna, J. Short-chain fatty acids–microbiota crosstalk in the coronavirus disease (COVID-19). *Pharmacological Reports* vol. 74 Preprint at https://doi.org/10.1007/s43440-022-00415-7 (2022).
3) Wang, R. *et al.* A Fast and Accurate Way to Determine Short Chain Fatty Acids in Human Serum by GC–MS and Their Distribution in Children with Digestive Diseases. *Chromatographia* **83**, (2020).

OP22

Mapping of Aspirin-Dependent Acetylation on Von Willebrand Factor

Esra Seyran

Cumhuriyet University Department of Molecular Biology and Genetics 58140 Sivas Turkey

esraseyran@cumhuriyet.edu.tr

In this study the impact of aspirin-induced acetylation on Von Willebrand Factor (VWF) is explored. VWF, is a tether protein responsible for platelet adhesion in blood coagulation, forms a bridge between the subendothelial matrix and platelets. The protein is able to shift from a non-adhesive plasma soluble protein to a multi-functional adhesive protein, making an activated surface, attractive to platelets. The multi-domain structure of VWF is the basis of its multi-functional properties. Binding sites that are important for the hemostatic function are located in the A1A2A3 domains of VWF[1]. Previous research has demonstrated that aspirin plays an important role in influencing various coagulation proteins, including VWF[2,3]. The acetylation of VWF by aspirin has not been reported yet, given the potential impact of acetylation on cellular processes, investigating the acetylation of VWF by aspirin could provide valuable insights into its role and function. We mapped the aspirin dependent acetylation of VWF using mass spectrometry, in vitro . Our interest focused on the A1, A2, and A3 domains of VWF where binding sites important for hemostatic function are located. The mapping of acetylation sites revealed that Aspirin acetylates Lysine residues in GpIb, Collagen, Heparin and Factor VIII binding sites of VWF. In order to assess the functional affects of aspirin dependent acetylation of VWF, we performed heparin binding and GPIb binding assays and Collagen Binding ELISA assay. The methodology involved incubating VWF with aspirin, followed by trypsin digestion and mass spectrometry analysis to map acetylation sites. The Western blot results confirmed aspirin-induced alterations in VWF's binding capacities. Mass spectrometry identified 25 acetylated lysine residues in VWF's A1, A2, and A3 domains when exposed to aspirin. Functional assessments, including heparin and GPIb binding assays, and a collagen binding ELISA assay, revealed a significant decrease in VWF binding to heparin and GPIb post-aspirin acetylation. Western blot results additionally confirmed these effects on VWF's binding capabilities. The understanding of post translational modifications in VWF structure is important in the context of Von Willebrand Disease and several Cardiovascular diseases since they are associated with elevated or dimished VWF activity. This study deepens our understanding of the molecular complexities of VWF, offering insights into potential therapeutic interventions.

References:

1) Sadler J. E. (1998). Biochemistry and genetics of von Willebrand factor. Annual review of biochemistry, 67, 395–424.
2) Homoncik, M., Jilma, B., Eichelberger, B., & Panzer, S. (2000). Inhibitory activity of aspirin on von Willebrand factor-induced platelet aggregation. Thrombosis research, 99 5, 461-6 .
3) Parker, R.I., & Gralnick, H.R. (1989). Effect of aspirin on platelet-von Willebrand factor surface expression on thrombin and ADP-stimulated platelets. Blood, 74 6, 2016-21 .

OP23

Synthesis, Characterization and Investigation of Antiproliferative Activities on Different Cancer Cell Lines of Imine Compounds

Kadir Merkit[a], Rahime Şeyma KOÇAK[b*], Esma Kübra Kağan Yeniçeri[c], Sümeyra Tuna Yıldırım[d], Ahmet Altay[e]

[a] *Department of Pharmaceutical Sciences, Health Sciences Institute, Erzincan Binali Yıldırım University, Erzincan, Turkey*
[b,*] *Faculty of Pharmacy, Erzincan Binali Yıldırım University, Erzincan, Turkey*
[c, e] *Department of Chemistry, Faculty of Arts and Sciences, Erzincan Binali Yıldırım University, Turkey*
[d] *Department of Analytical Chemistry, Faculty of Pharmacy, Erzincan Binali Yıldırım University, Erzincan, Turkey*

** rseymakocak@gmail.com*

Cancer remains a major global health problem, and according to 2020 World Health Organization, it is estimated that more than 18 million people worldwide will be affected by cancer, tragically 9.6 million will die and it is worryingly predicted that this number will almost double by 2040.[1] Cancer continues to fascinate the scientific community as one of the most perplexing diseases to afflict human populations. Its diversity of types, unpredictable course and challenging treatment options make it an enduring puzzle that warrants relentless investigation.[2] Recently, the phenolic Schiff base ligand has attracted great attention in the field of medicinal chemistry due to its versatile behavior and biological significance and they can play an important role in designing new chemotherapeutic compounds.[3] Schiff base-based metallo-drugs are being investigated to develop new anticancer and chemotherapy agents, since anticancer targets are different, heterocyclic Schiff bases can be structurally modified to obtain the desired molecule targeting a specific disease. In the 20th century, the world's first anticancer drug cisplatin has been discovered, which brings the medicinal inorganic chemistry in the frontline area of research. Taking advantage of the improved pharmaceutical effect of Schiff base compounds, combined anticancer drugs can be synthesized via a Schiff base reaction. In this study, firstly, a ligand was synthesized by the reaction of 4-methoxysalicylaldehyde and an aminophenol derivate. And the complexes of this ligand were prepared with some transition metals. These compounds were characterized using elemental, thermal and spectroscopic techniques.[4] The cytotoxic effects of these synthesized compounds were then tested on the breast cancer MCF-7 and lung cancer A-549 cell lines. Afterwards, the apoptotic effect of the most active compound was examined by flow cytometry analysis.

References:

1) World Health Organization *WHO Report on Cancer: Setting Priorities, Investing Wisely and Providing Care for All*, Geneva, 2020.
2) Ashique, S., Upadhyay, A., Garg, A., Mishra, N., Hussain, A., Negi, P., Dua, K., *Chem. Biol. Interact.*, **2022**, 363, 110000.
3) Subarkhan, M.M., Prabhu, R.N., Kumar, R.R., & Ramesh, R., *RSC Advances*, **2016**, *6*(30), 25082-93.
4) Choudhary, M., *Polyhedron*, **2023**, *232*, 116296.

OP24

The Biochemical Effects of Nitric Oxide and Brassinosteroid on Two Wheat Varieties Under Drought Stress

Eda Günay[a]*, Okan Acar[b]

[a]*Çanakkale Onsekiz Mart University, School of Graduate Studies, Çanakkale, TÜRKİYE*

[b] *Çanakkale Onsekiz Mart University, Faculty of Science, Biology Department, Çanakkale, TÜRKİYE*

**gunayeg@gmail.com*

Drought stress is one of the most dramatic abiotic stresses and significantly reduces crop yields in wheat. Brassinosteroids (BRs) are steroid hormones that play various roles in the growth and development of plants (Manghwar et al., 2022). In addition, SNP treatments are available to ameliorate the harmful effects of drought stress in wheat. This research focused on the effects of NO and BR treatments on two 21-day-old wheat varieties (*Triticum aestivum* cv. NKÜ Lider and cv. Kenanbey) under drought stress during 7-day were investigated. In this study, NO (sodium nitroprusside, SNP) and BR (24-epibrassinolide, EBL) treatments were both performed as foliar treatments. The applications were carried out as single (200 µM SNP and 0.0500 mg/l^{-1}) and combination (200 µM SNP +0.0500 mg/l^{-1} EBL). For this purpose, the determination of some biochemical parameters (Catalase (CAT), ascorbate peroxidase (APX), peroxidase (POX), glutathione peroxidase (GR) enzyme activities, the amount of hydrogen peroxide (H_2O_2) and lipid peroxidation (TBARS)) changes in wheat exposed to drought stress and the effect of SNP, EBL and SNP+EBL in this study. Our results showed that APX, GR and POX activities decreased under drought stress in the drought-sensitive Kenanbey variety. Contrary of this drought-tolerant NKÜ-Lider variety showed increasing GR, APX and CAT activities under drought stress with all treatments. The combined treatment of SNP+EBL indicates that it provides a more effective improvement in reducing the effects of oxidative stress caused by drought stress, especially in drought-sensitive variety. Additionally, drought significantly increased TBARS and H_2O_2 content in both varieties compared to controls. All treatments improved this increases but this improvement was more effective in the sensitive variety. These results show that drought stress significantly affect antioxidant enzyme activities, TBARs and H_2O_2 content. It can be concluded that combined treatments are especially more effective than single treatment of NO and BR for these wheat varieties under drought stress.

References:

1) Manghwar, H.; Hussain, A.; Ali, Q.; Liu, F. Brassinosteroids (BRs) role in plant development and coping with different stresses. *International journal of molecular sciences*. 2022, 23.3, 1012.

Acknowledgment: *This work was funded by The Coordination Unit of Scientific Research Projects of Çanakkale Onsekiz Mart University (ÇOMÜ-BAP) (Project number: FDK-2021-3786) and 100/2000 Council of Higher Education (CoHE) PhD Scholarship Program in the Priority Fields in Science-Plant Genetics and Agricultural Biotechnology. In addition, it was funded by the Scientific and Technological Research Board of Türkiye within the scope of the TÜBİTAK 2211-A National PhD Scholarship Program*

OP25

Comparison of Two *Bacillus* Species Isolated from Çanakkale Lapseki Coastal Zone on Barley under Salt Stress

Müge Teker Yıldız[a*], Okan Acar[a]

[a]*Çanakkale Onsekiz Mart University, Faculty of Science, Biology Department, Çanakkale, Türkiye*

**Corresponding author's email address (mugetekeryildiz@comu.edu.tr)*

Salt stress is one of the major abiotic stress factors around the world. Moreover, it negatively affects sustainable crop production, agricultural productivity, and microbial life. On the other hand, increasing salt stress negatively affects the growth and development of barley, posing a threat to global food security. Nowadays, it is known that inoculation of plant growth promoting rhizobacteria (PGPR) has significant potential in increasing stress tolerance and yield in agricultural products such as barley. Therefore, bacterial strains were isolated from the rhizosphere of *Arthrocnemum macrostachyum* in the Çanakkale-Lapseki coastal zone of Türkiye and tested for their beneficial potential[1]. This research focused on the effects of *Bacillus thuringiensis* and *Bacillus cereus* inoculating on cultivated barley (*Hordeum vulgare* L. Ocak,) under salt stress (0, 100, 200, 300 mM NaCl) on physiological (root-shoot length, biomass, dry weight), and biochemical parameters (total chlorophyll content, total protein content, hydrogen peroxide content (H_2O_2), lipid peroxidation content (TBARS) and antioxidant enzyme activities (peroxidase activity (POX), catalase activity (CAT))) were determined. Our results showed that in two-bacteria inoculation eliminated negative impacts of salt stress with increased root-shoot length, biomass, dry weight, chlorophyll content and total protein content in Ocak variety. Our results show that inoculation of *Bacillus thuringiensis* to Ocak variety eliminated the negative effects of salt stress by increasing chlorophyll content, and POX activities compared to *Bacillus cereus*, while TBARS and H_2O_2 content decreased. These results also indicated that these bacteria have a strong potential as biofertilizer under salt stress conditions for barley cultivation.

References

1) Ullah, A.; Bano, A.; Khan, N. Climate change and salinity effects on crops and chemical communication between plants and plant growth-promoting microorganisms under stress. *Frontiers in Sustainable Food Systems*.2021,5.

Acknowledgment

This work was funded by The Coordination Unit of Scientific Research Projects of Çanakkale Onsekiz Mart University (ÇOMU-BAP) (Project number: FDK-2021-3684). In addition to was funded by 100/2000 Council of Higher Education (CoHE) PhD Scholarship Program in the Priority Fields and the Scientific and Technological Research Board of Türkiye within the scope of the TÜBİTAK 2211-A National PhD Scholarship Program.

OP26

Determination of bioactivity properties of some honeys produced in the Western Black Sea region.

Oktay Bıyıklıoğlu[a*], Serhat Karabıcak[a], Derya Keleşoğlu[a], Hüyla Özler[b], İdris Yazgan[a], Talip Çeter[a]

[a] *Kastamonu University, Faculty of Science, Department of Biology*

[b] *Sinop University, Faculty of Arts and Sciences, Department of Biology*

**oktayman@gmail.com*

Honey, which has been an important foodstuff throughout human history, was a gathering activity in the early ages, but today it is largely obtained from modern hives. In addition to being a foodstuff, interest in honey has always remained alive due to its traditional therapeutic use. Studies have revealed the immune-boosting, anti-inflammatory, antimicrobial, and anticancer effects of honey. The usability of honey as a therapeutic substance is closely related to its bioactivity properties.[1] In this study, the bioactivity properties of 11 honeys collected from Karabük, Sinop, Bartın, and Zonguldak provinces in the Western Black Sea region were determined by their total phenolic substance analysis, total flavonoid substance analysis, DPPH* scavenging activity, and antioxidant power.[2-3] Among the honeys examined, the honey with the highest total phenolic substance content was detected in chestnut honey obtained from the Ayancık district of Sinop. The honey with the lowest total phenolic substance content was detected in flower honey obtained from the Devrek district of Zonguldak. The total flavonoid content of the honeys was similarly determined to be the highest in chestnut honey obtained from the Ayancık district of Sinop and the lowest in forest rose honey obtained from the Ulus district of Bartın. When the antioxidant capacities of the examined honeys were examined, it was determined that the honey with the strongest antioxidant capacity was the linden honey obtained from the Yenice district of Karabük, and the honey with the lowest antioxidant capacity was determined in terms of phenolic substance content, as well as in the flower honey obtained from the Devrek district of Zonguldak. When the bioactivity properties of the examined honeys were examined, it was observed that monofloral chestnut and linden honeys had higher bioactivity.

References:

1) Gupta, R. K.; Reybroeck, W.; van Veen, J. W.; & Gupta, A. (Eds.).. Beekeeping for Poverty Alleviation and Livelihood Security, Springer Netherlands, 2014
2) Fathi Hafshejani; & Shahnaz et al. Correlation between total phenolic and flavonoid contents and biological activities of 12 ethanolic extracts of Iranian propolis. Food science & nutrition vol. 11,7 4308-4325. 21 Apr. 2023, doi:10.1002/fsn3.3356
3) Uzunca, Hüsamettin, et al. Characterisation of Kastamonu honeys by palynological and physicochemical methods. Grana, 2023, 62.3: 192-205.

OP27

Determination of bioactivity properties of some bee pollens produced in the Western Black Sea region.

Serhat Karabıcak[a], Oktay Bıyıklıoğlu[a],Derya Keleşoğlu[a], Kerim Güney[b], Talip Çeter[a]

[a]*Kastamonu University, Faculty of Science, Department of Biology*

[b]*Kastamonu University, Faculty of Forestry, Department of Forest Engineering*

**serhatkarabicak@gmail.com*

On the one hand, honey bees collect pollen from flowers to meet the protein needs of their offspring, which is the main source of protein for bees. Bee pollen is collected by beekeepers using grid-shaped pollen traps placed at the entrances of the hives. As the bees pass through the holes in the pollen trap, the pollen that separates from the pollen basket on the bees' legs falls into the drawer below and is collected. In this study, the bioactivity properties of 11 bee pollens collected from Karabük, Sinop, Bartın and Zonguldak provinces in the Western Black Sea region were determined by total phenolic substance analysis, total flavonoid substance analysis, DPPH* scavenging activity and antioxidant power[1,2]. Among the bee pollens examined, the highest total phenolic content was measured in the sample obtained from Amasra district of Bartın, while the lowest was measured in the sample obtained from Safranbolu district of Karabük. The total flavonoid content, as determined in the total phenolic content, showed the highest value in Amasra district of Bartın, while the lowest value was in Devrek district of Zonguldak. Antioxidant activity was determined at very close levels between the samples, and the strongest antioxidant activity was detected in the bee pollen obtained from Karabük Yenice, while the lowest was detected in the bee pollen obtained from Sinop Ayancık. This study shows that bee pollen obtained from the Western Black Sea Region has very strong bioactivity.

References:

1) Fathi Hafshejani; & Shahnaz et al. Correlation between total phenolic and flavonoid contents and biological activities of 12 ethanolic extracts of Iranian propolis. Food science & nutrition vol. 11,7 4308-4325. 21 Apr. 2023, doi:10.1002/fsn3.3356
2) Uzunca, Hüsamettin, et al. Characterisation of Kastamonu honeys by palynological and physicochemical methods. Grana, 2023, 62.3: 192-205.

OP28

Anti-inflammatory Activities of Carvedilol and/or Melatonin on A549 Cells

Seydanur Avcı[a], Zeynep Karaköy[b], Hamza Halıcı*[c], Zekai Halıcı[a]

[a] *Atatürk University Department of Medical Pharmacology*
[b] *Department of Pharmacology, Faculty of Pharmacy, Erzincan Binali Yıldırım University*
[c] *Department of Hınıs Vocational Training School, Ataturk Universıty*
**hamzahalici@atauni.edu.tr*

Melatonin is an pineal hormone produced and released in relation to the circadian rhythm.[1] Carvedilol is a third-generation, non-selective b-blocker with vasodilator properties due to α1-adrenoreceptor antagonism.[2] Melatonin and carvedilol have been found to be effective on inflammatory cytokines in different animal and cell culture studies.[3,4] A549 cell line (ATCC, USA) was used in the study. Cells were seeded in dmem medium containing 10% fetal bovine serum (FBS) following a routine thawing procedure. They were incubated for 24 hours at 37°C, 5% CO_2 and 90% humidity. The number of proliferating cells was determined. 96-well plates were seeded with 1×10^4 cells/well. In the study, inflammation model was created with LPS. LPS was determined as 10 ug/ml. 1 hour was kept in the incubator. At the end of the period, different doses of carvedilol (10^{-5},10^{-6},10^{-7}M), melatonin 400 μM and doses of Carvemelo (carvedilol+melatonin) (10^{-5}M, 10^{-6} M, 10^{-7} M) and one group was determined as LPS only group. We were applied and kept in the incubator at 4 and 12 hours and measurements MTT were made according to protocol. At 4 and 12 hours, TNF-α amounts were measured from the supernatant obtained by ELISA method and statistically evaluated. Carvedilol 10^{-7} M and Carvemelo 10^{-7} M doses reduced inflammation more significantly than the control group. Carvedilol 10-7 and Carvemelo 10^{-7} M doses decreased the amount of TNF-α compared to the control group ($p<0.05$). In the study, it was observed that melatonin and carvedilol exerted anti-inflammatory effects when they used alone or when they combinated. Although carvedilol is a beta receptor blocking agent it can be beneficial in inflammatory lung conditions as well as being a good cardioprotective agent. Combination with well-known antioxidant agent, melatonin, increased its anti-inflammatory effect, suggesting that melatonin and carvedilol may be a new treatment option in inflammatory processes.

References:

1) Vlachou M, Siamidi A, Dedeloudi A, Konstantinidou SK, Papanastasiou IP. Pineal hormone melatonin as an adjuvant treatment for COVID-19 (Review). Int J Mol Med. 2021
2) Chen-Scarabelli C, Saravolatz L Jr, Murad Y, Shieh WS, Qureshi W, Di Rezze J, Abrencillo R, Gardin T, Gidwani UK, Saravolatz L, Faggian G, Scarabelli TM. A critical review of the use of carvedilol in ischemic heart disease. Am J Cardiovasc Drugs. 2012
3) Luo F, Liu X, Li S, Liu C, Wang Z. Melatonin promoted chemotaxins expression in lung epithelial cell stimulated with TNF-alpha. Respir Res. 2004
4) Gillespie SL, Hanrahan TP, Rockey DC, Majumdar A, Hayes PC. Review article: controversies surrounding the use of carvedilol and other beta blockers in the management of portal hypertension and cirrhosis. Aliment Pharmacol Ther. 2023

OP29

Effects of GS-441524 on Cell Viability in Lung Cancer Cells (A549)

Büşra İrem Şimşek[a], Zekai Halıcı[a], Elif Çadırcı[a*]

Atatürk University Faculty of Medicine, Medical Pharmacology, Erzurum ,Turkiye[a]

**ecadirci@atauni.edu.tr*

Remdesivir, an antiviral agent, has been recognized as the most promising therapeutic agent against coronavirus disease 2019 (COVID-19). However, the effect of the drug on reducing all-cause mortality has had mixed results [1]. The available evidence on the efficacy of remdesivir on mortality in hospitalized patients with COVID-19 is inconclusive. While some studies have shown positive results, with a reduction in mortality in patients with no or low oxygen requirements, other studies have shown little or no effect of remdesivir on mortality [2]. In addition, there is uncertainty regarding the effect of remdesivir on the duration of clinical recovery from oxygen dependency in patients undergoing both invasive and noninvasive ventilation. Although some studies have shown that remdesivir reduces mortality in patients receiving low oxygen support, this benefit is not evident in patients receiving mechanical ventilation [1]. In addition, remdesivir has been reported to reduce cell viability and induce apoptosis in SKOV3 cells , suggesting that remdesivir may have toxic side effects in lung cells and thus may be a target molecule for lung cancer[3]. Remdesivirine is the adenosine nucleotide prodrug of GS-441524 monophosphate, the primary metabolite measured in human serum[4]. Therefore, in this study, we aimed to evaluate the cytotoxic activity of GS-441524 on the lung cancer cell line A549 by analyzing its cytotoxic effects using MTT. Therefore, in this study, the cytotoxic effects of GS-441524 on the A549 lung cancer cell line were analysed by MTT to evaluate its cytotoxic activity. In the study, the A549 cell line (ATCC, USA) in cryotubes was removed from the liquid nitrogen tank and, after routine thawing, seeded in a T75 cm^2 flask containing 10% fetal bovine serum (FBS), DMEM medium with high glucose content and incubated in appropriate medium. The number of proliferating cells was determined and the cells were seeded on 96-well plates at a rate of 5 x 10^3 cells/well. After 24 hours, 4 different doses of GS-441524 (10^{-3}, 10^{-4}, 10^{-5} and 10^{-6} M) were applied. MTT assay was performed for in vitro cell viability analysis at 12 and 24 hours after drug incubation. According to our MTT assay results, compared to the control group, 10^{-3} M concentration of GS-441524 significantly decreased cell viability. However, it did not show any cytotoxic effect at lower concentrations. Further experimental and clinical studies are needed to expand the therapeutic uses of this drug.

References:

1. Blair HA. Remdesivir: A Review in COVID-19. Drugs. 2023;83(13):1215-1237.
2. Platzer M, Totschnig D, Karolyi M, Clodi-Seitz T, Wenisch C, Zoufaly A. The effect of early remdesivir administration in COVID-19 disease progression in hospitalised patients. Wien Klin Wochenschr. 2024;136(15-16):458-464.
3. Lee CM, Kang MA, Bae JS, et al. An in vitro study on anti-carcinogenic effect of remdesivir in human ovarian cancer cells via generation of reactive oxygen species. Hum Exp Toxicol. 2022;41:096032712210892.
4. Humeniuk R, Mathias A, Cao H, et al. Safety, Tolerability, and Pharmacokinetics of Remdesivir, An Antiviral for Treatment of COVID-19, in Healthy Subjects. Clin Transl Sci. 2020;13(5):896-906.

OP30

Effects of Sodium Borate Nanoemulsions on A549 Cell Line and *In-Vitro* Characterization

Yusuf Anıl Ay *[a], Emir Enis Yurdgülü [a], Emirhan Kıvanç [a], Emrah Özakar [b], Rukiye Sevinç-Özakar [b], Yasin Bayır [a]

[a] *Department of Biochemistry, Faculty of Pharmacy, Atatürk University, Erzurum/TÜRKİYE*

[b] *Department of Pharmaceutical Technology, Faculty of Pharmacy, Atatürk University, Erzurum/TÜRKİYE*

**anilay1539@gmail.com*

Lung cancer stands out as one of the leading causes of cancer-related deaths worldwide. The complex biology and heterogeneous nature of this disease complicate the development of effective treatment methods. Nanoemulsions have garnered attention due to their potential to enhance the bioavailability of drugs and provide targeted delivery [1]. The lipid structure of nanoemulsion formulations facilitates increased drug absorption, allows for specific targeting of cancer cells, and thus minimizes the impact of drugs on healthy tissues, reducing side effects. This has led to increased research on these formulations in cancer treatment over recent years. This study aims to characterize nanoemulsion formulations containing sodium borate (SB) and explore their potential applications in cancer therapy. Nanoemulsions containing sodium borate were prepared, and the droplet size, zeta potential, and polydispersity index (PDI) values were assessed. Antiproliferative effects were measured using the MTT assay on the A549 cell line. Based on the obtained results, in vitro wound healing assays were conducted to analyze the effects of the formulations on cell migration. As a result of the conducted studies, SB nanoemulsions exhibited a suitable distribution characterized by an appropriate zeta potential and polydispersity index (PDI) values. In studies conducted on the A549 cell line, the formulations demonstrated significant antiproliferative effects at varying doses compared to the positive control group. Wound healing studies conducted at the IC50 dose revealed that SB nanoemulsions inhibited cell migration. In conclusion, it was determined that SB nanoemulsions exhibit a pronounced antiproliferative effect. Furthermore, it was demonstrated through wound healing tests that these nanoemulsions can inhibit cell migration. These results imply that SB nanoemulsions have the potential to be effective therapeutic agents in medical contexts, especially for lung cancer treatment, and can serve as a basis for further studies.

References:

1) Pandey, P., Gulati, N., Makhija, M., Purohit, D., & Dureja, H. (2020). Nanoemulsion: A Novel Drug Delivery Approach for Enhancement of Bioavailability. *Recent patents on nanotechnology*, *14*(4), 276–293. https://doi.org/10.2174/1872210514666200604145755

OP31

Evaluating the Antiproliferative Effects of Propolis Nanoemulsions on A549 Cells

Emirhan Kıvanç *[a], Emir Enis Yurdgülü [a], Yusuf Anıl Ay [a], Emrah Özakar [b], Rukiye Sevinç-Özakar [b], Yasin Bayır [a]

[a] *Department of Biochemistry, Faculty of Pharmacy, Atatürk University, Erzurum/TÜRKİYE*

[b] *Department of Pharmaceutical Technology, Faculty of Pharmacy, Atatürk University, Erzurum/TÜRKİYE*

**emirhankvnc11@gmail.com*

Lung cancer is one of the most significant types of cancer due to its high mortality rates and prevalence. In addition to existing treatments for lung cancer, the exploration of supplementary therapeutic methods is essential [1]. Recently, the use of nanotechnological products in cancer treatment has gained popularity, and studies have demonstrated their considerable advantages over conventional therapies. The small droplet size of nanoemulsions offers benefits in enhancing the bioavailability of drugs and facilitating cellular targeting. This presents a significant opportunity for increased efficacy and reduced side effects.

Propolis is a substance known for its immunomodulatory and anti-inflammatory properties. This study investigates the therapeutic potential of nanoemulsion formulations containing propolis extract against lung cancer.

The in vitro characterization of nanoemulsions containing propolis extract was conducted, measuring droplet size, zeta potential, and polydispersity index (PDI). Cell viability was assessed using the MTT assay on the A549 cell line after 24, 48, and 72 hours of treatment. To examine the effects of the propolis extract-containing nanoemulsion on wound healing, a wound model was established in A549 cells.

The results from cell viability tests and the wound model suggest that the formulation possesses cytotoxic effects on A549 cells and could be a potential therapeutic agent in lung cancer treatment. Further mechanistic studies are needed to gather more evidence regarding the effects of propolis extract-containing nanoemulsions on lung cancer.

References:

1) Nasim, F., Sabath, B. F., & Eapen, G. A. (2019). Lung Cancer. *The Medical clinics of North America*, *103*(3), 463–473. https://doi.org/10.1016/j.mcna.2018.12.006

OP32

The Potential Anticancer Activity of Hordenine Against Metastasis and Cell Migration in MCF-7 Cells

Aylin AYDIN[a*], Rüstem Anıl UĞAN[b], Erhan BALLI[c]

[a] *Department of Pharmacology, Faculty of Pharmacy, Atatürk University, Erzurum, Turkey*
[b] *Department of Pharmacology, Faculty of Pharmacy, Atatürk University, Erzurum, Turkey*
[c] *Pharmacy Services Program, Patnos Vocational School of Higher Education, Ağrı İbrahim Çeçen University, Ağrı, Turkey*

**aylinaydin@atauni.edu.tr*

Hordenine, chemically known as 4-(2-dimethylaminoethyl)phenol, is a sympathomimetic and dopamine agonist alkaloid. It is extracted from a wide variety of plants, including cacti and cereal seedlings, and is also found in certain algae and fungi. Notably, it is present in high concentrations in germinated barley. Hordenine exhibits several pharmacological effects, including antioxidant, anti-inflammatory, antibacterial, antitumor, and antifibrotic properties. Breast cancer has become one of the most prevalent types of cancer in recent years. Drugs used in cancer treatments are expected to not only eliminate cancer cells but also inhibit cell migration to prevent metastasis. Metastasis is considered one of the primary factors that negatively impact treatment success.[1,2]

This study investigates the potential anticancer effects of hordenine, a natural alkaloid, on the MCF-7 human breast cancer cell line. The study evaluates the cytotoxic activity of hordenine as well as its effects on cell migration and metastasis. In the initial phase, the cytotoxic effect of hordenine on MCF-7 cells was determined using the MTT assay, and the IC50 value was established. Subsequently, hordenine was administered at doses corresponding to the determined IC50 values, and its effects on cell migration and metastasis were examined using a wound healing model at 24, 48, and 72 hours. The results indicate that hordenine significantly suppresses cell migration and metastasis. In particular, hordenine reduced the rate at which cells filled the wound area in a statistically significant manner during the 24, 48, and 72-hour treatment periods. These findings underscore the antimetastatic properties of hordenine and suggest that it may be considered a potential agent in breast cancer treatment. This study highlights the therapeutic potential of hordenine in cancer therapy and presents important findings that warrant further preclinical and clinical investigations.

References:

1) Wang, X., Guo, R. Z., Ma, L., Ding, Q. Y., Meng, J. H., Chen, Y. G., & Wu, J. H. (2020). Antiprolactinoma effect of hordenine by inhibiting MAPK signaling pathway activation in rats. *Evidence-Based Complementary and Alternative Medicine*, *2020*(1), 3107290.

2) Anwar, S., Mohammad, T., Shamsi, A., Queen, A., Parveen, S., Luqman, S., ... & Hassan, M. I. (2020). Discovery of Hordenine as a potential inhibitor of pyruvate dehydrogenase kinase 3: implication in lung Cancer therapy. *Biomedicines*, *8*(5), 119.

OP33

Electrochemical Aptasensor for Sensitive Detection of Food Allergen ARAH1

İnci Uludağ Anıl[a], Canan ÖZYURT[b], Burçak DEMİRBAKAN[a], Burcu ÖZCAN[a] , Mustafa Kemal SEZGİNTÜRK[a]

[a] *Bioengineering Department, Engineering Faculty, Çanakkale Onsekiz Mart University, Çanakkale, Turkey*

[b] *Chemistry and Chemical Processing Technologies, Biochemistry, Lapseki Vocational School, Çanakkale, Turkey*

** inciuludag@comu.edu.tr*

The eight most prevalent allergenic foods, which are the sources of the other constituents, account for 90% of reactions. These foods include eggs, fish, milk, peanuts, shellfish, soybeans, tree nuts, and wheat.[1] It is estimated that approximately 4-5% of the global population is impacted by allergic reactions to dietary proteins. Allergic responses to nuts, particularly hazelnuts and peanuts, can be lethal. The primary risk element is the absence of labeling indicating the presence of allergenic ingredients, leading to unknowing consumption by the user. In this study, it was aimed to develop an electrochemical impedance spectroscopy (EIS) based biosensing system based on aptamer-protein interaction for the rapid and ultrasensitive detection of allergen ARAH1 protein in peanut. Indium tin oxide-coated polyethylene terephthalate sheet (ITO-PET) was used as working electrode. To achieve covalent immobilization of carboxy-modified aptamers, ITO-PET sheets were treated with APTES. All measurements for the developed aptasensors were conducted using the Gamry Potentiostat/Galvanostat, Reference 600 (Gamry Instruments, Warminster, USA). The optimal concentration and incubation time for the manufacture of the proposed aptasensor were assessed, in addition to conducting comprehensive analytical studies to determine its selectivity, repeatability, and reproducibility. The suggested aptasensor has a detection range of 0.16-210 $fgmL^{-1}$ and a low limit of detection (LOD) of 22.533 $fgmL^{-1}$. The developed aptasensor will be employed for the quantification of proteins in actual food samples.

References:

1) Wong, G. W. K. (2024). Food allergies around the world.

Acknowledgment: This work was funded by the Çanakkale Onsekiz Mart University Council of Scientific Research Project [Project number: FBA-2023-4231].

OP34

Bacterial Cellulose Production and Characterization

Nurşah Hüma Tatoğlu[a]*, Barbaros Dinçer[a], Merve Ceylan[a], Demet Kızıl[b], Şengül Alpay Karaoğlu[a]

[a]Department of Chemistry, Faculty of Arts and Sciences, Recep Tayyip Erdoğan University, Rize, Turkey

[b]Bursa Technical University Central Research Laboratory, Bursa, Turkey

**dyt.nursahtat@gmail.com*

Due to global warming, cellulose resources are decreasing daily due to the forests and agricultural areas becoming deserts or being lost due to heavy rainfall. This necessitates the research of alternative cellulose sources. Some bacterial species found in many areas of our lives synthesize cellulose as an extracellular polymer substance that can be an alternative to plant cellulose. For this reason, studies on "Bacterial Cellulose" are increasing today. Apart from the food industry, bacterial cellulose is increasingly used in the fields of medicine, biomedicine, cosmetics, paper, and electronics[1,2].

This study aimed to produce cellulose in a laboratory environment without depending on environmental conditions and to characterize this cellulose. For this purpose, cellulose was produced using *Bacillus* spp. strain isolated from the intestines of bees, purified and the cellulose was characterized using FTIR, TGA and SEM techniques. As a result of the analysis of the obtained cellulose with these techniques, it was seen that it was quite compatible with other bacterial cellulose in the literature.

The general impression obtained in this study is that the cellulose produced can be an alternative source for industrial areas using cellulose.

References:

1) Shi, Z., Zhang Y., Phillips, G. O., Yang, G., Food Hydrocolloids, 2014, 35, 539-545.
2) Gunduz, G., Erbas Kiziltas, E., Kiziltas, A., Gencer, A., Aydemir, D., & Asik, N., Journal of Natural Fibers, 2019, 16(4), 567-575.

OP35

Antimicrobial and Antioxidant Evaluations of *Festuca lazistanica* subsp. *giresunica*

Melek Çol Ayvaz[a], Elif Çil[b], Sevda TÜRKİŞ[b]

[a]*Ordu University, Faculty of Science and Arts, Department of Chemistry, 52200, Ordu/TURKEY*

[b]*Ordu University, Faculty of Education, Department of Science Education, 52200, Ordu/TURKEY*

**mcol@odu.edu.tr*

The genus Festuca is one of the important pasture plants belonging to the Poaceae family. It includes plants used as animal feed with a worldwide distribution. The study material, *Festuca lazistanica* subsp. *giresunica*, is an endemic plant species specific to Giresun, locally known as has yumak.[1]

The antimicrobial activity of the methanolic extract was screened by Kirby-Bauer disk-diffusion method[2] against seven pathogenic microorganisms (2 gram negative, 2 gram positive non-filamentous, 3 gram positive filamentous bacteria) were selected. Total phenolic and flavonoid contents were determined as spectrophotometrically. The antioxidant activity of the extract was demonstrated based on its DPPH radical scavenging and Fe^{2+} chelation potential.

Total phenolic and flavonoid content values calculated as gallic acid and quercetin equivalents were 40.59 mg and 3042.09 mg per gram of dry extract, respectively. 0.098 mg/mL extract can clean half of the DPPH radicals added to the medium. In addition, 0.5 mg/mL of the extract shows chelation activity by binding 16.48% of the iron in the medium. However, no antimicrobial effect of the methanolic extract of *F. lazistanica* subsp. *giresunica* was detected on any of the studied bacterial pathogens.

Although there are studies on other Festuca species such as *F. arundinacea*[3], *F. glaucescens*[3], *F. rubra, F. ovina* and *F. sinensis*, these findings make an important contribution to the literature as they are the first biological activity evaluations on *F. lazistanica*.

1) Plants of the World Online. Facilitated by the Royal Botanic Gardens, **2023**. Kew. Available from: http://www.plantsoftheworldonline.org/
2) Hudzicki, *J. Am. Soc. Mic.* **2009**, 15, 55-63.
3) Lechowicz, K.; Pawłowicz, I.; Perlikowski, D.; Arasimowicz-Jelonek, M.; Majka, J.; Augustyniak, A.; Rapacz, M.; Kosmala, A. *Int. J. Mol. Sci.,* **2020**, 21(9), 3174.

OP36

Investigation of Synergistic Effects of Resveratrol and PEMF exposure on Caspase-12 Gene Expression in Glioblastoma Cells

Atike DOĞAN[1], Serdar KARAKURT[2], Çiğdem GÖKÇEK-SARAÇ*[1]

[1]*Department of Biomedical Engineering, Faculty of Engineering , Akdeniz University, Antalya, Turkiye*

[2]*Department of Biochemistry, Faculty of Science, Selçuk University, 42250, Konya, Turkiye*

*gokcekcigdem@gmail.com

Glioblastoma is the most common aggressive astrocytic (astrocyte-like) primary brain tumor in adults.[1] Pulsed magnetic field (PEMF) is a low-frequency magnetic fields that serves as an alternative, non-invasive treatment method for various cancers.[1] Resveratrol (RES) is a naturally occurring polyphenolic compound with numerous therapeutic effects found in grapes, peanuts and some fruits. Caspase -12 is a member of the caspase family that plays a crucial role in initiating ER stress-associated apoptosis and regulating the inflammatory response. There are limited studies in the literature investigating the synergistic effects of RES and PEMF exposure on cytotoxicity and the expression of key apoptotic gene in the human glioblastoma U87-MG cell line. Therefore, the present study aims to examine the possible effects of PEMF exposure (75 Hz, 1 mT) on caspase-12 gene expression in RES-treated U87-MG cells. Cells were examined in 4 experimental groups: Group I: non-treated U87-MG cells; Group II: RES-treated U87-MG cells; Group III: cells exposed to PEMF for 6 hours; and Group IV: cells treated with RES followed by 6 hours PEMF exposure. Cell viability and mRNA expression were examined by Alamar Blue, and qRT-PCR assays. The obtained IC_{50} values calculated for Group II and Group IV were 33.64 µg/mL and 10.53 µg/mL, respectively. The data showed that long-term PEMF exposure following RES treatment increased cytotoxic activity by 3.2 times ($p<0.001$) compared to the group treated only with RES. Similarly, caspase-12 gene expression was significantly higher in Group IV compared to the other groups ($p<0.001$). In conclusion, exposure to a long-period (6 hours) of pulsed magnetic field was observed to enhance the effectiveness of flavonoid compounds with known antioxidant properties, such as RES, potentially increasing their therapeutic effects in cancer treatment.

Acknowledgment

This work was supported by the grant to ÇGS from the Turkish Scientific and Technical Council (TÜBİTAK) [Project Number: 123R068].

References:

1) Z.Akbarnejad, H. Eskandary, L. Dinf,, SN. VergalloC, Nematollahi-Mahanie, A. Farsinejadf, MFS. Abadf, M. Ahmadia, 2017. Cytotoxicity of temozolomide on human glioblastoma cells is enhanced by the concominant, exposure to an extremely low-frequency electromagnetic field (100 Hz, 100 G). Electromagnetic Biology and Medicine, 92:254-264.

OP37

Ag Coated Quantum Dot Off-On Mechanism Based Detection for Accurate and Quick Folic Acid Assays

Ali Arda Ciritcioğlu[a], *Erdem Elibol[b], Zehra Günaydın[b], Tuna Demirci[b]
[a]*Kadıköy Anadolu Lisesi, Caferağa Mah. Dr. Esat Işık Cad. No 68/1 Kadıköy / İstanbul*
[b]*Düzce Üniversitesi Konuralp Yerleşkesi, Nanoteknoloji Laboratuvarı Merkez / Düzce*
**erdemelibol@duzce.edu.tr*

Folic acid (FA) is the stable oxidized pterylmonoglutamate form and synthetic parent structure of the wider folate family. Folates and FA facilitate the transfer of one-carbon units, serving a crucial role in purine and pyrimidine synthesis. Deficiency of these substances is related to Neural Tube Defects (NTDs) and megaloblastic anemia; thus, many countries are implementing mandatory FA reinforcements.[1] For these reasons, the accurate and quick assay of FA is of great importance; however, traditional methods such as high-performance liquid chromatography and microbiological assays fail to meet these goals, lacking in some aspects. Current Quantum Dot (QD) approaches mainly target the quenching aspect and are not effective at determining FA at low concentrations.[2-3]

In this study, carbon QDs (CQDs) were tested for use in accurate folate concentration prediction. CQDs were produced from hazelnut husk using the microwave method and were then surface coated with Ag ions to be put into the "off-state" where fluorescence capabilities are inhibited. FA solutions were prepared using pure water and FA tablets, and these solutions were mixed, at different concentrations, with PBS and “off-state” CQDs to formulate the test samples. The samples were measured for their fluorescence emission intensity with an excitation at 360nm, and it was found that CQDs turned to their “on-state” as the presence of FA increased. A linear fit model was created with an R2 value of ≈0.994. The samples were grouped into two according to their concentration levels for more precise predictions and remeasured with control samples and various plants. The lower concentration group included samples from 0,0376-0,7533µM, and the higher concentration group included samples from 0.7533-7.533µM. Each control group had three identical samples, and our study showed promising results, with one group's average percentage error at 0.70% and another’s at 1.85% at concentrations as low as 0.565µM. The accuracy of the guesses can be further improved by splitting the concentrations into more groups. Our method demonstrates low cost, quickness, accuracy, and low rate detection capabilities, making it a viable approach to FA assays.

References:

1) Lucock, M. (2000). Folic acid: nutritional biochemistry, molecular biology, and role in disease processes. Molecular genetics and metabolism, 71(1-2), 121-138.
2) Geszke-Moritz, M., Clavier, G., Lulek, J., & Schneider, R. (2012). Copper-or manganese-doped ZnS quantum dots as fluorescent probes for detecting folic acid in aqueous media. Journal of Luminescence, 132(4), 987-991.
3) Kayani, K. F., Rahim, M. K., Mohammed, S. J., Ahmed, H. R., Mustafa, M. S., & Aziz, S. B. (2024). Recent Progress in Folic Acid Detection Based on Fluorescent Carbon Dots as Sensors: A Review. Journal of fluorescence, 1-14.

OP38

Synthesis of Tetrazole-linked Phenothiazines as Cholinesterase Inhibitors: In vitro Approach Combined with Molecular Docking

Nurdan Akdoğan[a], Zeyad Adil Hameed[b], Ali Dişli[c*] Şevki Adem[b]

[a]*Department of Chemistry, Institute of Science, Gazi University, 06500 Teknikokullar, Ankara, Turkey*
[b]*Department of Chemistry, Faculty of Science, Çankırı Karatekin University, 18100 Çankırı, Turkey*
[c]*Department of Chemistry, Faculty of Sciences, Gazi University, Ankara, 06500 Teknikokullar, Turkey*
**adisli@gazi.edu.tr*

Cholinesterases, crucial for nerve and muscle function, are classified into two main types: acetylcholinesterase (AChE) and butyrylcholinesterase (BChE). AChE rapidly hydrolyzes acetylcholine in the synaptic cleft, terminating nerve signals and regulating neuromuscular transmission, while BChE, found primarily in plasma, complements AChE's role. Inhibitors of cholinesterases are widely used in treating neurodegenerative diseases such as Alzheimer's[1,2].

Heteroatom-containing compounds are significant in drug development due to their enhanced receptor-binding capabilities. Tetrazole and phenothiazine are heterocycles that offer the potential for precise genetic manipulation[2,3]. This study involved synthesizing new bioactive compounds derived from phenothiazine with a tetrazole ring. The molecular structures of these 10-{[5-(4-substituted phenyl)-2*H*-tetrazol-2-yl]propyl}-10*H*-phenothiazine derivatives were characterized using FT-IR, ^{1}H NMR, ^{13}C APT NMR, and HR-MS. The compounds were assessed for their effects on cholinesterase enzymes, showing superior inhibitory activity compared to conventional molecules. Docking studies confirmed effective interactions with enzyme active sites.

Acknowledgments

- The authors thank the Gazi University Scientific Research Projects Unit (BAP Project No:05/2020-26) for their financial support.

References:

1) C. Yamali, F. S. Engin, S. Bilginer, M. Tugrak, D. Ozmen Ozgun, G. Ozli, & H. I. Gul, Phenothiazine-based chalcones as potential dual-target inhibitors toward cholinesterases (AChE, BuChE) and monoamine oxidases (MAO-A, MAO-B). J. Heterocycl. Chem. 58(1) (2021) 161-171.
2) E. H. Özkan, N. K. Yetim, M. Gümüş, N. Sarı, & A. Dişli, Efficient determination and pesticide control by means of immobilization of acetylcholinesterase. Maced. J. Chem. Chem. Eng. 36(1) (2017) 119-128.
3) B. Tan, Y. Kartal, F. Yesilyurt, N. Akdoğan, D. Doyduk, & A. Dişli, Synthesis of new phenothiazine derivatives: Molecular docking, assessment of cytotoxic activity and oxidant–antioxidant properties on PCS-201-012, HT-29, and SH-SY5Y cell lines. Arch. Pharm. e2400281 (2024).

OP39

Synthesis, Characterization and Investigation Biological Activities of Schiff Base Metal Complexes

Begüm Dönmez[a,*], Muhammed Yusuf Zorlu[a], Rahime Şeyma Koçak[a], Sümeyra Tuna Yıldırım[b]

[a,] Faculty of Pharmacy, Erzincan Binali Yıldırım University, Erzincan, Turkey*
[b]Department of Analytical Chemistry, Faculty of Pharmacy, Erzincan Binali Yıldırım University, Erzincan, Turkey

** begumdonmezebyu@gmail.com*

Alzheimer's disease (AD) is the main cause of dementia and one of the most common neurodegenerative diseases affecting people worldwide. It is characterized by progressive memory loss, severe behavioral abnormalities and cognitive impairments.[1] Extensive studies of brain tissue from Alzheimer's patients have revealed remarkable differences in acetylcholine (ACh) and butyrylcholine (BCh) levels. Studies have shown that when acetylcholinesterase (AChE) is inhibited, acetylcholine levels increase, thus improving memory and cognitive functions in patients. Compounds that can inhibit acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE) enzymes, which hydrolyze ACh and BCh molecules, are used in the treatment of AD.[2] There are many studies on the effects of organic compounds on the inhibition of CAs and AChE enzymes, which are of great importance in the development of drugs for the treatment of AD. Today, many studies on the use of Schiff bases containing imino groups in the treatment of Alzheimer's disease.[3] These compounds showcase a wide spectrum of biological activities, encompassing antibacterial, antifungal, antimicrobial, antiviral, antimalarial, anti-inflammatory, antiproliferative, antioxidant, antipyretic properties and enzyme inhibition.[4] Herein, a novel ligand and its metal complexes were synthesized. The spectroscopic techniques such as FT-IR, UV-Vis., XRD, SEM, ^{1}H-NMR, ^{13}C-NMR were used to elucidate the identification of the synthesized molecules.[5] Additionally, *in silico* studies and biological activity studies of these synthesized compounds were also carried out.[6]

References:

5) Ewers, M., Sperling, R.A., Klunk, W.E., Weiner, M.W., & Hampel, H., *Trends in Neurosciences*, **2011**, *34(8)*, 430-442.
6) Marucci, G., Buccioni, M., Dal Ben, D., Lambertucci, C., Volpini, R., & Amenta, F., *Neuropharmacology*, **2021,** *190*, 108352.
7) Ishaq, M., Taslimi, P., Shafiq, Z., Khan, S., Salmas, R.E., Zangeneh, M.M., ...& Mohamad, H., *Bioorganic Chemistry*, **2020**, *100*, 103924.
8) Yakan, H., Koçyiğit, Ü. M., Muğlu, H., Ergul, M., Erkan, S., Güzel, E., ... & Gülçin, İ., *Journal of Biochemical and Molecular Toxicology*, **2022**, *36*(5), e23018.
9) Türkmenoğlu, M., Yıldırım, S.T., Altay, A., & Türkmenoğlu, B., *ChemistrySelect*, **2024**, *9*(4), e202303519.
10) Yaşar, Ü., Gönül, İ., Türkeş, C., Demir, Y., & Beydemir, Ş., *ChemistrySelect*, **2021**, 6(29), 7278-7284.

OP40

Odorant Binding Protein Based Biosensors Mimicking the Mosquito Olfactory System

M. Şenay ŞENGÜL DEMİRAK*

Tokat Gaziosmanpasa University, Department of Molecular Biology and Genetics, Tokat, Türkiye

**senay.sengul@gop.edu.tr*

A biosensor can imitate an insect olfactory system in which volatile organic compunda (VOCs) can be detected in a sensitive manner. In the peripheral olfactory system, odorant-binding proteins (OBPs) and odorant receptors (ORs) play critical roles in chemosensory signal transduction[1]. OBPs are small water-soluble proteins in the sensory organs of insects, and serve in the detection and transport of odorant molecules in the sensilla of insects. Because of its ability to mimic an olfactory system, a biosensor can be used to detect and discriminate odorants in the environment. It is indicated that insect OBPs are ideal candidates in biointerface technology, which plays a critical role in improving biosensor performance for the monitoring of VOCs[2]. With the detection, identification, or quantification of volatile compounds, an OBP-based biosensor help our understanding of chemical molecular sensing of mosquitoes. A high-throughput testing of repellant molecules that interact with mosquito olfactory proteins can be accomplished in order to interefe with the mosquito behavior

References:

1) Ignell, R., Sengul, M. S., Hill, S. R., Hansson, B. S., Olfaction in vector-host interactions: Odour coding and neural connections. Wageningen Academic Publishers, Wageningen, The Netherlands, 2010.
2) Dung, T. T.; Oh, Y.; Choi, S. J.; Kim, I. D.; Oh, M. K; Kim M. *Sensors*, **2018**, 18, 103.

OP41

Development of Column Packing Material with Monosize Spheres for the Determination of Ergosterol in Foods

Ayşe Naz Cerit , Pırıl Arısoy*, Gözde Baydemir Peşint

Adana Alparslan Türkeş Science and Technology University, Faculty of Engineering Sciences, Department of Bioengineering, Adana/Türkiye

*parisoy@atu.edu.tr

Ergosterol, a sterol found in fungal and protozoan cell membranes, serves as a critical biochemical marker for mold contamination in food, environmental and industrial samples. Studies show that ergosterol can be used as an indicator to determine mold growth on tomatoes, fruits and vegetables.[1] Its detection helps assess mold presence and spoilage levels in foods, making it a potential quality indicator. Existing methods for ergosterol detection are often complex, expensive or lack specificity.[2] Molecularly imprinted polymers (MIPs) offer a promising solution as they can be designed to specifically target and adsorb ergosterol molecules. In this study, molecularly imprinted monosized spheres were developed for use as column packing materials for the selective detection of ergosterol in various samples. Ergosterol imprinted monosize spheres (Erg-MIPs) were synthesized and characterized by FTIR, SEM, BET surface area analysis and swelling tests. Erg-MIPs were successfully synthesized, as confirmed by their uniform and smooth morphology, as observed in SEM images. BET surface area measurements indicated a suitable porous structure. Additionally, swelling tests revealed that the Erg-MIP exhibited good stability and functionality. These results collectively show that the synthesized polymers have desirable physical and chemical properties for further applications. Adsorption experiments were conducted under different conditions including variations in concentration, temperature and flow rate to optimize ergosterol binding. The maximum selective adsorption of Erg-MIP was obtained as 9.08 mg/g. Erg-MIP exhibits high affinity and selectivity for ergosterol even in the presence of competing sterols such as cholesterol and stigmasterol. The results demonstrated significant adsorption capacity with high selectivity for ergosterol compared to other sterols. Additionally, it was determined that Erg-MIP can be used up to 10 times without significant decrease in adsorption capacity.

This study was carried out with the support of TÜBİTAK 2209-A (application number: 1919B012207503) and the Çukurova Development Agency (TR62/18ÜRET/0032).

References:

1) Kadakal, Ç., & Tepe, T. K. (2019). Is ergosterol a new microbiological quality parameter in foods or not? In *Food Reviews International* Vol. 35, Issue 2, pp. 155–165.

2) Mansoldo, F. R. P., Firpo, R., Cardoso, V. da S., Queiroz, G. N., Cedrola, S. M. L., Godoy, M. G. de, & Vermelho, A. B. (2020). New method for rapid identification and quantification of fungal biomass using ergosterol autofluorescence. *Talanta*, *219*, 121238.

OP42

Effect of Hydrogen Sulfide on Antioxidant Capacity in Barley Under Drought Stress

Gamze BALTACIER[a]*, Okan ACAR[b]

[a]*Çanakkale Onsekiz Mart University, School of Graduate Studies, Department of Biology, Türkiye*

[b]*Çanakkale Onsekiz Mart University, Faculty of Science, Department of Biology, Türkiye*

**gamzebaltacier@gmail.com*

Plants are frequently exposed to abiotic stress conditions such as drought and salinity. Abiotic stress factors cause physiological, biochemical and molecular changes in plants, causing problems such as stunted growth, decreased yield, leaf browning and cell death. Plants produce 'reactive species' such as reactive oxygen species (ROS), reactive nitrogen species (RNS), reactive carbonyl species (RCS) and reactive sulphur species (RSS) in their widespread cellular response to stress factors. ROS and RSTs in the plant take part in molecular crosstalk and have a special role as a cellular signaling molecule.[1] Hydrogen sulphide (H_2S) is a small lipophilic molecule, can cross the cell membrane without a receptor, is colorless and is a gaseous signaling molecule. This study investigated the effectiveness of 0.5 mM NaHS (H_2S donor) application on drought stress resistance in two barley (*Hordeum vulgare* L.) varieties with different drought tolerances grown under drought stress. This study focused on the biochemical effects of NaHS treatment (H_2S amount, H_2O_2 amount, histochemical analysis of superoxide radical, total chlorophyll amount (SPAD), cell membrane permeability (CMP), lipid peroxidation (TBARS) and protein amount) on drought-sensitive Kalaycı-97 and drought-tolerant Yaprak genotypes under drought stress. While the amount of H_2O_2 increased by 65% with drought in Kalaycı-97 compared to the control, it did not change in Yaprak. NaHS application decreased the amount of H_2O_2 by 35% and by 10% in the resistant variety. In contrast to Kalaycı-97, lipid peroxidation decreased with drought stress in the resistant variety but increased with NaHS application. The results indicate that the susceptible genotype Kalaycı-97 was more positively affected by NaHS application than the resistant genotype Yaprak and thus was protected from drought-induced oxidative stress.

Acknowledgments: This research constitutes a part of Gamze Baltacıer's doctoral thesis research. Gamze Baltacıer's doctoral studies are supported by the Council of Higher Education 100/2000 (CoHE 100/2000) Doctoral Scholarship Program. Therefore, the authors thank CoHE for this scholarship program.

References:

1) Hasanuzzaman, M., Bhuyan, M. H. M., Zulfiqar, F., Raza, A., Mohsin, S. M., Mahmud, J. A. ve Fotopoulos, V. 2020. Reactive oxygen species and antioxidant defense in plants under abiotic stress: revisiting the crucial role of a universal defense regulator. Antioxidants, 9(8), 681.

OP43

Determinatıon of Antıdiabetic Propertıes of Salvia multicaulis Vahl. Species Collected from Different Localities

Emir Hasan Osmanoğlu[a], Hüseyin Alkan[b], Barış Reşitoğlu[a], Mehmet Veysi Çağlayan[a], Ramazan Tunç[a], Ferit Demirel[a], Serkan Yiğitkan[c], İsmail Yener[d], Abdulselam Ertaş[d]

[a]Dicle University, Institute of Health Sciences, Department of Analytical Chemistry,21280-Diyarbakir, Turkey [b]Dicle University, Faculty of Pharmacy, Department of Biochemistry, 21280 Diyarbakir, Turkey

[c]Dicle University, Faculty of Pharmacy, Department of Pharmacognosy, 21280 Diyarbakir, Turkey

[d]Dicle University, Faculty of Pharmacy, Department of Analytical Chemistry, 21280 Diyarbakir, Turkey

**mhalkan@dicle.edu.tr*

Salvia multicaulis Vahl. (Lamiaceae), also known as 'wild sage', is a perennial herbaceous flowering species of the genus *Salvia*, native to Turkey and neighbouring countries. The species has attracted great interest in areas such as food, medicine, pharmacology and cosmetics. Various studies have reported that *S. multicaulis* has a valuable phytochemical structure that can provide effects such as antidiabetic, antioxidant, antibacterial, antienzymatic. In this study, it was aimed to determine the antidiabetic properties (*in vitro*) of *S. multicaulis* species collected from different localities of Southeastern Anatolia Region of Turkey. The α-amylase and α-glucosidase enzyme (%) inhibition activities of the ethanol extracts of the upper and lower parts of the soil of each species (ES1 and ES2) were determined at different concentrations and the results were determined as µg/mL extract. Acarbose was used as standard reference in both methods. For ES1-K (% inhibition: 90.82±1.22) and ES1-Y (% inhibition: 71.93±0.78) samples, 50 µg/mL concentration was found to be the most active concentration inhibiting α-glucosidase. The ES2-Y (% inhibition: 7.78±0.13) sample exhibited higher activity for α-amylase enzyme inhibition than the other samples at a concentration of 25 µg/mL and compared to standard acarbose (6.23±0.07), while at a concentration of 100 µg/mL, the ES2-Y (% inhibition: 21.93±0.34) sample exhibited inhibitory activity almost equivalent to standard acarbose (27.45±0.34). For α-Glucosidase enzyme, ES2-K (% inhibition: 26.07±0.78 and 93.33±1.04, respectively) had the highest enzyme activity compared to standard acarbose (5.89±0.11 and 27.81±0.15, respectively) and at both concentrations (12.5 µg/mL and 50 µg/mL, respectively). When the results are evaluated in general, it can be said that the species have the potential to be used in the pharmaceutical industry, especially due to their α-glucosidase enzyme activities.

This study was supported by Dicle University Scientific Research Projects Coordination Office (DÜBAP; ECZACILIK.22.004).

OP44

Newly synthesized 1,4–naphthoquinone derivative molecule based potentiometric sensor and its greenness assessment

Oguz Özbek[a], Onur Cem Altunoluk[b,*], Kıymet Berkil Akar[b], Ömer Isildak[b]

[a]Tokat Gaziosmanpaşa University, Faculty of Science and Arts, Department of Molecular Biology and Genetics, 60250 Tokat, Türkiye

[b]Tokat Gaziosmanpasa University, Faculty of Science and Arts, Department of Chemistry, 60250 Tokat, Türkiye

* altunolukonurcem@gmail.com

Naphthoquinones are one of the important groups of molecules found in nature, and 1,4-naphthoquinone derivative molecules have a versatile spectrum of biological activity.[1] In addition to their important biological activities, sensor properties of naphthoquinone derivative molecules have also been proven in previous studies.[2] However, the use of naphthoquinone derivatives as sensor materials in potentiometric sensors is quite limited compared to other analytical methods. Potentiometric ion selective sensors provide significant advantages such as high selectivity, wide concentration range, low detection limit, ease of use, low cost, low energy consumption and long lifetime in ion analysis.[3,4] In this study, a new 1,4-naphthoquinone derivative molecule was synthesized, and its sensor properties were investigated. The prepared sensor exhibited selectivity towards barium(II) ions. The developed sensor was also shown to have a wide concentration range, a low detection limit, a fast response time, good reproducibility and a wide pH working range. The novel sensor showed very successful results in different water samples. Finally, the greenness assessment of the fabricated sensor was carried out using the Green Analytical Procedure Index (GAPI) and Analytical Greenness metric (AGREE) tools.

References

1) Khan, J.; Rani, M.; Aslam, M.; Pandey, G.; Pant, B. N. *Res. Chem*. **2023**, *6*, 101138.

2) Bhasin, A. K.; Chauhan, P.; Chaudhary, S. *Sens. Actuators B: Chem.* **2019**, *294*, 116–122.

3) Özbek, O.; Altunoluk, O. C. *Anal. Biochem*. **2024**, *695*, 115657.

4) Özbek, O.; Altunoluk, O. C. Isildak, Ö. *Anal. Sci.* **2024**, *40,* 141–149.

OP45

The Dual Effect of Topography and Electrical Conductivity Enhances Neural Cell Activity

Didem Mimiroglu[1*], Yigithan Tufan[3], Tulin Yanik[2], Batur Ercan[3,4]

[1]*Biochemistry, Faculty of Science, Sivas Cumhuriyet University, 58140, Sivas, TURKEY*

[2]*Department of Biological Sciences, Middle East Technical University, 06800, Cankaya, Ankara TURKEY*

[3]*Department of Metallurgical and Materials Engineering, Middle East Technical University, 06800, Cankaya, Ankara TURKEY*

[4]*BIOMATEN, Center of Excellence in Biomaterials and Tissue Engineering, Middle East Technical University, 06800, Cankaya, Ankara, TURKEY*

**dmimiroglu.cumhuriyet.edu.tr*

Neural guidance channels (NGCs) applications with specific properties are used to ensure the proper regeneration of damaged neural cells in the peripheral nervous system (PNS). These properties can be mimicking extracellular matrix with having topographical features, being biocompatible and biodegradable, channel-like structural design, having electrical conductivity, and etc. While there are many separate studies in the literature examining the effects of materials enhanced with these properties on neural cells, there are limited number of studies examining the dual effect obtained by providing both nanoscale topographies on the surfaces and conductivity together [1,2]. Therefore, the aim of the study is to examine the effects of silk fibroin surfaces with nanoscale surface topography and carbon nanofiber (CNF) cooperated conductivity on neural cells. In accordance with the purpose of the study, nanoscale surface topographies were formed on the surface of CNF incorporated into silk fibroin material using the replica molding method from the anodized metal surfaces. Scanning electron microscopy (SEM) and atomic force microscopy (AFM) were used to examine the surface nanoscale topographies. In order to examine the dual effect on neural cell proliferation, cellular morphology, neural cell activity and microtubule protein expression levels, MTT assay, immunofluorescence imaging and western-blotting were studied, respectively. It was observed that silk fibroin surfaces with dual effects of nanoscale surface topography and conductivity increased neural cell proliferation at about 20% in 7 days, enhanced cellular spreading and increased microtubule formation nearly 2-fold compared to the control group. According to these results, the use of silk fibroin surfaces with dual effects of conductivity and nanoscale topographies may play an important role in NGC applications [3].

References:

1. Kaushik, G., Khatua, C., Ghosh, S., et al. “Electrical Stimulation-Mediated Differentiation of Neural Cells on Conductive Carbon Nanofiller-Based Scaffold,” *Biomedical Materials and Devices*, V. 1, No. 1, 2023, pp. 301–18.

2. Cho, Y., Choi, Y., and Seong, H. “Nanoscale surface coatings and topographies for neural interfaces,” *Acta Biomaterialia*, V. 175, 2024, pp. 55–75.

3. Mimiroglu, D., Tufan, Y., Yanik, T., et al. “Synergistic effect of nanostructured topography and CNF incorporation into silk fibroin films enhances mouse neuroblastoma cell functions,” *Surfaces and Interfaces*, V. 45, No. July 2023, 2024, p. 103876.

OP46

Investigation of Protective Effect of *Rosa canina L* Against Cisplatin Induced Nephrotoxicity and Hepatotoxicity

Kağan Kılınç[a] Sema Duygu Çiftçi[b], İnci Aydoğdu[b], Elif Şahin[c], Derya Öztürk Okatan[d], Arif Burak Çekiç[e], Engin Yenilmez[d], Mustafa Nuri Ural[f], Semanur Işık[e], Neslihan Sağlam[c]

[1]Gümüşhane University, Faculty of Engineering and Naturel Sciences, Department of Genetic and Bioengineering, Gümüshane/Türkiye

[2]Gümüşhane University, Institute of Graduate Education, Department of Biotechnology Gümüşhane/Türkiye

[3]Karadeniz Technical University, School of Medicine, Department of Biochemistry Trabzon/Türkiye

[4]Karadeniz Technical University, School of Medicine Department of Histology and Emriology Trabzon/Türkiye

[5]Karadeniz Technical University, School of Medicine, Department of General Surgery, Trabzon/Türkiye

[6]Gumushane University, Faculty of Engineering and Naturel Sciences, Department of Software Engineering, Gümüshane/Türkiye

**kagankilinc@yahoo.com*

Cisplatin is a drug widely used in cancer treatment and nephrotoxicity and hepatotoxicity are the most common side effects of the drug. Rosehip (Rosa canina) is a medicinal plant with significant antioxidant and anti-inflammatory properties[1]. In our study, the protective effect of rosehip extract on ciplatin-induced nephrotoxicity and hepatotoxicity in rats was investigated. 5 different rat groups were formed and rosehip extract (200 and 400 mg/kg) was administered for 11 days to the groups except control and cisplatin groups. On day 5, cisplatin (7.5 mg/kg single dose i.p) was injected into cisplatin groups. On day 12, all groups were sacrificed, blood was collected and liver and kidney tissues were removed. Some of the tissues were homogenised and some were used for histopathological analyses. BUN, CREA, ALT, AST, TAS, TOS, MDA, SOD, CAT, TNF-α and IL-6 parameters in serum and tissue homogenates were analysed by enzymatic, colorimetric and ELIZA methods. Kidney and liver tissues were histopathologically evaluated with 3 different staining methods[2] (H&E, Masson Trichome and PAS staining). ALT, BUN, CREA, TAS, TOS, TAS, MDA, SOD, TNF- α CAT and IL-6 parameters were significantly different in the control group and rosehip+cisplatin groups (Cis + 400 mg/kg rosehip and Cis + 200 mg/kg rosehip) compared to the cisplatin group, although they varied in liver and kidney tissues ($p<0.05$ was considered statistically significant). Histopathological analyses supported the serum and tissue parameters. In conclusion, it was observed that rosehip extract may play a protective role in tissues against cisplatin-induced acute damage, more prominently in kidney tissue.

References :

1) Kilinc, K.; Demir, S.; Turan, I.; Mentese, A.; Orem, A.; Sonmez, M.; Aliyazicioglu, Y. *Rosa Nutrition and cancer*, **(2020).** *72*(2), 273–282.
2) Malkoç, M.; Patan, H.; Yaman, S. Ö.; Türedi, S.; Kerimoğlu, G.; Kural, B. V.; Örem, A. *Life Sci.* (**2020),** 15,249

OP47

Determination of Antibiotic Resistance Profiles of Bacteria Isolated from Gökçeada Salt Lake Soil Samples

İlke KARAKAŞ[a*], Nurcihan HACIOĞLU DOĞRU[b]

[a]*Vocational School of Health Services, Çanakkale Onsekiz Mart University, Çanakkale, Türkiye*

[b]*Department of Biology, Faculty of Science, Çanakkale Onsekiz Mart University, Çanakkale, Türkiye*

**ilke.karakas@comu.edu.tr*

Due to its high salinity content, Gökçeada Salt Lake Lagoon offers a suitable habitat for extremophilic microorganisms, especially halophiles. In this study, antibiotic susceptibility profiles of 60 bacterial strains isolated from 4 soil samples collected from Gökçeada Salt Lake Lagoon in different periods (September 2023, December 2023, April 2024, July 2024) were determined. Morphological and biochemical identifications of the isolates were carried out by gram staining, indole production, nitrite, and nitrate formation methods. Antibiotic susceptibilities were tested by disk diffusion method using Novobiocin (NV), Erythromycin (E), Streptomycin (S), Bacitracin (B), Penicillin G (P), Ampicillin (AM) and Tetracycline (T) antibiotics. The Multiple Antibiotic Resistance (MAR) index was found to be above 0.2 for all strains, and the highest MAR value was calculated as 0.7142 in isolates collected in April. Such a high MAR index indicates the effect of anthropogenic pressure on microorganisms in the region and shows that this situation carries potential risks for public health[1].

"This study was produced from the doctoral thesis titled "Determination of Microorganism Diversity in Gökçeada Salt Lake Lagoon by Metabarcoding and Investigation of Biotechnological Potential" and is supported by Çanakkale Onsekiz Mart University Scientific Research Projects Coordination Unit (*FDK-2024-4741*) and TÜBİTAK 1002-A Projects (*123Y332*)."

References:

1) Karakaş, İ., Doğru, N. H., Gül, Ç., & Tosunoğlu, M. *Biology Bulletin.* **2024**, *51*, 932-941.

OP48

As natural antimicrobial agents: Cell-free culture filtrate of *Aspergillus niger* and *Rhizomucor pusillus*

Derya BERİKTEN[a], Şükran GÜNAYDIN[a*]

[a]Kütahya Health Sciences University, *Faculty of Engineering and Natural Sciences, Department of Molecular Biology and Genetics, Kütahya, Türkiye*

[a]**sukran.gunaydin@ksbu.edu.tr*

Medicines developed from natural sources are a frequent target for the research and discovery of antimicrobial compounds. Discovering of penicillin in 1928 was a motive to explore of nature as a source of new antimicrobial agents. Fungi produce a diverse range of bioactive metabolites, making them rich source of different types of medicines. This suggests that these bioactive metabolites could potentially serve as attractive therapeutic options for the treatment of infections. A thermophilic and a thermotolerant fungi previously isolated from hot spring waters in Turkey were used in this study. These strains were identified as *Rhizomucor pusillus* and *Aspergillus niger* through multi-loci gene sequencing. In the present study, we investigated and analyzed the cell free culture filtrate (CFCF) of *R. pusillus* and *A. niger* using HPLC. The impact of the cell free culture filtrates as antibacterial agents against four strains of Gram-positive bacteria *Staphylococcus aureus* (ATCC 29213), *Enterococcus faecalis* (ATCC 29212), methicillin-resistant *Staphylococcus aureus* (MRSA) and coagulase-negative staphylococci (MRCoNS) and two strains of Gram-negative bacteria *Pseudomonas aeruginosa* (ATCC 277853), *Escherichia coli* (ATCC 25922), a yeast *Candida parapsilopsis* (ATCC 22019) and a filamentous fungi *Aspergillus niger* (obtained from Kütahya Health Sciences University) were also investigated.[1,2] CFCF of *A.niger* was found to have significant antibacterial activity against all Gram (−), Gram (+) bacteria and fungi, and the highest antimicrobial activity was observed against MRSA and *A. niger.* Although CFCF of *R. pusillus* is effective on fewer microorganisms than the other CFCF, it was found to antibacterial activity against Gram (−) *E. coli*, Gram (+) *E. faecalis, S. aureus*, MRSA from bacteria and *C. parapsilopsis* from fungi. These findings highlight the potential of the CFCF of *R. pusillus* and *A. niger* as a source of natural antimicrobial agents for controlling various pathogens.

References:

1) Clinical and Laboratory Standards Institute (CLSI), CLSI Document M27, Reference Method for Broth Dilution Antifungal Susceptibility Testing of Yeasts, 4th Ed., **2017**
2) Clinical and Laboratory Standards Institute (CLSI), CLSI Document M100, Performance Standards for Antimicrobial Susceptibility Testing, 33rd Ed., **2023**

OP49

Antioxidant Activity Potentials of Olive Mill Waste Water and Pomace in Çanakkale Province

Nurcihan Hacıoğlu Doğru[a*], Neslihan Güleç[a], İlke Karakaş[b]

[a]*Department of Biology, Faculty of Science, Çanakkale Onsekiz Mart University, Çanakkale, Türkiye*

[b]*Vocational School of Health Services, Çanakkale Onsekiz Mart University, Çanakkale, Türkiye*

**nurcihan.n@gmail.com*

Olive mill waste (OMW) is a by-product of the olive oil production process that has attracted increasing attention due to its rich composition of bioactive compounds. OMW is a complex mixture comprising organic compounds, including phenolic compounds, flavonoids, polysaccharides, and various other valuable molecules[1]. These compounds have demonstrated a wide range of applications, including their use as fertilizers, antioxidants, antifungal and antibacterial agents, cytoprotective agents, and stabilizing agents in food preservation[2]. In this study, the antioxidant activities of olive mill waste and pomace samples collected from 10 different olive oil production facilities in Çanakkale province were determined using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) method. In the samples taken from different stations, the free radical scavenging activity at a concentration of 20 µg/mL DPPH was found to be in the following order: ascorbic acid (control standard) > Z8 > Z3 > Z1 > Z10 > Z7 > Z9 > Z5 > Z6 > Z2 > Z4. The highest antioxidant activity was observed at station Z8, with a value of 79.76 ± 0.51%, while the lowest activity was determined at station Z4, with a value of 64.65 ± 4.80%. Our results demonstrate that olive oil waste can be used in valorization studies as a safe and useful source of valuable compounds with antioxidant activity.

References:

1) Attard, K.,; Lia, F. *IntechOpen*. **2024**. doi: 10.5772/intechopen.1004127.
2) Posadino, A .M.; Cossu, A.; Giordo, R.; Piscopo, A.; Abdel-Rahman, W. M.; Piga, A.; Pintus, G. *Foods*. **2021**, *10*(4),800.

This study was financially supported by the Çanakkale Onsekiz Mart University Scientific Research Projects Coordination Unit, Turkey (FBA-2024-4701).

OP50

Synthesis and biological evaluation of rhodanine analogues containing sulfonate groups as potential aldose reductase inhibitors

Erbay KALAY[1], Osman Nuri ASLAN[2], Yeliz Demir[3], Cüneyt Türkeş[4]

[1]*Department of Material and Material Processing Technologies, Kars Vocational School, Kafkas University, Kars, 36100*

[2]*Eastern Anatolia High Technology Application and Research Center, Atatürk University, Erzurum 25240, Turkey*

[3] *Department of Pharmacy Services, Nihat Delibalta Göle Vocational High School, Ardahan University, Ardahan 75700*

[4]*Department of Biochemistry, Faculty of Pharmacy, Erzincan Binali Yıldırım University, Erzincan 24002, Turkey*

onaslan@atauni.edu.tr

Aldose reductase (ALR2, EC1.1.1.21), part of the aldo-keto reductase family, is significantly involved in the development of chronic problems related to diabetes mellitus, such as retinopathy, nephropathy, and neuropathy. Rhodanines and their analogues have become a privileged heterocyclic scaffold since the introduction of various glitazones (troglitazone, pioglitazone, rosiglitazone) and epalrestat into clinical use for treating type II diabetes mellitus and diabetic complications, respectively[1]. Moreover, 5-Arylidenerhodanines have been identified as potent agents in high-throughput screens against various prokaryotic and eukaryotic targets. Unfortunately, extensive research is still required to improve their properties and reduce their adverse effects, as both classes of drugs have adverse effects often associated with cardiovascular, liver and hematologic toxicity.[1,2]

In this study, we evaluated the inhibitory potential of rhodanine analogues containing sulfonate group (**1-8)** as ALR2 inhibitors relevant to various physiological and pathological conditions.[3] Our findings reveal that these rhodanine analogues containing sulfonate group (**1-8)** moderately inhibit ALR2 at micromolar concentrations, with inhibition constants (K_{is}) ranging from 0.43 ± 0.04 µM to 2.68±0.35 µM, compared to the **reference drug epalrestat** (K_i of 0.93 ± 0.09 µM). **6** and **8** showed more inhibition effect than other compounds as ALR2 inhibitors.

References :

1) Tomasic, T.; Masic, L. P. *Curr. Med. Chem.* **2009**, *16*, 1596-1629.
2) Liu, H.; Sun, D.; Du, H.; Zheng, C.; Li, J.; Piao, H.; Li, J.; Sun, L. *Eur. J. Med.Chem.* **2019**, *172*, 163-173.
3) Demir, Y.; Tokalı, F.S.; Kalay, E.; Türkeş, C.; Tokalı, P.; Aslan, O.N.; Şendil, K.; Beydemir, Ş.; *Molecular Diversity*, **2023**, *27*, 1713-1733.

POSTER PRESENTATION ABSTRACTS

PP01

Green Synthesis of Silver Nanoparticles and Their Application: Antimicrobial Activity

Adam Mougou Mahamat and Bilge Hilal Cadirci

Bioengineering Department, Faculty of Engineering and Architecture, Tokat Gaziosmanpaşa University, Turkiye[a]

Pharmaceutical Microbiology, Faculty of Pharmacy, Tokat Gaziosmanpaşa University, Turkiye[b]

mmahamatadam1@gmail.com

In recent years, green synthesis of nanoparticles has proven to be an up-and-coming alternative to address growing environmental concerns because this method involves producing nanoparticles in an environmentally friendly manner using plant extracts as natural reducing agents and stabilizers. This study aims to obtain silver nanoparticles from the leaves of the Prunus mahaleb plant and evaluate the antimicrobial activity of six pathogenic microorganisms.

P. mahaleb leaves are harvested on the campus of Tokat Gaziosmanpaşa University. Silver nanoparticles were synthesized using the green method from fresh and dry P. mahaleb leaf extracts, and their activity on targeted microorganisms was evaluated.

The resulting silver nanoparticles are diluted to a precise concentration and tested for antimicrobial activity by the disk diffusion method on Mueller-Hinton agar. The microorganisms used are Escherichia coli ATCC 11229, Staphylococcus aureus ATCC 29213, Pseudomonas aeruginosa ATCC 9027, Streptococcus pyogenes ATCC 176, Candida utilis KUEN 1031 and Candida albicans ATCC 1223.

The study demonstrates that silver nanoparticles synthesized by the green method using P. mahaleb leaves are highly effective antimicrobial agents against Gram-positive and negative bacteria, yeasts, and fungi. The antimicrobial activity of AgNPs from P. mahaleb leaves (fresh and dried) is significantly higher than that of pure AgNPs on microorganisms and that of pure leaf extracts is zero. As natural antimicrobial agents, AgNPs show great promise in the food industry, textile industry, the environment such as wastewater treatment, and medical devices.

References

1) Chhangte Vanlalveni, Samuel Lallianrawna, Ayushi Biswas, Manickam Selvaraj, Bishwajit Changmai and Samuel Lalthazuala Rokhum, Green synthesis of silver nanoparticles using plant extracts and their antimicrobial activities: a review of recent literature, 2021, 11, 2804-2837.

2) Annamalai, J., Nallamuthu, T. Green synthesis of silver nanoparticles: characterization and determination of antibacterial potency. *Appl Nanosci* **6**, 259–265 (2016).

3) Garibo, D., Borbón-Nuñez, H.A., de León, J.N.D. *et al.* Green synthesis of silver nanoparticles using *Lysiloma acapulcensis* exhibit high-antimicrobial activity. *Sci Rep* **10**, 12805 (2020).

PP 02

Investigation of Antibiotic Adsorption Potential of Agricultural Waste-Based Activated Carbon

Bahar Yavuz[a], Aydan Aksoğan Korkmaz[b], Harun Kaya[c],Funda Ersoy Atalay[d]

[a]*Malatya Turgut Özal University, Institute of Postgrad.Education, Biomedical Engineering, Türkiye*
[b]*Malatya Turgut Özal University, Hekimhan Voc.Sch., Mining Technology, Türkiye*
[c]*Malatya Turgut Ozal University, The Faculty of Engineering and Natural Sciences, Türkiye*
[d]*Inonu University, Science and Art Faculty, Department of Physics, Türkiye*

**bahargs44@gmail.com*

In recent years, antibiotics, in addition to their use in medicine, have been increasingly used in agriculture and animal production. In particular, amoxicillin (AMX) is very widely used as a medium-spectrum β-lactam, active against a wide variety of Gram-positive and a limited number of Gram-negative organisms[1]. Since amoxicillin is hydrolytically stable and does not decompose easily in water, it is widely detected in wastewater, soil and sediments. Waters containing antibiotics should be treated using an effective process to protect human and environmental health[2]. Adsorption is one of the most suitable methods for the removal of dissolved organic pollutants such as antibiotics from industrial wastewater[3]. Activated carbon (AC) is currently one of the most widely used adsorbents for water and air purification on an industrial scale. Almost all carbonaceous materials can be used to produce activated carbon, but the properties vary with its raw materials and activation method. The most widely used raw materials for the manufacture of activated carbon are wood, charcoal, nut shells, fruit pits, brown and bituminous coals, lignite, peat, bone, and paper mill waste (lignin)[4].

In this study; the stem, root and stem parts of tomatoes, which are agricultural waste, were first carbonized at 500°C for 1 hour and 150 ml/min N_2 flow. Then, it was subjected to chemical activation for 1 hour at 800°C with KOH in a ratio of 1:3. The obtained AC was used for the removal of AMX from solutions of different concentrations (25, 50, 100 and 200 ppm). In the adsorption studies, 0.05 g AC was added to the 100 mL prepared AMX solutions and kinetic studies were carried out by taking samples for periods ranging from 1-300 minutes. The samples taken were measured by UV/VIS spectrometry. The adsorption mechanism was studied with Langmuir and Freundlich isotherms, and the kinetic was studied with Pseudo-First-Order and Pseudo-Second-Order models. According to Langmuir, the maximum adsorption capacity was calculated as 331 mg/g for 50 ppm and 75 min with 96.4% AMX removal. From the experimental results, it has been seen that the adsorption occurs physically, monolayer, homogeneous and slowly in the removal of AMX with AC obtained from agricultural waste. However, it has been concluded that it is a cheap, clean, sustainable and necessary process with high efficiency.

Acknowledgment

This research was funded by the Malatya Turgut Özal University Scientific Research Project Unit (BAP) under Project No. 23Y03.

References:

1) Salvo, F.; De Sarro, A.; Caputi, A.P.; Polimeni, G., Exp. Opin. Drug Saf. **2009**, *8(1)*, 111-118.
2) Naghsh, N.; Barnoos, S.; Zisti, F.; Chandrika, K.; Balarak, D., Int.J.Pharm.Inv. **2024**, *14(2)*, 1-6.
3) Balarak, D.; Khatibi, A.D.; Chandrika, K., Int.J.Pharm.Inv. **2020**, *10(2)*, 106-111.
4) Yu, F.; Li, Y.; Han, S.; Ma, J., Chemosphere, **2016**, *153*, 365-385.

PP03

Measurement of Cytottoxic Effect of Selenium Nanoparticles on Human Thyroid Cancer Cells

Gülsüm ORUÇ [a], Çiğdem GÖKÇEK SARAÇ [b], Serdar KARAKURT [a]

[a] *Faculty of Science, Department of Biochemistry, Selcuk University, Türkiye*
[b] *Faculty of Engineering, Department of Biomedical Engineering, Akdeniz University, Türkiye*

oruc1501@gmail.com

Selenium, a nonmetallic element, plays an active role in many physiological processes in biological systems, such as the function of the immune system, the regulation of redox processes, and the provision of iodine homeostasis. Selenium deficiency has been shown to trigger the development of diseases such as depression and autoimmune diseases, as well as chronic heart diseases, goiter, diabetes, and cancer. It has also exhibited selective cytotoxicity in cancer cells, particularly by driving drug-resistant cells into apoptosis (1). This study aimed to synthesize selenium nanoparticles (SeNP) and evaluate their potential anticarcinogenic effects on human thyroid cancer cells. In this direction, SeNPs were synthesized by reduction reaction method and characterized by dynamic light scattering (DLS), Fourier transform infrared spectroscopy (FTIR), and spectrophotometric methods. The obtained SeNPs were applied at concentrations ranging from 0 to 200 µg/mL on human thyroid cancer cell line; TT cells and their cell viability and cytotoxic effects were evaluated using ''Alamar Blue'' reagent. The IC50 was calculated from the sigmoidal curve as 67.85 µg/mL. Flow cytometric analyses to elucidate the cell death mechanism showed that SeNPs directed thyroid cancer cells to early apoptosis. The results reveal that SeNPs induce cell death by triggering apoptotic mechanisms in thyroid cancer cells and show selective cytotoxicity, especially against drug-resistant cells. These findings suggest that SeNPs may be used as a potential therapeutic agent not only in targeted cancer therapy but also in the treatment of cancer-associated autoimmune diseases.

References:

1) Selenius M, Rundlof AK, Olm E, Fernandes AP, Bjornstedt M. *Antioxid Redox Signal* **2010**, 12, 867.

PP04

Protein-rich Macrovipera Lebetinus Snake Venom from Turkiye Inhibits Proliferation, Migration and Invasion of Colon Cancer

Sude KOCABIYIK[a], Aziz AVCI[b], Nazan UZUM[b], Serdar KARAKURT[a]

[a]*Department of Biochemistry, Faculty of Science, Selcuk University, Konya, Turkiye*
[b]*Department of Biology, Faculty of Arts and Sciences, Adnan Menderes University, Aydin, Turkiye*

[*] kcbyksude@gmail.com

Colorectal cancer is a major disease caused by various risk factors. It is commonly diagnosed worldwide and is the second most common cancer in women and the third most common in men [1]. Both types of this tumor, which occur in the rectum and colon tissue of the large intestine, can often differentiate to form other tumors, such as stem cells. Traditional treatment methods against these cells are often inadequate due to both the lowering of the immune system of the patients and their non-specific cytotoxicity by developing resistance [2, 3]. In this study, we aimed to develop natural-based treatment methods with protein-containing compounds of the snake venom of *Macrovipera lebetinus* (*M. lebetinus*), commonly known as the big viper, which is found in the Southeastern Anatolia region of Turkiye. *M. lebetinus* venom, which is rich in enzymes, non-enzymatic proteins and peptides that show cytotoxic effects by affecting different receptors on the DLD-1 cell line, was collected and lyophilized. Then, the effects of snake venom on the metastasizing and colony forming potential of DLD-1 cells, a colon adenocarcinoma cell line, were examined under *in vitro* conditions. In line with the outputs obtained within the scope of the project, it was determined that *M. lebetinus* venom had anti-invasive potential and inhibited (88.28%, $p<0.0001$) the DLD-1 cell line. Venom inhibited colony formation (71.51%, $p<0.0001$) in the DLD-1 cell. *M. lebetinus* venom inhibited metastasis and colony formation against colon cancer under *in vitro* conditions. Our study aimed to cure patients who metastasize and invade and form different tumors in their body that do not respond to traditional treatment methods. It supports studies with natural toxins known as a promising therapeutic agent in cancer research.

Keywords: DLD-1, Metastasis, *Macrovipera lebetinus*, Colorectal Cancer, Colony

References

1. Sawicki, T.;Ruszkowska, M.; Danielewicz, A.; Niedźwiedzka, E.; Arłukowicz, T.; Przybyłowicz, K. E. Cancers (Basel), **2021**, 9, 2025
2. Krasteva, N.; Georgieva, M. Pharmaceutics, **2022**, 6, 1213
3. Limam I.; Abdelkarim, M.; El Ayeb, M.; Crepin, M.; Marrakchi, N.; Di Benedetto, Int. J. Mol. Sci. **2023**, 15, 12219

PP05

Extraction of *Juglans* Sporopollenin Exine Capsules, Removal of Allergenic Content and Use in Drug Delivery

Seher Guler[a], Harun Kaya[b], Naile Ozturk[c], Hayrettin Tonbul[c], Funda Ersoy Atalay[a,*]

[a]*Inonu University, The Faculty of Science and Arts, Department of Physics, Malatya, Turkey*
[b]*Malatya Turgut Ozal University, The Faculty of Engineering and Natural Sciences, Malatya, Turkey*
[c]*Inonu University, Faculty of Pharmacy, Department of Pharmaceutical Technology, Malatya, Turkey*

**Corresponding author's email address: funda.atalay@inonu.edu.tr*

The extraction of plant pollens involves isolating various compounds, such as lipids and proteins, which have allergenic properties, thereby reducing potential adverse reactions. Thus, purified pollen extracts can be explored for use in drug delivery systems. These systems can benefit from pollen's natural bioadhesive and mucoadhesive properties, enhancing the delivery and efficacy of medications. Recent research highlights that pollen-based carriers offer a promising approach for pharmaceutical applications in targeted and controlled drug release. [1-3]

Juglans sporopollenin exine capsules (SECs) were hollowed through a series of washing and extraction processes using acetone and phosphoric acid. The protein content, which could cause allergic reactions, was removed by treatment with KOH. After each process, SEM measurements, BET surface area analysis, CHNS analysis, UV measurements, and FTIR analyses were conducted. The resulting hollow, spherical, and non-allergenic *Juglans* SECs were used for loading irinotecan/sorafenib, active agents used in colorectal cancer treatment, via passive loading techniques. Encapsulation efficiency was found to be 62% for irinotecan and 46% for sorafenib.

This study was supported by the TUBITAK project number 223M188.

References:

3) Barrier, S.; Diego-Taboada, A.; Thomasson, M. J.; Madden, L.; Pointon, J. C.; Wadhawan, J. D.; Beckett, S. T.; Atkinad, S. L.; Mackenzie, G. *Journal of Materials Chemistry*, **2011**, *21*(4), 975-981.
4) Mundargi, R.; Potroz, M., Park; J. Seo, J.; Tan, E.-L.; Lee, J. H.; Cho, N-J. *Sci. Rep.,* **2016**, *6*, 19960.
5) Iravani, S.;, Varma, R. S. *Nano-Micro Letters*, **2021**, *13*(1), 128.

PP06

Investigation of *In Vitro* Effects of Carboxylic Acid Derivatives Containing Pyrazole Group on NADPH-Dependent Aldose Reductase Enzyme

Yeliz DEMİR[a*], Nurgül ABUL[b], Cüneyt TÜRKEŞ[c], Hasan ÖZDEMİR[b], Şükrü BEYDEMİR[d]

[a*] *Ardahan University, Nihat Delibalta Göle Vocational High School, Department of Pharmacy Services, Ardahan, Türkiye*

[b] *Atatürk University, Faculty of Science, Department of Chemistry, Erzurum, Türkiye*

[c] *Erzincan Binali Yıldırım University, Faculty of Pharmacy, Department of Biochemistry, Erzincan, Türkiye*

[d] *Anadolu University, Faculty of Pharmacy, Department of Biochemistry, Eskişehir, Türkiye*

**yelizdemir@ardahan.edu.tr*

Aldose reductase (ALR2; EC 1.1.1.1.21), an enzyme involved in the regulation of the proinflammatory response through the reduction of aldehyde phospholipids, the synthesis of metabolically vital compounds such as prostaglandins and the modulation and modification of steroids *in vivo*[1]. Carboxylic acids are known as potent inhibitors of ALR2 due to the strong interactions with the enzyme's recognition site by a polarized anion group[2]. In this context, the *in vitro* inhibitory effect of carboxylic acid derivatives containing pyrazole groups on the ALR2 enzyme associated with diabetes was investigated. For this purpose, sheep lenses were first homogenized in homogenate buffer (10 mM NaH_2PO_4, pH=7.4). The supernatant obtained after centrifugation was subjected to ammonium sulfate precipitation[3].The inhibition effect of carboxylic acid derivatives containing the pyrazole group was determined by measuring ALR2 activity at different inhibitor concentrations. %Activity-[I] graphs were drawn and IC_{50} values were calculated from the equation of the curve. The K_i values were calculated by drawing Lineweaver-Burk plots with the values obtained at three different concentrations of the compounds. According to the data obtained, the K_i values of the five different pyrazole derivatives studied were between 0.274-1.892 µM, and 1-(4-chlorophenyl)-3-phenyl-*1H*-pyrazole-5-carboxylic acid molecule was determined as the best inhibitor of ALR2 enzyme with 0.274 µM.

Acknowledgment: This research was supported by the Unit of Scientific Research Projects of the University of Ardahan [Grant number: 2023-004].

References:

1) Penning TM., *Chem Biol Interact*, **2015**, 234:236-46.
2) Thakur, S., Gupta, S. K., Ali, V., Singh, P., & Verma, M., *Arch Pharm Res*, **2021**, *44*(7), 655–667.
3) Türkeş, C., Demir, Y., & Beydemir, Ş., *Appl Biochem Biotechnol*, **2019,** 189, 318-329.

PP07

Antifouling and Anticorrosive Properties of Poly(N-methylaniline) film Containing of Different Concentrations of ZnO Nanoparticles on Stainless Steel

Gul Ozyilmaz, Osman Ozkan, Ali Tuncay Ozyilmaz, Cenk Erdogan

Hatay Mustafa Kemal University, Faculty of Arts and Sciences, Department of Chemistry, Hatay, TÜRKİYE

**cenk.erdogan@mku.edu.tr*

Marine bacteria form carbohydrate-dominated biofilms on man-made structures, leading to biofouling and corrosion, which cause economic damage. Since, copper-based paints used to prevent biofilm formation are banned due to environmental harm, prompting a search for eco-friendly, affordable, and easy-to-apply alternatives[1,2].

The aim of this study is to develop an economical and easily applicable coating for 304 stainless steel (SS), which is widely used in marine structures, to reduce both corrosion and fouling. The anticorrosive (ANCO) and antifouling (ANFO) properties of poly(N-methylaniline) (PNMA) containing ZnO nanoparticles (NPs) at different concentrations were investigated. Polymer film with and without ZnO NPs were synthesized onto SS coupons applying cyclic voltammetry technique with the 3-electrode method in presence of oxalic acid electrolyte. The coated and bare coupons were kept in the Mediterranen Sea in Arsuz, Hatay, for a week to be exposed to fouling and corrosion. The coupons were transported to the laboratory in the sea water tank to investigate the ANFO and ANCO properties.

SEM, fluorescence microscopy and AFM were used to examine the surface properties while crystal violet dye method was used to compare the biofilm amounts of the bare and the coated coupons. To determine the elemental composition of the coupons's surface, the EDX analysis was carried out. Anodic polarization, Tafel curves and impendance analysis were used to compare anticorrosive properties of the bare and the polymer coated coupons and to reveal the ZnO NPs concentration that provided the best protection. As a result, it was determined that when 0.5 mg/mL of ZnO NPs was used as PNMA synthesis, the highest ANFO and ANCO effects for SS coupons were got.

Acknowledge: We thank to MKU Scientific Research Projects Commission (Project No: 22.YL.010).

References:

1. Chambers, L. D., Stokes, K. R., Walsh, F. C., & Wood, R. J. (2006). *Surface and Coatings Technology*, *201*(6), 3642-3652.
2. Üstükarcı, H., Ozyilmaz, G., & Ozyilmaz, A. T. (2024). *Enzyme and Microbial Technology*, *172*, 110340.

PP08

Effects of Heavy Metal Stress on Seedling Growth and Antioxidant Enzymes in Sorghum (*Sorghum bicolor L. Moench*)

Büşra ÇEVİK[a], Hakan Arslan[b], Deniz EKİNCİ[a,c*]

[a]*Ondokuz Mayıs University Faculty of Agriculture, Department of Agricultural Biotechnologyi SAMSUN, Türkiye*

[b] *Ondokuz Mayıs University Faculty of Agriculture, Department of Agricul Structures and Irrigation, SAMSUN, Türkiye*

[c]*University of Oxford, Department of Chemistry, Oxford, United Kingdom*

**deniz.ekinci@chem.ox.ac.uk*

Plants take the substances they need to complete their physiological period from the soil through their roots.[1] They encounter environmental negativities while taking nutrients. The factors that prevent the normal growth and development of plants are defined as "stress" and cause yield loss in the plant. Stress factors can be divided into two groups as biotic and abiotic stress factors. Viruses, insects, fungi, weeds, nematodes and parasites are biotic stress factors that cause plant damage. Stress factors caused by environmental changes and caused by non-living factors are called abiotic stress.[2] Heavy metals and their toxic levels can affect physiological and biochemical processes by causing the emergence of ROS species.[3] For this purpose, effects of common heavy metals (Hg^{+2} and Cd^{+2}) on some physiological and biochemical properties of Sorghum (*Sorhum bicolor L. Moench*) were investigated with the doses of 3-15 ppm. The effects on enzyme activity (SOD, POX), chlorophyll content, wet weight, dry weight, and proline content were investigated. For this purpose, a commercial variety of sorghum, Öğretmenoğlu 77, was used. The seeds planted in pots were grown for 33 days and then heavy metal solution was applied at two-day intervals. At the end of the growing period, analyzes were carried out with the samples taken from the leaves. According to the results of the research, mercury and cadmium applications caused first increase, and then decrease in POX and SOD enzyme activities. Similarly, chlorophyll content first increased and then a decrease was observed. Our findings show the behaviour of Soghum in response to heavy metal stress.

References:

1) Kinnersley, A. 1993. The role of phytochelates in plant growth and productivity. *Plant growth regulation, 12*(3), 207-218.
2) Wrzaczek, M., Vainonen, J. P., Gauthier, A., Overmyer, K., & Kangasjärvi, J. 2011. Reactive oxygen in abiotic stress perception-from genes to proteins. *Abiotic Stress Response in Plants, eds A. Shanker and B. Venkateswarlu (Rijeka: InTech)*, 27-55.
3) Gill, S. S., & Tuteja, N. 2010. Reactive oxygen species and antioxidant machinery in abiotic stress tolerance in crop plants. *Plant physiology and biochemistry, 48*(12), 909-930.

PP09

Design of a new dialysis membrane for removal of Fe^{3+} ions from thalassemia patients

Veyis Karakoç[a*], Vedat Arda Küçük[b]

[a] *Eldivan Vocational School of Health Services, Çankırı Karatekin University, Çankırı, Türkiye*

[b] *Department of Chemical Engineering, Faculty of Engineering, Çankırı Karatekin University, Çankırı, Türkiye*

veyiskarakoc@karatekin.edu.tr

In this study, as an alternative to the existing chelator removal method for the treatment of thalassemia patients, experimental studies were conducted to develop a suitable dialysis membrane to remove iron accumulated in the body of thalassemia patients as a result of blood transfusion. For this purpose, a poly(2-hydroxyethyl methacrylate) (HEMA) based membrane was synthesized and characterized by UV polymerization method. Desferrochamine (DFO), an iron chelator used for many years, was covalently bound to this membrane[1,2]. The chelating agent has been used by thalassemia patients since 1960 and causes toxic side effects when taken for long periods[3,4]. The adsorption behavior of the synthesized poly(2-hydroxyethyl methacrylate-glycidyl methacrylate)-desferroxamine (poly(HEMA-GMA)-DFO) polymeric membrane for Fe3+ ions was investigated in continuous and batch systems from aqueous solutions. Subsequently, the adsorption behaviors of the membrane for Fe3+ ions from human blood plasma were investigated. From the experimental studies, it was observed that the synthesized poly(HEMA-GMA)-DFO polymeric membrane adsorbed Fe3+ ions from aqueous solutions in batch system at pH:5.0 and 10mg/L concentration with 7.8mg/g polymeric membrane, in continuous system with 4.28mg/g polymeric membrane and in human blood plasma with 0.72mg/g polymeric membrane. According to all the obtained results, it is seen that the synthesized polymeric membrane, which can be used as dialysis membrane, has adsorptive properties and can bring a different approach to treat thalassemia patients.

References :

4) Aydinok, Y.., Hematology, **2012**, 17, 28-31.
5) Farashi, S., Harteveld, C.L. Blood Cells, Molecules and Diseases, **2018,** 70 43–53
6) Papanikolaoua, G., Pantopoulos, K., Toxicol. Appl. Pharmacol., **2005**, 202, 199- 211.
7) Kontoghiorghes, G J., Weinberg, E D., Review Blood Rev, **1995,** 9. 33-45

PP10

Effects of the Plant Phenolic Compound Resveratrol on Prostate Cancer and Glutathione S-Transferase Enzyme Involved in the Metabolism of Chemotherapeutic Drugs

Fatma Zehra YILMAZ[1], Orhan ADALI[2], Serdar KARAKURT[1]

[1]*Selçuk University, Faculty of Science, Department of Biochemistry, Selçuklu, Konya, Turkiye*
[2] *Middle East Technical University, Department of Biological Sciences, Ankara, Turkiye*

yilmazfatimazehra00@gmail.com

Prostate cancer, which is commonly observed in men, is a malignant type of tumor. Although various treatment methods are currently used for prostate cancer, they can lead to issues such as drug resistance and toxic effects on healthy tissues. Due to these problems, a significant portion of cancer research focuses on discovering natural or synthetic substances with fewer side effects. Additionally, one of the major challenges in treatment arises from the inadequate or excessive metabolism of chemotherapeutic drugs by the Phase II enzyme system, which can lead to a loss of drug efficacy. As a result, the use of plant-derived natural compounds in cancer treatment is increasing. One of these natural compounds, trans-resveratrol, a polyphenol isolated from plants, has been shown to be effective in cancer prevention. In this study, the effect of resveratrol on Glutathione S-Transferase (GST), one of the Phase II enzymes, was investigated in PC-3 and LnCaP prostate cancer cell lines and PNT1A normal prostate cells. The cytotoxic effects of resveratrol on cell lines were determined using the Alamar Blue method. Additionally, GST enzyme activities were measured, and protein and mRNA expressions were analyzed using Western blot and qRT-PCR techniques, respectively. The results of the study showed that the IC_{50} values of resveratrol in PC-3 and LnCaP prostate cancer cell lines were 78.4 µM and 76.2 µM, respectively. No toxic effect was observed in the PNT1A normal prostate cell line. In terms of its effect on enzyme activity, total GST activity was found to be higher in the LnCaP cell line compared to the PC-3 cell line. It was determined that resveratrol treatment led to changes in protein expression, with a decrease observed in the GSTpi isoform and an increase in the GSTmu isoform. Following resveratrol treatment, mRNA expression of GST in the GSTmu isoform increased by 1.58-fold in the PC-3 cell line and by 2.2-fold in the LnCaP cell line, while the GSTpi isoform showed a 10% decrease in the PC-3 cell line, and no GSTpi expression was observed in the LnCaP cell line. In light of this study, resveratrol appears to play a potential role in the treatment of prostate cancer and in preventing the reduction of drug efficacy.

Acknowledgment: This study was supported by TUBITAK (Project No: 113Z488).

Referance:

1) Stoner G.D., Mukhtar H.; Polyphenols as cancer chemopreventive agents. J Cell Biochem. (1995), 22, 169-80.

PP11

Investigating the Molecular Effects of Resveratrol on Prostate Cancer and Its Influence on the CYP3A4 Isoform Involved in Chemotherapeutic Drug Metabolism

Elif BOZKIR[1], Orhan ADALI[2], Serdar KARAKURT[1]

[1]*Selçuk University, Faculty of Science, Department of Biochemistry, Selcuklu, Konya, Turkiye*
[2] *Middle East Technical University, Department of Biological Sciences, Ankara, Turkiye*

eliif.bzkr@gmail.com

Prostate cancer is known as a common cancer type in men in terms of incidence and mortality. Although prostate cancer treatment strategies have been developed, they often come with side effects. Additionally, the excessive or insufficient metabolism of chemotherapeutic drugs by cytochrome P450 can lead to a loss of drug efficacy, posing a significant challenge in cancer treatment. In this context, the use of natural plant-based products for treatment or prevention has been increasing due to their biological effects on cancer. Resveratrol, a plant phenolic compound, is known for its antioxidant and antimutagenic properties, as well as its ability to inhibit the proliferation and transformation of cancer cells. In this study, the effects of resveratrol on prostate cancer were investigated using molecular approaches, along with its effects on the cytochrome P450 isoform, Ethylmorphine N-Demethylase (CYP3A4), which metabolizes chemotherapeutic drugs. The cytotoxic effects of resveratrol on the prostate cancer cell lines PC-3, LnCaP, and the normal prostate cell line PNT1A were evaluated using the Alamar Blue assay. CYP3A4 enzyme activities were measured, and protein and mRNA expressions were analyzed using western blot and qRT-PCR, respectively. The IC_{50} value of resveratrol in the PC-3 cell line was calculated as 78.4 µM, while in the LnCaP cell line it was 76.2 µM, showing dose-dependent cytotoxic effects, with no toxic effects observed on the normal prostate cell line PNT1A. CYP3A4 enzyme activity increased by 64.2% in the PC-3 cell line, significantly inhibiting CYP3A4 in these cells, while no significant change was observed in the LnCaP cell line. Resveratrol treatment increased CYP3A4 mRNA expression by 2.5-fold in the PC-3 cell line and by 2.2-fold in the LnCaP cell line. Additionally, an increase in CYP3A4 protein levels was observed following resveratrol treatment. This study suggests that resveratrol may be a promising strategy for alternative and complementary treatment of prostate cancer.

Acknowledgment: This study was supported by TUBITAK (Project No: 113Z488).

Referance:

1) Baur J.A., Sinclair D.A.; Therapeutic potential of resveratrol: the in vivo evidence. Nat. Rev. Drug Discov. **2006**, 5, 493-506.

P12

Mapping Regulatory Networks and Discovering Drug Candidates in Pediatric Retinoblastoma

Sena Özyiğit[a, b], Beste Turanlı[a*]

[a*] *Marmara University, Faculty of Engineering, Department of Bioengineering, Istanbul, Turkey*

[b] *Biruni University, Faculty of Engineering and Natural Sciences, Department of Biomedical Engineering, Istanbul, Turkey*

*beste.turanli@marmara.edu.tr

Retinoblastoma is the most common intraocular cancer in children. Every year, 8,000 new cases are diagnosed worldwide, and it accounts for about 4% of all pediatric cancers.[1] It is caused by the inactivation of *RB1* genes known as tumor suppressor genes. In most cases, the cancer is detected at an advanced stage. Therefore, the discovery of new retinoblastoma biomarkers will contribute to early diagnosis and understanding of the pathogenesis of the cancer to define precise treatment strategies. In this study, we used three transcriptome datasets (GSE111168, GSE125903 and GSE208143) from the GEO database to determine differentially expressed genes (DEGs).[2] DEGs are used to construct the protein-protein interaction (PPI) network via Cytoscape.[3] GSE111168, GSE125903, GSE208677, and GSE7072 were used to determine differentially expressed miRNAs. Biomolecules of transcriptional regulation such as transcription factors (TFs) and miRNAs were proposed by implementing gene expression profiles through biomolecular networks at the genome level. The PPI network revealed 14 proteins as hub proteins, six proteins (*CDC20*, *CRK*, *DLG4*, *MCM2*, *PLK1*, and *YAP1*) were common according to the betweenness and degree metrics. In the miRNA-DEG network, 9 common hub miRNAs (hsa-let-7a-5p, hsa-let-7b-5p, hsa-miR-124-3p, hsa-miR-1273g-3p, hsa-miR-193b-3p, hsa-miR-4284, hsa-miR-4459, hsa-miR-574-5p and hsa-miR-603) were identified. The TF-DEG network revealed 7 reporter transcription factors (*E2F1*, *FOS*, *HNF4A*, *MYB*, *MYCN*, *SP5*, *TCF4*) for retinoblastoma. Drug repositioning was also performed using L1000CDS[2] for all datasets and 12 common drugs were determined while seven of these drugs had not been previously studied for retinoblastoma.[4] The top 3 drugs by rating overlap ratio were CAM-9-027-3, CAY10594, and niguldipine hydrochloride.

Acknowledgment: This research was supported by TÜSEB through project number 31169, Marmara University through project number FYL-2023-11040 and TÜBİTAK through the grant BIDEB 2210-A.

References:

1) Shields, Carol L.; Lally, Sara E. Retinoblastoma. Ocular oncology, **2019**, 91-99.
2) Barrett, Tanya, et al. NCBI GEO: archive for functional genomics data sets—update. Nucleic acids research, **2012**, 41.D1: D991-D995.
3) Shannon, Paul, et al. Cytoscape: a software environment for integrated models of biomolecular interaction networks. Genome research, **2003**, 13.11: 2498-2504.
4) Duan, Qiaonan, et al. L1000CDS2: LINCS L1000 characteristic direction signatures search engine. NPJ systems biology and applications, **2016**, 2.1: 1-12.

PP13

Saffron Pigments as a Natural Staining Agent for *Saccharomyces cerevisiae* Cell Wall Analysis Using Fluorescence Microscopy

Sueda Nur Ellialtıoğlu, Tolga OZKAN, Serdar KARAKURT

Selçuk University, Faculty of Science, Department of Biochemistry, Selçuklu, Konya, Turkiye

suedaellialtioglu@gmail.com

Saffron (*Crocus sativus*) is a highly valued plant that has been known and used throughout human history[1]. In addition to its applications in food, cosmetics, and medicine, saffron is also notable for its strong pigments, which have attracted attention in biotechnological and biochemical research. One of saffron's most distinctive features is its content of crocin and crocetin, carotenoid compounds that produce vibrant yellow and orange colors. These compounds possess a natural and potent staining capacity, offering potential for use in various biological systems. In this study, we investigated the potential use of saffron's pigmentation properties in examining the structural characteristics of Saccharomyces cerevisiae cells. For this purpose, 2 mg of saffron was weighed and incubated in deionized water (dH_2O) for 12 hours. After the incubation period, Saccharomyces cerevisiae cells were treated with the resulting solution for 5 minutes. The staining properties of saffron on the cells were observed using fluorescence microscopy under light with a wavelength of 200-400 nm. Our findings revealed that the saffron solution stained the outer cell wall of Saccharomyces cerevisiae but did not penetrate the cells. The use of saffron pigments for staining yeast cell walls provides clear microscopic images and presents saffron as a natural, non-toxic, and environmentally friendly alternative to conventional chemical dyes. This study highlights saffron's potential as a sustainable and safe staining agent for biological applications, particularly in the microscopic analysis of yeast cells.

References:

1) Tsimidou, M., Tsatsaroni, E. *Industrial Crops and Products*. **1993**, 1(4), 213-226.

PP14

Resveratrol's Impact on Prostate Cancer: Inhibition of Metastasis and Colony Formation via NQO1 Modulation

Elif BEKMEZCİ[a], Orhan ADALI[b], Serdar KARAKURT[a]

[a]*Selçuk University, Faculty of Science, Department of Biochemistry, Selçuklu, Konya, Turkiye*
[b]*Middle East Technical University, Department of Biological Sciences, Ankara, Turkiye*

elifbekmezci312@gmail.com

Prostate cancer is a significant public health concern, characterized by high mortality and incidence rates, and is commonly diagnosed in men. Despite the development of various treatments, many exhibit undesirable side effects. Furthermore, the efficacy of these drugs can be limited by their metabolism through Phase II enzyme systems. Consequently, there is an increasing interest in natural compounds with fewer side effects. Resveratrol, a prominent natural component, has demonstrated antioxidant and antimutagenic properties, along with efficacy in cancer research. This study aims to elucidate the molecular effects of resveratrol on prostate cancer, with a particular emphasis on the role of the NQO1 enzyme, which is crucial for cellular defense against oxidative stress and plays a vital role in cancer progression. Using the Alamar Blue assay, we assessed the cytotoxic effects of resveratrol on the prostate cancer cell line PC-3 and the normal prostate cell line PNT1A. We also investigated the potential of resveratrol to inhibit metastasis and colony formation in prostate cancer cells. The Western blot technique was employed to measure the protein expression levels of NQO1. Our findings revealed that the IC50 value of resveratrol in the PC-3 prostate cancer cell line was 78.4 µM, while it showed no toxic effects on the normal PNT1A cell line. Resveratrol inhibited the metastatic potential of the PC-3 cell line by 54.5% and reduced its colony formation capacity by 38.9%. Notably, resveratrol was found to enhance the protein levels of NQO1, highlighting its importance in cancer defense mechanisms. These results underscore the potential of resveratrol as a therapeutic agent in prostate cancer treatment, particularly through its ability to modulate NQO1 expression, which may contribute to improved cellular protection and reduced cancer progression.

Acknowledgment: This study was supported by TUBITAK (Project No: 113Z488).

Reference:

1. Liu P.L., Tsai J.R., Charles AL, Hwang J.J., Chou S.H., Ping Y.H., Lin F.Y., Chen Y.L., Hung C.Y., Chen W.C., ChenY.H, ChongIW. *Mol Nutr Food Res*., **2010**, 54(2), 196-204.

PP15

Investigation of the Cytotoxic Effects of Silver Zeolite Nanofibers Produced by Electrospinning Method on HaCaT Cell Line

Nilay TUFAN[a], Halis OGUZ[b], Serdar KARAKURT[c]

[a]*Institute of Health Sciences, Department of Chemical, Biological, Radiological and Nuclear Defense, Selcuk University, Turkiye*
[b]*Faculty of Veterinary Medicine, Department of Pharmacolcogy and Toxicology, Selcuk University, Turkiye*
[c]*Faculty of Science, Department of Biochemistry, Selcuk University, Turkiye*

nilaytufan1w3@gmail.com

Nanomaterial innovations hold significant promise for the treatment of acute injuries resulting from chemical, biological, radiological, and nuclear (CBRN) incidents. By employing low-toxicity composite materials as structural elements in the synthesis of nanofibers, it is possible to develop biocompatible, antimicrobial wound dressings that enhance the wound healing process. This study aims to investigate the wound healing potential of polymeric nanofiber dressings incorporating silver/zeolite nanoparticles. Silver nanoparticles (AgNPs) were synthesized via the chemical reduction method, with their characterization conducted through UV-Vis spectroscopy. The electrospinning technique was utilized to produce nanofibers, and optimization studies involved preparing solutions with varying concentrations of polyvinyl alcohol (PVA) and silver/zeolite composites to achieve effective wound dressings. Scanning electron microscopy (SEM) was employed for the shape and size analysis of the nanofibers. The cytotoxicity of the silver/zeolite composites was assessed in vitro using the Alamar Blue assay, with the healthy keratinocyte cell line HaCaT serving as the control. The ratio of live to dead cells was determined via Trypan Blue exclusion. Characterization revealed that AgNPs exhibited a peak absorption at 400 nm, confirming their nanoscale dimensions and silver content. Optimal electrospinning conditions were established, with a solution-collector distance of 15 cm, a voltage of 17 kV, and a solution flow rate of 0.5 mL/hour. Notably, no cytotoxic effects were observed in the in vitro studies. This research suggests that nanofiber wound dressings formulated with nano-sized materials may serve as effective alternatives to traditional wound dressings for therapeutic applications in injuries arising from CBRN incidents.

Reference:

1. Manea F, Motoc S, Pop A, Remes A, Schoonman J. *Nanoscale Res Lett*. **2012**,7(1), 331

PP16

Synthesis, Characterization, and Anticancer Activity of New Purine Derivatives

Nurdan Akdoğan[a], Ayşenur İşgüzar[b], Senem Akkoc[c,d], Ali Dişli[b*]

[a] *Department of Chemistry, Institute of Science, Gazi University, 06500 Teknikokullar, Ankara, Türkiye*

[b] *Department of Chemistry, Faculty of Sciences, Gazi University, Ankara, 06500 Teknikokullar, Türkiye*

[c] *Department of Basic Pharmaceutical Sciences, Faculty of Pharmacy, Suleyman Demirel University, Isparta, 32260, Türkiye*

[d] *Faculty of Engineering and Natural Sciences, Bahcesehir University, Istanbul, 34353, Türkiye*

**adisli@gazi.edu.tr*

Purines are vital heterocyclic molecules that fulfill the crucial role of storing and expressing genetic information. Nucleic acids' integral constituents provide crucial activities in cellular processes and coenzyme systems. Significant biologically active analogs can be readily synthesized by structural changes of purines. Particularly, purine derivatives containing sulfur show great promise in the treatment of cancer and autoimmune diseases[1-3]. The present work involved the synthesis and characterization of new purine derivatives that incorporate adenine and thiazole rings, both recognized for their bioactive characteristics. The synthesized compounds were characterized using spectroscopic techniques (^{1}H NMR, ^{13}C NMR, FT-IR, HR-MS). The synthesized compounds were assessed specifically against two different cancer cell lines. Among the compounds tested, two showed cytotoxic effects on the HepG2 liver cancer cell line and seven showed cytotoxicity against the MDA-MB-231 breast cancer cell line.

Acknowledgments

- We would like to express our sincere gratitude to Tübitak for their financial support, which made this study possible within the scope of the Tübitak 2209A program.
- SA would like to thank Suleyman Demirel University Research Fund for financial support with project number GDP-2024-9516.

References:

1. Sen, T., Adhikari, S., Baildya, N., & Ghosh, K. (2024). Functionalized Adenine-based Receptors for Monocarboxylic Acids' Recognition. *Current Organic Chemistry*, *28*(16), 1288-1299.
2. Dilek, G., Tekin, I. O., Coban, B., Disli, A., & Gercek, Z. (2021). Synthesis of novel selenotetrazole purine derivatives and their potential chemotherapeutic activities. Medicinal Chemistry Research, 30, 84-97.
3. Kinali-Demirci, S., Idil, O., Disli, A., & Demirci, S. (2020). Adenine derivatives for regenerable antibacterial surface applications based on A− T base pairing. ChemistrySelect, 5(32), 10128-10134.

PP17

Synthesis, Structural Characterization and *In Silico* Approaches of New Drug Candidate Molecules

Muhammed Yusuf Zorlu[a,*], Rahime Şeyma Koçak[a], Begüm Dönmez[a], Sümeyra Tuna Yıldırım[b]

[a,*] *Faculty of Pharmacy, Erzincan Binali Yıldırım University, Erzincan, Turkey*
[b] *Department of Analytical Chemistry, Faculty of Pharmacy, Erzincan Binali Yıldırım University, Erzincan, Turkey*

**m.yusufb24@gmail.com*

Azomethine compounds are a class of flexible ligands that are both resourceful and promising. Azomethine's nitrogen atom interferes with normal cellular functions. They have structural similarities with natural biological substances. Among ligands, Schiff bases are the focal point due to various structural features such as structural diversity, and chelating ability of the azomethine group, and these features make them suitable for research. Heterocyclic scaffolds with the azole ring system and phenol derivatives have been associated with a wide range of biological effects. The presence of nucleophile groups significantly facilitates the chelation of metal ions widely used in drug discovery, synthesis and catalysis. It is known that the presence of electron-rich species such as nitrogen (N), oxygen (O) and sulfur (S) in these compounds greatly increases their usage areas. They have excellent pharmacology application prospects in the modern era and are widely used in the pharmaceutical industry.[1] The azomethine group can be seen in drugs like Thiacetazone and Nifuroxazide (INN) available in the pharmacy.[2] Therefore, the characterization of the synthesized compounds and the investigation of their mechanisms of action are of great importance. Herein, (*E*)-2-Floro-4-bromo-6-{[(2-hydroxyphenyl)imino]methyl}phenol and its metal complexes were synthesized by using a salicylaldehyde derivate, and then some spectroscopic techniques such as FT-IR, ^{1}H-NMR, ^{13}C-NMR, XRD, SEM and UV-Vis were used at structural characterization.[3, 4] Molecular modeling program was used to elucidate the mechanism of action of the synthesized compounds. The active site where the docking will occur was determined and the interactions of possible drug molecule candidates synthesized by the Structure Based Drug Design method with the target receptor site were calculated using the Glide module in the Schrödinger program package.[5]

References:

1) Tsacheva, I., Todorova, Z., Momekova, D., Momekov, G., & Koseva, N., *Pharmaceuticals*, **2023**, 16(7), 938.
2) Hassan, A.S., Askar, A.A., Nossier, E.S., Naglah, A.M., Moustafa, G.O., & Al-Omar, M.A., *Molecules*, **2019**, 24(17), 3130.
3) Türkmenoğlu, M., Yıldırım, S.T., Altay, A., & Türkmenoğlu, B., *ChemistrySelect*, **2024**, 9(4), e202303519.
4) Rajimon, K.J., Elangovan, N., Khairbek, A.A., & Thomas, R., *Journal of Molecular Liquids*, **2023**, 370, 121055.
5) Lolak, N., Akocak, S., Türkeş, C., Taslimi, P., Işık, M., Beydemir, Ş., ... & Durgun, M., *Bioorganic Chemistry*, **2020**, 100, 103897.

PP18

DNA Binding Studies of Three New Bis(azo-imine) Based Transition Metal Complexes

Nagihan Saglam Ertunga[a,*], Ali Zengin[b], Kerim Serbest[c], Abdulmalek Hasan Mohammed Ghaleb[c]

[a]Karadeniz Technical University, Faculty of Science, Department of Chemistry, 61080, Trabzon, Türkiye
[b]Recep Tayyip Erdoğan University, Pazar Vocational School, 5330, Rize, Türkiye
[c]Recep Tayyip Erdoğan University, Faculty of Arts and Sciences, Department of Chemistry, 53100, Rize, Türkiye

* nagihan@ktu.edu.tr

DNA interacting is important in the processing of DNA such as replication, transcription, and recombination, and DNA-interacting agents are also powerful tools in cancer treatments, gene editing, and protein bioengineering. Therefore, the development of DNA interacting agents and/or artificial chemical nucleases are of great interest.[1]

In this study, the interaction of the newly synthesized and characterized bis(azo-imine) based transition metal complexes with DNA was examined using spectroscopic and electrophoretic methods. Spectroscopic DNA titration studies have shown that both ligand and three metal complexes interacted with DNA. Additionally, electrophoresis studies revealed that the dinuclear metal complex cleavages DNA in oxidative and light-induced manner. The results supported that this complex may be suitable agents for DNA-based drug development.

References:

1) Kato, K.; Ichimaru, Y.; Okuno, Y.; Yamaguchi, Y.; Jin, W.; Fujita, M.; Otsuka, M.; Imai, M.; Kurosaki, H. *Bioorg. Med. Chem. Lett.* **2021**, 36, 127834.

PP19

Investigation of Enzyme Activities of Enzyme-Inorganic Hybrid Nanoflowers (Ei-hNFs) Synthesized by Different Methods

İsmail Kızmaz*, Nalan Özdemir

Erciyes University Faculty of Science Chemistry Department Kayseri Türkiye

ismail193kizmaz@gmail.com

Because of their superior properties, enzyme-inorganic hybrid nanoflowers (Ei-hNFs) have attracted increasing interest in recent years [1]. Ei-hNFs are mostly synthesized by incubation (one-pot biomineralization) method [2] . It usually takes 3 days. So far, many Ei-hNFs have been synthesized by incubation method. However, sonication method has been applied recently in order to make the synthesis faster [3]. Sonication time varies between 5-30 minutes depending on the study. Only a few Ei-hNFs have been synthesized by the sonication method. There is no study in the literature yet examining in detail the effects of these two methods (incubation and sonication) on the Ei-hNFs.

Therefore, in this study, Ei-hNFs were synthesized using these two (incubation and sonication) methods. In both methods, laccase was used as the organic component and Cu(II) ions were used as the inorganic component. The synthesized Ei-hNFs were characterized using some appropriate techniques. The morphology of the synthesized Ei-hNFs was visualized by SEM. The presence and distribution of some important elements (Cu, O, P, N, S) in Ei-hNFs were investigated by EDX and SEM elemental mapping. Chemical structure analysis was performed by FT-IR and crystal structure analysis was performed by XDR. The activity of Ei-hNFs was determined spectrophotometrically. Thus, the effect of the synthesis method on the Ei-hNFs was determined.

This study is supported by a grant (Project Number: FYL-2024-13683) from Scientific Research Projects Committee of Erciyes University.

References

1) Khadega A. Al-Maqdi, Muhammad Bilal, Ahmed Alzamly, Hafiz M. N. Iqbal, Iltaf Shah, and Syed Salman Ashraf. Enzyme-Loaded Flower-Shaped Nanomaterials: A Versatile Platform with Biosensing, Biocatalytic, and Environmental Promise, Nanomaterials 2021, 11, 1460.
2) Merve Turk, Cevahir Altinkaynak, Nazlican Yangin, Nalan Özdemir. Fabrication of myoglobin hybrid nanoflowers for decolorization process of evans blue and congo red, Materials Letters, 325, (2022), 132853.
3) Zhiwei Han, Hongrao Wang, Jian Zheng, Shanshan Wang, Shuyu Yu, Lei Lu. Ultrafast synthesis of laccase-copper phosphate hybrid nanoflowers for efficient degradation of tetracycline antibiotics, Environmental Research 216 (2023) 114690.

PP20

Determination of the Antioxidant Properties of Papaveris Folium Ethanol Extract

Melisa Şima Yüksel[a], Turan Furkan OZKAN[b], Serdar KARAKURT[a]

[a]*Selcuk University, Faculty of Science, Department of Biochemistry, Konya, Türkiye*

[b]Selçuk University, Faculty of Pharmacy, Konya, *Türkiye*

melisayuksel35@gmail.com

The poppy plant (Papaver somniferum) is one of the indispensable plants in the healthcare and pharmaceutical industries due to its content of benzylisoquinoline alkaloids (1). Additionally, the fresh leaves of the plant, known as "Afyon Otu" (Poppy Herb) in folk usage, are consumed as food. The presence of morphine, codeine, and paramorphine in *P. somniferum* imparts sedative-hypnotic properties to the plant. When consumed, *P. somniferum* acts by neutralizing free radicals, thereby showing the potential in reducing the risk of diseases such as heart conditions and cancer in the human body. In this study, the antioxidant properties of the ethanol extract of *Papaveris folium* were investigated by determining the total phenolic and flavonoid content. To determine total phenolic content, gallic acid was used as a standard, and measurements were taken at 765 nm. For the determination of total flavonoid content, quercetin was used as a standard, with measurements taken at 415 nm. The total phenolic concentrations were found to be 62.8 µg/mL ± 0.2 for mature *P. folium* and 58.1 µg/mL ± 0.08 for immature *P. folium*. The total flavonoid concentrations were found to be 19.6 µg/mL ± 0.02 for mature *P. folium* and 23.4 µg/mL ± 0.005 for immature *P. folium*. Based on the obtained data, it was determined that both the mature and immature forms of *P. folium* possess antioxidant effects. Due to its antioxidant properties, *P. folium* serves as a preliminary step for future studies to investigate its sedative effects at the molecular level on cells, and thus, *P. folium* could be a potential therapeutic candidate for use as an analgesic.

Reference:

1) Muhammad W, Khan MA, Nazir M, Siddiquah A, Mushtaq S, Hashmi SS, Abbasi BH. *Mater Sci Eng C Mater Biol Appl*. **2019**, 103, 109740.

PP21

The Effect Of Bio-Priming Applications With Rhizobacteria (PGPR) And Salicylic Acid Derivative On Germination and Seedling Growth In Wheat Plant Under Salt Stress

Seyit Batuhan DUDAK[a], Hakan ARSLAN[b], Deniz EKİNCİ[a,c]

[a] *Ondokuz Mayıs University, Faculty of Agriculture, Department of Agricultural Biotechnology, Samsun, Turkiye*
[b] *Ondokuz Mayıs University, Faculty of Agriculture, Department of Agricultural Structures and Irrigation, Samsun, Turkiye*
[c] *University of Oxford, Deparment of Chemistry, Oxford, United Kingdom*
**deniz.ekinci@chem.ox.ac.uk*

Stress factors negatively affect the growth and development process of plants. Nowadays, abiotic stress factors especially hinder the growth and development of plants.[1] Salinity is one of the most important problems in agricultural activities and is becoming a global problem. It is expected that more than 50% of total agricultural land will be affected by salinity by 2050.[2] If the plant is exposed to high amounts of salt, oxidative stress increases due to impaired conductivity of chlorophyll and stomata in the plant leaves, resulting in impaired enzymatic levels.[3] Some methods are applied before and after planting to improve crop production. In this study, priming with salicylic acid derivative and PGPR was applied to prevent the negative effects of salinity and support plant growth in wheat plants. Wheat plants were treated with six different irrigation water salinities (0.38, 2, 4, 7, 10, 15 dS/m) and three different priming treatments (Control, BA and PGPR). Among the different priming treatments, PGPR increased the germination rate and wet weight by 5.20% and 12.10%, respectively, compared to the control group. Furthermore, PGPR treatments increased catalase, ascorbate peroxidase, glutathione reductase and superoxide dismutase enzyme activities by 16.35%, 14.04%, 71.87% and 16.35%, respectively, while BA treatment increased guaiacol peroxidase activity by 7% compared to the control group. PGPR treatment decreased malondialdehyde content by 29.62%, while it increased proline content by 23.23%. As a result, it was determined that priming applications against salt stress in wheat plants positively affected germination, growth and development of the plant and it is thought that the applications will be effective in different plants.

References:

1) Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). Impacts of climate change on the future of biodiversity. Ecology letters, 15(4), 365-377.
2) Shrivastava, P., & Kumar, R. (2015). Soil salinity: a serious environmental issue and plant growth promoting bacteria as one of the tools for its alleviation. Saudi journal of biological sciences, 22(2): 123-131.
3) Omoto, E., Taniguchi, M., and Mayake, H. (2012). Adaptation responses in C4 photosynthesis of maize under salinity. J. Plant Physiol. 169, 469–477

PP22

Investigation of Anticancer and Antioxidant Properties of *Potentilla recta* Plant on Different Cancer Cell Lines

Esma Kübra KAĞAN YENİÇERİ*[a], Ahmet ALTAY[b]

[a]*Department of Chemistry, Institute of Science and Technology, Erzincan Binali Yıldırım University, 24030, Erzincan, Turkey*
[b]*Department of Chemistry, Faculty of Arts and Sciences, Erzincan Binali Yıldırım University, 24100 Erzincan, Turkey*
*esma.kagan@gmail.com

In this study, the antioxidant and cytotoxic activities of the water and methanolic extracts of the plant *Potentilla recta* was investigated. Antioxidant activities were assessed on the basis of total phenolic and total flavonoid contents, DPPH radical scavenging and ferrous ion reducing antioxidant power capacities.[1] The cytotoxic activities of the extracts were tested on HEP3B, A549, HeLa and HT-29 human cancer cell lines using the XTT method.[2-3] The Folin Ciocalteu and aluminium chloride studies demonstrated that the methanol extract from the plant exhibited a higher concentration of phenolic and flavonoid contents. Additionally, the methanolic extract demonstrated a significantly enhanced iron ion reducing capacity, which correlated with the observed increase in phenolic content. The XTT analysis demonstrated that the water and methanolic extracts exhibited considerably enhanced cytotoxicity against diverse human cancer cell lines, with markedly reduced IC_{50} values. The methanol extract of the plant demonstrated a markedly potent IC_{50} value (IC_{50}=78.29±0.043 µg/mL) against the HEP3B cancer cell line, whilst the water extract exhibited the most efficacious result with the lowest IC_{50} value against both HT-29 (IC_{50}=37.13±0.017 µg/mL) and HeLa (IC_{50}=21.20±0.015 µg/mL) cell lines. The results were found to be ineffective for the A549 cell line. These preliminary results suggest that the methanol extract of the plant, with its rich phytochemical content, has a potent in vitro antioxidant cytotoxic effect, opening the door to *in vivo* anticancer studies.

References:

1. Altay, A.; Yeniceri, E.; Taslimi, P.; Taskin-Tok, T.; Yilmaz, M. A.; Koksal, E. *S. Afr. J. Bot.* **2022**, 150, 940-955.
2. Demirci, S.; Alp, C.; Akşit, H.; Ulutaş, Y., Altay, A.; Yeniçeri, E.,Köksal, E.; Yaylı, N. *Chem Biol Drug Des*. **2023**, 101(6), 1273-1282.
3. Yeniçeri, E.; Altay, A.; Koksal, E.; Altın, S.; Taslimi, P.; Yılmaz, M. A.; Cakır, O.; Tarhan, A.; Kandemir, A. *Eur. J. Integr. Med.* **2024,** 66, 102337.

PP23

Exploring the Cytotoxic and Antioxidant Properties *Hedysarum candisissimum* on the A549 Cell Line.

İkra PİRBUDAK*[a], Esma Kübra KAĞAN YENİÇERİ[a], Ahmet ALTAY[b]

[a]*Department of Chemistry, Institute of Science and Technology, Erzincan Binali Yıldırım University, 24030, Erzincan, Turkey*
[b]*Department of Chemistry, Faculty of Arts and Sciences, Erzincan Binali Yıldırım University, 24100 Erzincan, Turkey*

**ikrapirbudak0@gmail.com*

The current study investigates the total phenolic and flavonoid contents, antioxidant activities and cytotoxic effects of hexane, ethyl acetate, water and methanol extracts obtained from the above-ground parts of *Hedysarum candidissimum*. The total phenolic and total flavonoid contents of the extracts were determined separately by means of Folin–Ciocalteu and aluminium chloride colorimetric analysis. The antioxidant activity of the extracts was evaluated through the use of two distinct analytical techniques: DPPH radical scavenging and ferric ion reducing antioxidant power (FRAP) analysis.[1] The cytotoxicity of the extracts was investigated using the XTT assay on the human lung cancer (A549) cell line.[2] The Folin–Ciocalteu and aluminium chloride colorimetric analyses demonstrated that the methanol extract from the plant exhibited a higher concentration of phenolic and flavonoid compounds.[3] In addition, the methanolic extract demonstrated significantly enhanced DPPH radical scavenging and ferrous ion reducing capabilities. The XTT analysis revealed that the water extract exhibited markedly enhanced cytotoxicity against the examined A549 cancer cells, with considerably lower IC_{50} values, followed by the methanol extract. In conclusion, the findings have provided a foundation for further anticancer research, given the plant's rich chemical composition.

References:

1. Altay, A.; Yeniceri, E.; Taslimi, P.; Taskin-Tok, T.; Yilmaz, M. A.; Koksal, E. *S. Afr. J. Bot.* **2022**, 150, 940-955.
2. Altay, A.; Yeniçeri, E. K. K.; Taslimi, P.; Taskin-Tok, T.; Yılmaz, M. A.; Köksal, E. *ChemistrySelect.* **2022**, 7(23), e202200039.
3. Altay, A.; Tohma, H.; Durmaz, L.; Taslimi, P.; Korkmaz, M.; Gulcin, I.; Koksal, *E. J. Food Biochem*. **2019**, 43(7), e12908.

PP24

Investigation of Anticancer and Antioxidant Potentials of *Pastinaca erzincanensis* on HeLa Cell Line

Kardelen Damla ALKİM*[a], Esma Kübra KAĞAN YENİÇERİ[a], Ahmet ALTAY[b]

[a]*Department of Chemistry, Institute of Science and Technology, Erzincan Binali Yıldırım University, 24030, Erzincan, Turkey*
[b]*Department of Chemistry, Faculty of Arts and Sciences, Erzincan Binali Yıldırım University, 24100 Erzincan, Turkey*

*alkimkardelen@hotmail.com

Natural products are defined as pure compounds that have been isolated from plants, fungi, animals, or microorganisms. Secondary metabolites are produced biosynthetically from primary metabolites, which consist of carbohydrates, proteins and fats that are necessary for the survival of the organism in plants. It is established that certain endemic plants, which are also defined as ethnobotanical plants, are employed in the treatment of various diseases among the general public.[1] It has been demonstrated that Pastinaca sativa, a member of the Pastinaca family, displays a range of biological activities as a consequence of the research conducted. The present study investigated the total phenolic and flavonoid contents, antioxidant activities and cytotoxic effects of ethyl acetate, water and methanol extracts obtained from the aboveground parts of the endemic plant *Pastinaca erzincanensis* (*P.erzincanensis*). The total phenolic and total flavonoid contents of the extracts were evaluated separately by Folin–Ciocalteu and aluminium chloride colorimetric analyses, and antioxidant activities were evaluated by DPPH radical scavenging and iron ion reducing antioxidant power (FRAP) analyses.[2] The cytotoxic effects of the extracts were investigated on the HeLa cell line, a human cervical cancer cell line, with the use of the XTT analysis.[3] The Folin–Ciocalteu and aluminium chloride colourimetric analyses demonstrated that the methanol extract obtained from the plant exhibited a higher concentration of phenolic and flavonoid compounds. In addition, the methanolic extract demonstrated a considerably higher iron ion reducing capacity in parallel with the phenolic contents. The DPPH radical scavenging results demonstrated that all three extracts exhibited considerable efficacy, particularly in comparison to the standards. All extracts of the *P. erzincanensis* plant demonstrated superior efficacy in the DPPH test when compared to the synthetic standards, Trolox and BHT. The antioxidant results for *P. erzincanensis* demonstrated a notable degree of efficacy when compared to other plants within the Pastinaca family. Compared to similar plants belonging to the Pastinaca family, the antioxidant results of *P. erzincanensis* showed quite significant results. XTT analysis results revealed that the methanolic extract showed much stronger cytotoxicity against the tested HeLA cancerous cells, with much lower IC_{50} values. In conclusion, all these results suggest that *P. erzincanensis* provided a basis for the evaluation of different biological activities, thanks to the rich phytochemical content of the plant.

References:

1) Altay, A.; Yeniceri, E.; Taslimi, P.; Taskin-Tok, T.; Yilmaz, M. A.; Koksal, E. *S. Afr. J. Bot.* **2022**, 150, 940-955.
2) Altay, A.; Tohma, H.; Durmaz, L.; Taslimi, P.; Korkmaz, M.; Gulcin, I.; Koksal, *E. J. Food Biochem*. **2019**, 43(7), e12908.
3) Demirci, S.; Alp, C.; Akşit, H.; Ulutaş, Y., Altay, A.; Yeniçeri, E., Köksal, E.; Yaylı, N. *Chem Biol Drug Des*. **2023**, 101(6), 1273-1282.

PP25

Development of L-Proline Imprinted Nanofilm-Coated Surface Plasmon Resonance Sensors for Diagnosis and Monitoring of Esophageal Cancer and Hyperprolinemia

Saygın Altürk*, Pırıl Arısoy, Gözde Baydemir Peşint

Adana Alparslan Türkeş Science and Technology University, Faculty of Engineering Sciences, Department of Bioengineering, Adana/Türkiye

*sayginalturk@hotmail.com

L-proline is essential for human health because It promotes tissue repair, guaranteeing appropriate wound healing and a decrease in scarring[1,2]. Additionally, it has been documented in the literature that metabolic patients with esophageal cancer had significantly lower serum proline levels. Molecularly Imprinted Polymers (MIPs) are synthetic polymers that use a specific target molecule as a "template" and create recognition sites specific to this molecule in their structure. MIPs, can be used as recognition components in surface plasmon resonance (SPR) sensors. SPR biosensors provide rapid, sensitive, and economical detection of target biomolecules by measuring changes in the refractive index on or near a thin metal film. Furthermore, when combined with MIPs, the selectivity and sensitivity of the sensors can be significantly increased[3]. In this study, aim was to synthesize L-proline imprinted nanofilms on the surface of gold SPR chip to selectively detect the L-proline molecule from human serum. In order to determine the most effective pre-complex ratio to be used in nanofilm synthesis, pre-complexes were prepared with Pro:VIM at different molar ratios. The molar ratio of 1:4, which is the ratio where maximum absorbance is obtained, was selected to be used in the study. Poly (2-hydroxyethyl methacrylate) (PHEMA)-based Pro-MIP and non-imprinted (NIP) SPR sensors were synthesized and characterized by scanning electron microscope images (SEM), Fourier Transform Infrared Spectroscopy (FTIR), Atomic Force Microscopy (AFM) and contact angle measurements. The thickness of Pro-MIP and NIP nanofilms was determined to be less than 100 nm. According to SEM analysis results, it was observed that polymerization occurred homogeneously on the surface. Aqueous L-proline solutions at various concentrations were used in adsorption studies for the real-time detection of prolin and detection limit was obtained as 0.0005 mg/mL. The SPR isotherm parameters were determined accordingly, and the results demonstrated that Pro-MIP SPR sensors were more compatible with the Langmuir isotherm model. Selectivity of the SPR sensor for L-prolin was evaluated in presence of competitor molecules L-histidine and L-phenylalanine. In addition, it was determined that Pro-MIP SPR sensors can be used up to 5 times without significant decrease in adsorption capacity. Outcomes showed that a biosensor was obtained that could determine L-proline in low detection limits, simultaneously.

References

1) V. L. Albaugh, K. Mukherjee, and A. Barbul, *J Nutr*, vol. 147, no. 11, pp. 2011–2017, Nov. 2017.
2) T. Ponrasu *et al.*, *Amino Acids*, vol. 45, no. 1, pp. 179–189, Jul. 2013
3) J. Homola, *Chem Rev*, vol. 108, no. 2, pp. 462–493, Feb. 2008 .

PP26

Extremely Low-Electromagnetic Field: Friend or Foe against the Neurons? A Scoping Review of Last Decade (2014-2024) from Omics Perspective

Sinan KANDIR[a, b,c], Neriman EZGIN[b], Cigdem GOKCEK-SARAC[d], Serdar KARAKURT[e]

[a]*Department of Physiology, Ceyhan Faculty of Veterinary Medicine, Cukurova University, Adana, Turkiye*

[b]*Department of Biotechnology, Institute of Natural and Applied Sciences, Cukurova University, Adana, Turkiye*

[c]*Department of Translational Medicine, Institute of Medical Science, Cukurova University, Adana, Turkiye*

[d]*Department of Biomedical Engineering, Faculty of Engineering, Akdeniz University, Turkiye*

[e]*Department of Biochemistry, Faculty of Science, Selcuk University, Turkiye*

*sinankandir@cu.edu.tr

Extremely low frequency electromagnetic fields (ELF-EMF) are a unique class of electromagnetic radiation characterized by frequencies ranging from 0 to 300 Hz. These fields are often emitted by various electrical devices and power lines, and their potential impact on human health and the environment has been a subject of ongoing research and debate.[1] The frequency, and intensity of the EMF can cause significant differences in its mechanism of action. Exposure to ELF-EMFs in particular may lead to sustained changes and reorganization in neuronal plasticity, which may affect nerve cell functions and signals in the long term. This review aims to scope the effects of ELF-EMFs on neuronal plasticity, the adaptive processes of neurons, and the proteomic changes that occur during these processes. The study was methodologically designed using scoping study frameworks. The search terms included "extremely low-frequency electromagnetic fields" AND "neuroplasticity" AND "neuronal plasticity" and "neural plasticity" AND "neuron plasticity" AND "plasticity" AND "neuronal" AND "neurogenesis" AND "neuron" AND "neural" in PubMed, Web of Science and Scopus databases. Time restrictions were applied from 2014 to 2024 and, the review articles were excluded. A total of 66 articles were independently evaluated by the authors, and a common consensus was reached after discussion. From these, 34 research articles were included in the scoping study. The articles were evaluated and analyzed by web-based tool Rayyan, following a scoping review approach. The results suggest that neuronal regeneration and neuroplasticity occur during neurodegenerative diseases. However, the researchers mostly reported that under normal circumstances the neural cells' fate is negatively affected by the ELF-EMF. On the other hand, ELF-EMF provokes anxiety-like behaviors.

References:

1) SCENIHR (Scientific Committee on Emerging and Newly Identified Health Risks), Potential health effects of exposure to electromagnetic fields (EMF), 27 January 2015.

PP27

Determination of Essential Oil and Aroma Content of *Origanum onites* L. by GC-MS

Barış Reşitoğlu[a], Emir Hasan Osmanoğlu[a], Mehmet Veysi Çağlayan[a], Ferit Demirel[a], Serkan Yiğitkan[b], İsmail Yener[c], Mehmet Akdeniz[a], Hüseyin Alkan[d], Abdulselam Ertaş[c]

[a]*Dicle University, Institute of Health Sciences, Department of Analytical Chemistry,21280-Diyarbakir, Turkey*
[b]*Dicle University, Faculty of Pharmacy, Department of Pharmacognosy, 21280 Diyarbakir, Turkey*
[c]*Dicle University, Faculty of Pharmacy, Department of Analytical Chemistry, 21280 Diyarbakir, Turkey*
[d]*Diyarbakir Group Chairmanship, The Council of Forensic Medicine, Diyarbakir, Turkey*
[e]*Dicle University, Faculty of Pharmacy, Department of Biochemistry, 21280 Diyarbakir, Turkey*

**mhalkan@dicle.edu.tr*

Lamiaceae family members are important in pharmacology and perfumery industry because they contain volatile and aromatic oil. *Origanum onites* L. is one of the most important medicinal and aromatic plant grown in the Mediterranean area and extensively using in many traditional medicinal and culinary since ancient times. The components of the essential oils obtained by hydrodistillation method using Clevenger apparatus were determined by GC/FID gas chromatography and mass spectrometry (MS). Relative percentages of the separated components were calculated from the data collected in GC-FID analysis. Alkanes were used as reference points for Kovats Index (KI) calculation. Identification of the essential oil components was done by comparing the retention times and mass spectra with the retention times and mass spectra of the original samples. NIST and Wiley GC-MS libraries were also used for the determination of essential oil components. All chromatographic conditions for aroma analysis were the same as the essential oil analysis parameters, except that sample extraction was performed by SPME (Solid Phase Microextraction) method. 95.31% of the essential oil and 97.85% of the aroma of *Origanum onites* species were elucidated and 24 and 29 components were identified, respectively. The major components of the essential oil were identified as carvacrol (39.80%), p-cymene (11.30%) and Terpinen-4-ol (11.22%). The major components of the aroma was determined as carvacrol (64.60%), p-cymene (4.40%) and Y-terpinene (4.16%)

PP28

DNA Interaction and α-Glucosidase Inhibition Potential of a Newly Synthesized Zn(II) Phthalocyanine Complex

Melike Yildirim Akatin[a,*], Ece Tugba Saka[b], Nagihan Saglam Ertunga[b]

[a]*Karadeniz Technical University, Macka Vocational School, Trabzon, Turkey*

[b]*Karadeniz Technical University, Faculty of Science, Department of Chemistry, Trabzon, Turkey*

**myildirim@ktu.edu.tr*

Phthalocyanine compounds are unique macrocyclic molecules with an 18 π electron system that are used in many areas such as catalysts, liquid crystals and organic semiconductors as well as therapeutic agents for anticancer, antibacterial and antiviral treatments.[1] Due to its primary cellular functions, DNA is a target molecule for many drug molecules in particular in the treatment of cancer, viral, and bacterial diseases. Also, inhibitors of α-glucosidase are used to diabetes by retard the absorption of glucose in the digestive organs.[2] In this study, DNA interaction and α-glucosidase inhibition potential of a new Zn(II) phthalocyanine compound were investigated by using spectroscopic and electrophoretic methods.

The results of the study showed that the complex interacted with DNA and showed DNA cleavage activity. It also inhibited the α-glucosidase **(IC_{50} = 0.23 µM) more than acarbose (IC_{50}** = 665.84 **µM**) with non-competitive manner. The results support that the new molecule may be use an antimicrobial or anticancer, and antidiabetic agent.

References:

1) Ertunga, N. S., Saka, E. T., Taskin-Tok, T., Bektas, K. I., Akatin, M. Y. (2024). Dalton Transactions, 53(27), 11354-11367.
2) Ertunga, N. S., Saka, E. T., Taskin-Tok, T., Akatin, M. Y., Bektas, K. I., Colak, A. (2024). Applied Organometallic Chemistry, e7583.

PP29

Decolorization of Congo Red Dye with HRP Enzyme Purified by Aminobenzohydrazide-based Affinity Chromatography

Nurgül ABUL*, Hasan ÖZDEMİR

Atatürk University, Faculty of Science, Department of Chemistry, Erzurum, Türkiye

*nurgul.abul@ogr.atauni.edu.tr

Due to the increasing production and applications of synthetic dyes, as well as the demand for textile products, dye wastewater has become a major source of pollution worldwide. Directly discharged or incompletely processed synthetic dyes significantly affect the aesthetic value, water transparency and gas solubility of the water body.[1] On the other hand, some toxic substances in paints threaten human health by causing bleeding, skin ulceration, nausea and dermatitis.[3] Therefore, water pollution from dyes is a current and growing problem that requires attention. Currently used synthetic dyes are processed by physical and chemical methods, which have financial and methodological disadvantages. Thus, it is important to determine environmentally friendly, economical and easily applicable methods. Compared to other methods, enzymes are advantageous in that they form mild and less toxic reagents, are environmentally friendly, have the ability to degrade a wide range of substrates, and can be applied to a wide variety of dyes.[3] Horseradish peroxidase (HRP, EC 1.11.1.7) obtained from horseradish roots is one of the most widely studied peroxidases and is effective for oxidizing azo dyes to compounds with lower toxicity.[4] For this purpose, HRP enzyme was purified from horseradish plant root in a single step using the aminobenzohydrazide-based affinity chromatography technique that we designed according to the previously determined method[5] and its decolorization potential on Congo red azo dye was determined. Optimization experiments were performed for pH (4.0-8.0), enzyme amount (max 13 EU/L), temperature (20ºC-70ºC), H_2O_2 (2.25 mM stock solution) and dye concentration (4-25 mg/L). According to the results obtained, the highest decolorization was observed in 30 minutes at 0.15 mM H_2O_2, pH 4.0 and 50°C. Increasing the dye concentration resulted in a decrease in % decolorization. By increasing the amount of HRP enzyme (0.66-13 EU/L), dye removal increased from %8.76 to %18.34 in the same period of time and to %44.08 after 2 hours. As a result, the potential of the HRP enzyme purified by us on the color removal of a synthetic dye used in textiles that has adverse effects on the environment and health was revealed.

References:

1) Banat, I. M., Nigam P., Singh D. & Marchant R.**,** *Bioresour. Technol.* **1996,** *58*(3), 217–227.
2) Lee, Y. H., Matthews, R. D., & Pavlostathis, S. G. *Water Environ. Res.* **2006,** 78 (2), 156–169.
3) Coconi-Linares N., Ortiz-Vázquez E., Fernández F., Loske, A. M., & Gómez-Lim, M. A. *J. Biotech*. **2015,** *209*, 76–84.
4) Yassin, M.A., Gad, A.A.M., *J. Environ. Chem. Eng.* **2020,** 8, 104435.
5) Almaz Z., Oztekin A., Abul N., Gerni S., Erel D., Kocak, S. M.; Sengül, M. E. & Ozdemir H. *Appl. Biochem. Biotechnol.* **2021,** *68*(1), 102–113.

PP30

Synthesis of Silver Nanoparticle Using Olive Leaves (Domat var.)

Nermin GEBEŞÇE, Gülbeyaz ALP, Şebnem SELEN İŞBİLİR*

Trakya University, Faculty of Science, Department of Chemistry, Edirne/Turkiye

**sebnemselenisbilir@trakya.edu.tr*

Plants can be used as reducing and stabilizing agents in nanoparticle synthesis due to their content of secondary metabolites such as phenolic compounds, flavonoids, phenolic acids, and alkaloids, which have various biological activities.[1,2] The use of plant resources as reducing agents in green synthesis steps is important especially in terms of evaluation of plant wastes and sustainability. In addition, compared to chemical and physical nanoparticle synthesis methods, the green synthesis method also has advantages such as low cost, operation at low temperatures, ease of application, and not using toxic materials.[3,4]

In this study, it was aimed to synthesize silver nanoparticles (AgNP) using the green synthesis method with Domat variety olive leaves. The synthesized silver nanoparticles were characterized using UV-VIS (Ultraviolet and Visible Region Spectroscopy), SEM (Scanning Electron Microscopy), and SEM/EDX (Scanning Electron Microscopy with Energy Dispersive X-ray Spectroscopy) analyses. The total phenolic content of the nanoparticles produced by green synthesis and olive leaf extract, and their antioxidant activity by DPPH radical scavenging method were determined. According to the data obtained from the study; the peaks in the range of 200-316 nm due to phenolic and flavonoid compounds in olive leaf extract decrease, while the formation of peaks in the range of 400-450 nm indicates the formation of AgNP. In addition to the surface evaluation made by SEM analysis, it was determined that the nanoparticles contained 14.5% silver element based on SEM/EDX data. The radical scavenging power of AgNPs synthesized using olive leaf extract is over 50%, and it has been determined that a significant portion of the phenolic compounds present in olive leaves were used as reducing agents during the nanoparticle synthesis. The preference for green synthesis methods in nanoparticle synthesis offers an environmentally friendly alternative where natural plant wastes can be utilized.

(This study was conducted as a Graduation Thesis in the 2023-2024 Academic Year.)

References

1) Soni, V.; Raizada, P.; Singh, P. et al. *Environ. Res.* **2021,** 111622.
2) Ahmed, S.F.; Mofijur, M.; Rafa, N. et al. *Environ. Res.* **2022,** 204, 111967.
3) Basnet, P.; Chanu, T.I.; Samanta, D.; Chatterjee, S. *J. Photochem. Photobiol. B.* **2018,** 183, 201-221.
4) Kumar, S.; Basumatary, I.B.; Sudhani, H.P.K. et al. Trends Food Sci. Technol. **2021,** 112, 651-666.

PP31

Preparation and Characterization of Magnetic Enzyme-Inorganic Hybrid Nanoflowers (ME-ihNFs)

Hava İlkaya*, Nalan Özdemir

Erciyes University Faculty of Science Chemistry Department Kayseri Türkiye

Immobilization enables enzymes to be reused and thus facilitates the use of enzymes in industrial processes. So far, many different immobilization methods have been developed by researchers. Enzyme-inorganic hybrid nanoflowers (Ei-hNFs) are one of the enzyme immobilization methods that have been studied intensively for the last 12 years due to their superior properties[1]. However, one of the biggest challenges in the use of Ei-hNFs is the difficulty in separating them by centrifugation[2]. To address this issue, magnetic enzyme-inorganic hybrid nanoflowers (MEi-hNFs) have emerged as a promising alternative enzyme immobilization platform due to their easy separation, structural stability, and ability to enhance catalytic efficiency[3]. Magnetic nanoparticles are used for this purpose. The magnetic immobilized enzyme can realize multiple recycling of the enzyme and increase the usage time of the enzyme.

Therefore, in this study, MEi-hNFs were synthesized using laccase, MNPs and Cu(II) ions. The synthesized MEi-hNFs were characterized using some appropriate techniques. The morphology of the synthesized Ei-hNFs was visualized by SEM. The presence and distribution of some important elements (Cu, Fe, O, P, N, S) in MEi-hNFs were investigated by EDX and SEM elemental mapping. Chemical structure analysis was performed by FT-IR and crystal structure analysis was performed by XDR. The activity of Ei-hNFs was determined spectrophotometrically. Thus, the effect of the synthesis method on the synthesized Ei-hNFs was determined.

Hava İlkaya financial support is provided by TUBITAK BIDEB 2210-C. I would like to thank Tubitak Bideb for its support. (2210 - MSc/MA Scholarship Programs)

References

1- Aydemir D., Gecili F., Özdemir N., Ulusu N.N. 2020. “Synthesis and characterization of a triple enzyme-inorganic hybrid nanoflower (TrpE@ihNF) as a combination of three pancreatic digestive enzymes amylase, protease and lipase” Journal of Bioscience and Bioengineering 129: 679-686.

2- Khadega A. Al-Maqdi, Muhammad Bilal, Ahmed Alzamly, Hafiz M. N. Iqbal, Iltaf Shah, and Syed Salman Ashraf. “Enzyme-Loaded Flower-Shaped Nanomaterials: A Versatile Platform with Biosensing”, Biocatalytic, and Environmental Promise, Nanomaterials 2021, 11, 1460.

3- Pravin D. Patil, Radhika K. Kelkar, Neha P. Patil, Pradnya V. Pise, Sadhana P. Patil, Arundhatti S. Patil, Nishant S. Kulkarni, Manishkumar S. Tiwari, Ajay N. Phirke & Shamraja S. Nadar, “Magnetic nanoflowers: a hybrid platform for enzyme immobilization”, CritiCal reviews in Biotechnology, 2024, 44 (5) 795–816.

PP32

Molecular Signatures of Polycystic Ovarian Syndrome Identified by Integrative Bioinformatics Approach

Ebrar Gezer, Ceyda Kasavi

Department of Bioengineering, Marmara University, Istanbul, Turkey

**ceyda.kasavi@marmara.edu.tr*

Polycystic Ovary Syndrome (PCOS) is a complex and lifelong condition affecting women's reproductive and metabolic health. PCOS leads to significant metabolic issues such as diabetes, hypertension, and cardiovascular disease due to its association with insulin resistance and hormone imbalances. The primary symptoms include irregular menstrual cycles, excess hair growth (hirsutism), and difficulties in conceiving, which can vary depending on age, weight, and ethnicity. The molecular mechanisms driving PCOS involve various genetic, endocrine, and environmental factors, yet they remain incompletely understood. This study aimed to identify novel molecular signatures for PCOS through bioinformatics approaches. Meta-analysis of transcriptome data and integrative analysis of gene expression with human biological networks at various levels revealed hub proteins and reporter molecules (i.e., transcription factors, miRNAs, and metabolites) vital to disease pathogenesis. A total of 1237 differentially expressed genes (DEGs) were commonly identified through the analysis of three independent datasets. Enrichment analysis of DEGs revealed significant alterations in metabolic and hormonal regulation pathways, including the AGE-RAGE and cAMP signaling pathways, which are critical in PCOS pathogenesis. YWHAH and ACTB were identified as hub proteins, highlighting their central roles in PCOS. Reporter receptors ESR1 and AR were determined as key regulators of hormonal pathways, while hsa-miR-26a-5p emerged as the most central reporter miRNA, playing a significant role in metabolic regulation and inflammation. This systems-level analysis sheds light on the underlying pathways driving PCOS and suggests potential molecular signatures for targeted therapies.

PP33

Selective and fast potentiometric determination of local anesthetic procaine in pharmaceutical samples

Oguz Özbek[a], Onur Cem Altunoluk[b,*]

[a]*Tokat Gaziosmanpaşa University, Faculty of Science and Arts, Department of Molecular Biology and Genetics, 60250 Tokat, Türkiye*

[b]*Tokat Gaziosmanpaşa University, Faculty of Science and Arts, Department of Chemistry, 60250 Tokat, Türkiye*

** altunolukonurcem@gmail.com*

Procaine which was first synthesized by Alfred Einhorn in 1950, is one of the ester–structured local anesthetics.[1] To date, liquid chromatography, gas chromatography and spectrophotometric methods have been used to determine procaine in pharmaceutical samples.[2] However, these methods lack certain advantages provided by potentiometric techniques. Potentiometric sensors offer particular advantages including wide linear concentration range, ease of preparation and use, low cost, short response time, low limit of detection, long lifetime, high selectivity and good reproducibility.[3,4] In this study, a poly(vinyl chloride) (PVC) membrane potentiometric sensor was developed for the determination of procaine. For this purpose, procaine–tetraphenylborate ion pair was synthesized and used as an ionophore. The developed procaine–selective potentiometric sensor was shown to work in a wide concentration range and to have a low limit of detection. Besides, the sensor had fast response time, good selectivity and good reproducibility. The newly developed sensor was able to determine procaine in injection samples with very high recoveries.

References

[1] Zhang, X.; Zhao, D.; Feng, L.; Jia, L.; Wang, S. *Microchim. Acta* **2010**, *169*, 153–159.
[2] Özbek, O.; Altunoluk, O. C. *Anal. Biochem*. **2024**, *695*, 115657.
[3] Özbek, O.; Altunoluk, O. C. *Sensor Int.* **2023**, *4,* 100224.
[4] Özbek, O.; Altunoluk, O. C. Isildak, Ö. *Anal. Sci.* **2024**, *40,* 141–149.

PP34

Identification of Salt and Drought Stress Related Hub Genes in *Arabidopsis thaliana*

Tuğba GÜRKÖK-TAN[a]*, Veyis KARAKOÇ[b], Gülşen GÜÇLÜ[c]

[a*]*Cankiri Karatekin University, Food and Agriculture Vocational School, Department of Field Crops, Cankiri, Türkiye*

[b]*Cankiri Karatekin University, Eldivan Vocational School of Health Services, Çankırı, Türkiye*

[c]*Sivas Cumhuriyet University, Health Services Vocational School, Department of Health Programmes, Sivas, Türkiye*

**t.gurkokmail.com*

Abiotic stresses cause significant loss of agricultural output in the world. Throughout their lives, plants are exposed to a variety of adverse environmental circumstances. Drought and salt are two major variables that limit plant water intake and influence plant growth and development.[1] In this study we aim to identify the hub genes playing important roles in salt and drought stresses in Arabidopsis thaliana. The microarray data were downloaded from Gene Expression Omnibus (GEO). Differentially expressed genes (DEGs) between groups were determined using GEO2R online tool. The overlapped genes between salt and drought stresses were found. PPI network analysis was constructed by STRING and Cystoscope, respectively. Hub genes were predicted using the Cytoscape-cytoHubba plug-in. The Functional enrichment analysis of hub genes analysed via STRING database. Under dataset GSE113950, 30 samples were analysed for DEGs within each other. 4482 (1954 up-regulated, 2528 down-regulated) and 2409 (872 up-regulated, 1537 down-regulated) DEGs were identified in salt treated vs control and drought treated vs control comparisons, respectively. The number of overlapped DEGs between comparisons was 1511. Then, we detected 20 hub genes from overlapped genes. Functional enrichment analysis of hub genes revealed that cell wall organization or biogenesis, carbohydrate metabolism, structural constituent of cell wall were among the most significant gene ontology terms. Phenylpropanoid biosynthesis was the most enriched pathway for the hub genes. The results suggest that cell wall organization associated genes play crucial roles both in salt and drought stress.

References:

1) Yordanov, I., Velikova, V., Tsone, V. *Photosynthetica*. **2000**, 30, 171–186.

PP35

Determination of Antioxidant Capacity of Waxflower Plant and Examination of Inhibition Effect on Carbonic Anhydrase Isoenzymes

Zeynebe Bingöl

Tokat Gaziosmanpaşa University, Vocational School of Health Services, Department of Medical Services and Techniques, 6250-Tokat/Turkey

zeynebe.bingol@gop.edu.tr

Reactive oxygen species are highly energetic and unstable, so they can easily exchange electrons with other atoms and molecules. This situation poses a danger for neurological diseases, cancer, oxidative damage due to iron accumulation and many other diseases. Antioxidant molecules have the ability to trap and stabilize radicals, preventing oxidation caused by reactive oxygen species. Detection of molecules with high antioxidant activity used medical purposed has gained importance in the treatment of various diseases.[1,2]

Waxflower (Chamelaucium) is a woody perennial plant endemic to Western Australia. It is known as a potted plant with many small flowers and leaves.[3] Many investigations have been carried out on the nature and identity of structural antifungal compounds in flowers and leaves. Antifungal activity against pathogens has been observed in leaf and flower extracts.[4]

Human carbonic anhydrase (hCA) isoenzymes, which are zinc ion-containing metalloenzymes, have an important role in maintaining pH homeostasis. CA inhibitors suppress CA enzyme activity and their use in antiglaucoma agents, antiepileptics, diuretics and some other disorders has been clinically established.[5]

In this study, it was aimed to examine the antioxidant capacities of waxflower plant and inhibition studies on human carbonic anhydrase isoenzyme activity. Antioxidant capacity were determined using Fe^{3+}-Fe^{+2}, FRAP and Cu^{2+}-Cu^{+} reducing analyses, DPPH$^{\bullet}$ and ABTS$^{\bullet+}$ scavenging experiments. It was observed that the sample solution exhibited antioxidant activity when compared with standard antioxidants BHA, BHT, trolox, α-tocopherol and ascorbic acid. In addition, when the inhibition effect of wax flower plant for carbonic anhydrase I and II isoenzymes purified from human erythrocyte cells was examined; IC50 values were found as 0.577 mg/mL and 1.800 mg/mL, respectively. It was found to have effective inhibitory properties when compared with acetazolamide, the known standard inhibitor of the CA enzyme.

References:

1) Gulcin, I.; Alwasel, S.H. *Processes.* **2023**, *11*, 2248.
2) Guven, L.; Erturk, A.; Koca, M.; Gulcin, I. *ChemistrySelect.* **2023**, *8*, e202303101.
3) Dinh, S. Q.; Joyce, D. C.; Irving, D. E.; Wearing, A. H. *Australas. Plant Path.* **2011**, *40*, 301-308.
4) Terry, L. A.; Joyce, D. C.; Khambay, B. P. S. *Australas. Plant Path.* **2003**, *32*, 411-420.
5) Gumus, M.; Babacan, Ş. N.; Demir, Y.; Sert, Y.; Koca, I.; Gulcin, I. *Arch. Pharm.* **2022**, *355*, 2100242.

PP36

Development of Bone Biomarker Biosensor for Diagnosis and Monitoring of Some Bone Diseases

Emrah DEMİRBAŞ,Dilek Nur ALTAY, Hülya YAĞAR*

Trakya Üniversitesi, Fen Fakültesi, Kimya Bölümü Edirne,Turkiye

**emrah.demirbas@outlook.com*

The determination of specific bone biomarkers in blood and urine can be used in the diagnosis, prognosis and staging of effective treatment of bone diseases[1]. Osteopontin (OPN), bone sialoprotein, previously identified as a bone matrix protein, is now considered a multifunctional protein that has recently been discussed as a cancer biomarker[2]. In this study, an OPN biosensor was developed with disposable and inexpensive indium tin oxide coated polyethylene terephthalate (ITO-PET) electrodes for specific and practical quantitative determination of OPN. In the fabrication of this immunosensor system, firstly self-assembled layers (SAMs) were formed on the ITO-PET electrode surface with Trimethoxy[2-(7-oxabicyclo[4.1.0]hept-3-yl)ethyl]silane (TMOHES) solution. Then, anti-OPN antibody protein was immobilized, and the open chemical ends remaining on the electrode surface without antibody binding were closed with bovine serum albumin (BSA) solution. The monitoring of this entire immobilization process and concentration determinations of analyte OPN protein solutions were carried out using electrochemical impedance spectroscopy (EIS) and cyclic voltammetry (CV) techniques. Firstly, the fabrication and preparation conditions of the OPN biosensor were optimized, TMOHES concentration was determined as 0.25% THOMES, anti-OPN concentration was determined as 50 ng/ml anti-OPN, incubation time for immobilization of anti-OPN protein was determined as 60 min and incubation time of OPN proteins before analysis was determined as 60 min. Afterwards, analytical characterization studies of OPN biosensor were carried out by determining linear detection range, repeatability, reproducibility, storage capacity and selectivity. Furthermore, surface characterization during each immobilization step and analysis was determined by scanning electron microscopy and FTIR analyses. Detection time and range of OPN biosensor were determined as 60 min and 10-60 ng/mL OPN concentration, respectively. Finally, the potential of OPN biosensor to be used in clinical studies was demonstrated by OPN analysis in commercially purchased human serum.

This study was produced from the master thesis titled “Development of Bone Biomarker Biosensor for Diagnosis and Monitoring of Some Bone Diseases”, and was supported by Trakya University Scientific Research Project Unit with project number TÜBAP 2023/60.

References

1) Claudon, A., Vergnaud, P., Valverde, C., Mayr, A., Klause, U., Garnero, P.; Clin. Chem., **2008**, 54, 1554-1563.
2) Wei, R., Wong J. P. C., Kwok H. F. *J Cancer.* **2017**, 15, 8(12), 2173-2183.

PP37

The synthesis, anti–bacterial and sensor properties of newly synthesized rhodanine derivative molecules

Erbay Kalay[a], Muhammed Elik[b], Oguz Özbek[b], Caglar Berkel[b], Osman Nuri Aslan[c]

[a] Kafkas University, Kars Vocational School, Department of Material and Material Processing Technologies, 36100 Kars, Turkey

[b]Tokat Gaziosmanpasa University, Faculty of Science and Arts, Department of Molecular Biology and Genetics, 60250 Tokat, Turkey

[c]Atatürk University, Eastern Anatolia High Technology Application and Research Center, 25240 Erzurum, Turkey

*caglar.berkel@gop.edu.tr

Rhodanine, also known as 2-thioxo-4-thiazolidinone, is a five-membered ring compound containing heteroatoms such as sulfur and nitrogen.[1,2] In addition to its strong biological activities, it has been used as a sensor material in various analytical techniques.[3] In the present study, two different novel rhodanine derivative molecules were synthesized, and their sensor and biological activities were investigated. The characterization of these molecules was carried out using spectroscopic techniques such as ^{1}H–, ^{13}C– NMR, FT–IR and Q–TOF. The antibacterial activities of the synthesized molecules were investigated using *Acinetobacter baumannii*, *E. coli*, *Enterococcus faecalis*, *Proteus mirabilis*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. These novel molecules were shown to inhibit the growth of certain bacteria to a particular extent. Later, sensor properties of the synthesized rhodanine derivative molecules were investigated using potentiometric methods. PVC membrane sensors using the synthesized molecules as ionophore exhibited selectivity towards Cu(II) ions. The sensors, which showed very successful results under laboratory conditions, were able to determine copper(II) ions in various real samples. In conclusion, this study investigates the synthesis, characterization, sensor and biological properties of novel rhodanine derivative molecules.

References

1) Jabeen, S.; Palmer, R. A.; Potter, B. S.; Helliwell, M.; Dines ,T. J.; Chowdhry, B. Z. *J. Chem. Crystallogr.* **2009**, *39*, 151–156.
2) Enchev, V.; Chorbadjiev, S.; Jordanov, B. *Chem. Heterocycl. Compd*. **2002**, *38*, 1110–1120.
3) Kim, H.; Gil, D.; Kim, C. *J. Chin. Chem. Soc*. **2022**, 69, 856-863.

PP38

Fabrication of MXene-supported molecularly imprinted polymer-based electrochemical sensor for specific recognition and determination of uracil

Ahmet CETINKAYA[a,b*], Sevilay ERDOGAN-KABLAN[b], Havva Nur GURBUZ[c], Aytekin UZUNOGLU[d], Emirhan NEMUTLU[b], Sibel A. OZKAN[a]

[a]Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, Ankara, Türkiye
[b]Hacettepe University, Faculty of Pharmacy, Department of Analytical Chemistry, Ankara, Türkiye
[c]Necmettin Erbakan University, Faculty of Engineering, Department of Metallurgical and Materials Engineering, Konya, Türkiye
[d]Istanbul Technical University, Faculty of Chemical and Metallurgical Engineering, Department of Metallurgical and Materials Engineering,Türkiye

**ahmet.cetinkya@yahoo.com*

Acute kidney injury (AKI) is defined as an abrupt loss of kidney function and is characterized by elevated serum creatinine levels (>0.3 mg/dL), an increase in creatinine (Cr) within 48 hours, or >1.5-fold increase in baseline Cr or decreased urine output (≤0.5 mL/kg/h) within seven days. Acute renal failure (ARF) is a common condition associated with increased morbidity and mortality. While 3.2% to 9.6% of hospitalizations are reported to have ARF in the literature, in-hospital mortality is roughly 20%, and mortality in patients receiving intensive care can reach 50%. [1] Three possible explanations for the observed high uracil (URA) levels are investigated: increased DNA catabolism, enzymatic deamination of cytosine, and renal retention of URA. This study developed an electrochemical sensor based on molecularly imprinted polymers (MIPs) and supported by nanomaterials for the highly sensitive and selective determination of URA.[2] For this aim, sensor performance was evaluated using different nanomaterials such as titanium-modified MXene nanoribbon (TiMXene NRb), titanium-modified MXene (TiMXene), niobium-modified MXene (NbMXene), and niobium-modified MXene nanoplate (NbMXene NP). In addition to other MIP components, 2-thienylboronic acid (2-TBA) was employed as the functional monomer. Both morphological and electrochemical characterization of the designed sensor were performed using electrochemical impedance spectroscopy (EIS), cyclic voltammetry (CV), scanning electron microscopy (SEM), and energy dispersive X-ray analysis (EDX). Under optimum conditions, the calibration range was found to be between 2.50×10^{-13} M and 2.50×10^{-12} M. The limit of detection (LOD) and limit of quantification (LOQ) were calculated as 5.74×10^{-14} M and 1.91×10^{-13} M, respectively. For the rapid measurement of URA in commercial serum samples, the proposed improved sensor demonstrated noteworthy sensitivity and selectivity. The unique selectivity of the sensor is demonstrated by its successful performance even in the presence of molecules similar to URA.

Acknowledgments

This study is produced from the “Molecular Imprinted Electrochemical Based Metabolomics Studies for Early Diagnosis of Acute Renal Failure” project, and the authors are grateful for the financial support from THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TÜRKİYE (TUBITAK) Project Number 122C272.

References

1) Güdük, N.K.; Sahin, T. *Heliyon*. **2023**, *9 (8), e18715.*
2) Parry, T.E. *Br. J. Haematol*. **1978**, *39, 241-248.*

PP39

In vitro and *In silico* Evaluation of the Inhibitory Effect of 4-nitro-N-(furan-2-ylmethyl)-N-(3-nitrophenyl)benzamide on Acetylcholinesterase and Butyrylcholinesterase

Ziya Dağalan[a], Ece Oğuz[a], Mehmet Koca[b], Bilal Nişancı[a] and Pınar Güller[a]

[a]*Department of Chemistry, Faculty of Sciences, Atatürk University, Erzurum, Türkiye*

[b]*Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Atatürk University, Erzurum, Türkiye*

* ptaser@atauni.edu.tr

The therapy for Alzheimer's disease (AD) has been handled the major cholinesterase enzymes, acetylcholinesterase (AChE, EC 3.1.1.7) and butyrylcholinesterase (BuChE, EC 3.1.1.8), in accordance with the cholinergic hypothesis [1]. The average length of time from the start of clinical symptoms and death from Alzheimer's disease (AD) is 8.5 years. AD is a progressive neurodegenerative illness [2]. Since ACh degrades quickly in memory-related disorders, it has been discovered that the levels of ACh in the brains of elderly AD patients and age-matched control groups differ by almost 50% [3]. Both AChE and BuChE are normally capable of hydrolyzing ACh. As a result, it has been important to find compounds that can be drugs with low toxicity and adverse effects and inhibit AChE and BuChE.

In this study, 4-nitro-N- (furan-2-ylmethyl)- N- (3-nitrophenyl) benzamide was synthesized for the first time. Then, the compound's inhibitory properties were examined in human AChE and BuChE in vitro, and possible interactions were determined by molecular docking studies. AChE and BuChE were isolated from human blood with a specific activity of 0.032 EU/ml protein and 0.359 EU/ml protein, respectively. As a result of in vitro inhibition studies it was found that 4-nitro-N-(furan-2-ylmethyl)-N-(3-nitrophenyl)benzamide inhibited both enzymes. The dissociation constants Ki of the molecule for AChE and BuChE were calculated as 44.08±4.17 µM and 7.25±0.85 µM, respectively. The predicted binding energies and interaction types of the compound with enzymes were determined by the computer-aided molecular docking method (AutoDock 1.5.6).

References

1) Bartus, R.T.; Dean, R.L.; Beer, B.; Lippa, A.S. *Science* **1982**, 217, 408-417.
2) Querfurth,H.W.; Laferla, F.M. *N. Engl. J. Med.* **2010**, *362*, 1844-1845.
3) Dhanasekaran, S.; Perumal, P.; Palayan, M. *J. Appl. Pharm. Sci.* **2015**, 5, 12-16.

PP40

Antioxidant Activities of Clli 1392, Crystal, and Clark Flaxseed (*Linum Usitatissimum L.*) Species

Uğur Güller[a] and Pınar Güller[b]

[a]*Department of Food Engineering, Faculty of Engineering, Iğdır University, Iğdır, Türkiye*

[b]*Department of Chemistry, Faculty of Sciences, Atatürk University, Erzurum, Türkiye*

** ugur.guller@igdir.edu.tr*

Flaxseed is a promising functional food because of its abundance of physiologically active phenolics, flavonoids, and minerals present in the seeds. A number of critical functions have been attributed to the phenolic compounds it contains, including anti-inflammatory, anti-oxidative and anti-carcinogenic activities. In this study, the antioxidant properties of Clli 1392, Crystal, and Clark varieties were examined and compared. The extraction procedure was performed as previously reported. (2021).[1] Total phenolic contents were found as 729.5±173.3, 669.5±17.92 and 890.3±37.9 mg GAE/g and total flavonoid content were determined between as 326.15±7.46, 451.43±97.21, and 399.21±74.57 mg QE/g respectively. Radical scavenging activities of all three flaxseed extracts were higher than ascorbic acid. Besides, extracts had ferrous ion chelating activities and cupric-reducing capacities as good as standard .

Acknowledgment: Authors thank Dr. M. Zeki Koçak from Department of Field Crops, Faculty of Agriculture, Iğdır University for identifying and classifying the flaxseed species used in this study.

References

1) Mirończuk-Chodakowska, I.; Witkowska, A.M.; Zujko, M.E. *Adv. Med. Sci.* **2018**, 63, 68–78.
2) Belinskaia, D.A.; Voronina, P.A.; Shmurak, V.I.; Vovk, M.A.; Batalova, A.A.; Jenkins, R.O.; Goncharov, N.V. *Antioxidants* **2020**, 9, 966.
3) Güller, U.; Güller, P.; Çiftci, M. *Altern. Ther. Health Med.* **2021**, 27, 33–37.

PP41

Investigation of Antibacterial Activity of 4-Ethylresorcinol and 2,5-Dimethylresorcinol

Salih Can AKPINAR[a], Havanur DEMİRTAŞ[a], Behiye TAŞER[a]

[a] *Agri Ibrahim Cecen University, Faculty of Science and Letters, Department of Molecular Biology and Genetics, 04100-Ağrı*

**btaser@agri.edu.tr*

Nosocomial infections are a growing health problem worldwide, with more than 1.4 million cases diagnosed each year. Besides the high cost and number of deaths, the main problem of these hospital-acquired infections is their increasing resistance to antibiotics[1]. Resorcinol is a molecule with unique structural features for developing drug compounds exhibiting chemical structures and properties suitable for treating various human diseases. Our study investigated the antibacterial activity with agar well diffusion method[2]of resorcinol derivatives, 4-Ethylresorcinol, and 2.5-Dimethylresorcinol, against gram-negative Escherichia coli and gram-positive Staphylococcus aureus bacteria. After the pathogens were inoculated in MHA medium, resorcinol derivatives were added to the 6 mm diameter wells opened in the agar at 10 mg/ml concentration. After incubation, the inhibition zone diameters around the wells were measured. The MIC value of the molecules was determined by the microdilution method using 96-well plates[3]. While the inhibition diameter of both molecules is approximately 8 mm in *E. coli*, for *S. aureus* it is 12 mm for 4-ethylresorcinol and 10 mm for 2.5-dimethylresorcinol. The MIC values determined on the well-plate were equal for both molecules and were 1.25 mg/ml for *E. coli* and 0.625 mg/ml for *S. aureus*. The same analyses were performed for resorcinol. While no inhibition zone was observed in *E. coli*, a diameter of approximately 7 mm was detected in *S. aureus*. The MIC values were for *E. coli* and *S. aureus*, 2.5 and 1.25 mg/ml, respectively. As a result, -CH_3 groups attached to the resorcinol ring was increased the antibacterial activity of the molecule.

This study was supported by TUBITAK 2209-A project (Application No: 1919B012322293).

References:

1) Modjinou T.; Versace D.L.; Abbad-Andaloussi S.; Langlois V.; Renard E. *Materials Today Communications* **2017**, *12*, 19–28.
2) Denev P.; Kratchanova M.; Ciz M.; Lojek A.; Vasicek O.; Nedelcheva P.; Blazheva D.; Toshkova R.; Gardeva E.; Yossifova L.; Hyrsl P.; Vojtek L. *Food Chemistry* **2014**, *157*, 37-44.
3) CLSI, Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically, 11th ed., Clinical and Laboratory Standards Institute, Wayne, 2018.

PP42

Combinatorially Synthesized Triazole and Benzenesulfonamide Hybrid Carbonic Anhydrase Inhibitors

Nisanur KARACA*, Murat Küçük, Olcay Bekircan

Department of Chemistry, Faculty of Science,Karadeniz Technical University, 61080, Trabzon, Turkiye.

**yerlikayanisanur8@gmail.com*

Bioactive compounds can be isolated from natural sources (especially plants) or produced by synthetic methods. Every year, thousands of new compounds with different bioactivities are synthesized and many of them are used in various sectors. Triazole and sulfonamide derivatives are among the compound groups that have been intensively studied in terms of bioactivity.[1] Studies on carbonic anhydrase (CA) inhibition and antioxidant activities in particular have revealed that these compounds exhibit significant activity. CA inhibitors are widely used in the treatment of many diseases such as glaucoma, epilepsy, and cancer, while antioxidants are widely used in the health and food fields. Current synthesis methods such as combinatorial library synthesis play an important role in the rapid production of new compounds and the determination of their bioactivities. This study aimed to produce hybrid molecules containing 1,2,4-triazole and benzenesulfonamide groups for the first time by library synthesis approach. CA inhibitory and antioxidant activities of the compounds were evaluated by comparing them with standard CA inhibitors and antioxidants. In addition, the inhibitory effects of the synthesized mixtures on the esterase activity of the bCA (bovine CA) enzyme were investigated in vitro and compared with the standard inhibitors acetazolamide and sulfonamide. The IC_{50} values (the concentration resulting in 50% inhibition) of these inhibitors on the esterase activity were found to be 90 nM and 9.3 □M, respectively. In the study, 2 parallels were used and the graph was created by taking the averages of the absorbance values. The graph was plotted for compound concentration against the absorbances measured. IC_{50} values were found using this graph for the library mixtures (KS-1 and KS-2) and compared with the standards. According to the results obtained from the graphs, the IC_{50} value of KS-1 for CA was calculated as 192.4 nM and KS-2 as 620.8 nM. When these values were compared with acetazolamide and sulfanylamide, the two standards commonly used in the literature, The mixtures inhibitory potentials were close to acetazolamide and much better than sulfanylamide. As a result, KS-1 and KS-2 compounds showed high inhibitory activities and successful results were obtained against acetazolamide and sulfonamide. What will be the following worg is to investigate the CA inhibition of individual compounds in the mixture by on-line HPLC-CAI method.

Reference:

1) A El-Gazzar, M. G., Nafie, N. H., Nocentini, A., Ghorab, M. M., Heiba, H. I., & Supuran, C. T. (2018). Carbonic anhydrase inhibition with a series of novel benzenesulfonamide-triazole conjugates. Journal of Enzyme Inhibition and Medicinal Chemistry, 33(1), 1565–1574.

PP43

Design and Applications of Electrochemical Nanozyme Platform Consisting of Magnetic Nanomaterials and Inorganic Nanomaterials

Selenay Sadak[a,b], Cigdem Kanbes Dindar[a], Bengi Uslu[a*]

[a] *Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, 06560, Ankara, Türkiye*

[b] *Ankara University, The Graduate School of Health Sciences, 06110, Ankara, Türkiye*

**buslu@pharmacy.ankara.edu.tr*

Although catechol is an industrial waste, it is a phenolic compound that has many harmful effects on human health, such as skin irritation and eye sensitivity. It is also one of the main materials widely used in the chemical industry such as textile products, pharmaceutical industry, cosmetics, and can also be found in water as waste.[1] Many different methods have been developed to date for the determination of catechol. Among these methods, electrochemical techniques attract attention due to their rapid results, low cost, high sensitivity, easy application and wide determination ranges. In this study, a nanozyme-based electrochemical sensor that mimics enzymes was developed for the determination of catechol. For this purpose, the GCE surface was modified with FeMNP/ZnCl nanocomposite, which has magnetic properties and contains inorganic nanomaterials, synthesized from waste tea with green synthesis method, and MWCNT, which was prepared by dissolving it in chitosan. Plasma method was applied to modify the surface with magnetic nanomaterial. Autolab PGSTAT302N model potentiostat was used for all electrochemical procedures. The electrode surface was characterized using SEM, and the surface properties were studied in detail using EIS and CV methods. DPV method was used for catechol determination, catechol was determined in the concentration range of 1.0 $x10^{-9}$ – 1.0 x 10^{-8} M, and according to the results, LOD was calculated as 2.59 x 10^{-10} M and LOQ as 7.87 x 10^{-10} M. In addition, the developed method allowed the successful determination of catechol in serum, green tea and black tea samples. According to the recovery studies performed in serum, catechol was determined with 100.3% recovery. The innovative and environmentally friendly electrochemical detection platform has demonstrated a wide range of potential applications for routine, rapid and reliable catechol detection, and successful results have been achieved.

References:

1) Kokulnathan T, Arumugam A. Construction of a Copper Bismuthate/Graphene Nanocomposite for Electrochemical Detection of Catechol. Published online 2022. doi:10.1021/acs.langmuir.2c01151

PP44

Preparation of MIP-Based Electrochemical Sensor Surfaces: Utilization in the Selective Detection of L-Citrulline Amino Acid

Gülsüm Ece Meraki[a], Selenay Sadak[a,b], Bengi Uslu[a*]

[a]*Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, 06560, Ankara, Türkiye*
[b] *Ankara University, The Graduate School of Health Sciences, 06110, Ankara, Türkiye*

**buslu@pharmacy.ankara.edu.tr*

L-Citrulline (L-Cit) is a non-essential, non-protein amino acid recognized for its antioxidant properties. It plays a crucial role as a precursor to L-arginine in the urea cycle. When consumed, dietary L-Cit is absorbed by the kidneys, vascular endothelial cells, and other tissues, resulting in increased levels of plasma and tissue L-arginine. L-arginine serves as the substrate for the production of nitric oxide (NO) by endothelial cells, which acts as a potent vasodilator. L-Cit supplementation lowers lactate levels and alleviates muscle soreness 24 hours after exercise, likely due to its antioxidant effects.[1]

Molecularly imprinted polymers (MIPs) can be viewed as synthetic counterparts to natural antibody-antigen systems. They function on a “lock and key” principle, allowing them to selectively bind to the specific molecule they were designed to recognize during production. MIPs provide the same level of specificity and selectivity as biological receptors, but with the added advantages of durability and lower cost.[2] In this research, a polymer-based electrochemical sensor surface was prepared to use in the selective determination of L-Cit.

In study, analyses were conducted using cyclic voltammetry (CV) and differential pulse voltammetry (DPV) techniques within a three-electrode system. This setup included a 3 mm diameter glassy carbon electrode (GCE) as the working electrode, an Ag/AgCl (BAS; 3M KCl) electrode as the reference electrode, and a platinum wire as the counter electrode. An MIP-based electrochemical sensor for L-Cit was modified by using cyclic voltammetry (CV) and the electropolymerization method. The optimal concentration range was found to be $5*10^{-11}$. Based on the findings, the limit of detection (LOD) was determined to be $5.445*10^{-13}$, while the limit of quantification (LOQ) value was established as 1.65×10^{-12}. The developed electrochemical sensor successfully enabled the rapid and robust analysis of L-citrulline with high sensitivity at low detection concentrations.

References:

1) Valaei K, Mehrabani J, Wong A. Effects of L-citrulline supplementation on nitric oxide and antioxidant markers after high-intensity interval exercise in young men: a randomized controlled trial. *Br J Nutr.* **2021** Jun 17, 1-23.
2) Joseph J. BelBruno**,** Molecularly Imprinted Polymers, *Chem. Rev.* **2019**, 119, 1, 94–119

PP45

Determination of bioactivity properties of some bee breads produced in the Western Black Sea region

Oktay Bıyıklıoğlu[a], Serhat Karabıcak[a], Derya Keleşoğlu[a], Ömür Gençay Çelemli[b], Barış Bani[a], Talip Çeter[a]

[a] *Kastamonu University, Faculty of Science, Department of Biology*

[b] *HacettepeUniversity, Faculty of Arts and Science, Department of Biology*

**oktayman@gmail.com*

Worker honey bees carry the pollen they collect from flowers to the hive on their hind legs, making it sticky with their saliva. The collected pollen is stored in the honeycomb cells and fermented with substances from the bees' stomachs, yeasts and lactic acid bacteria, and this ripened product is called perga. During periods when the bees' natural pollen sources decrease and their need for pollen increases, the stored perga is consumed by the bees as a protein source. In this study, the bioactivity properties of 11 bee breads collected from Karabük, Sinop, Bartın and Zonguldak provinces in the Western Black Sea region were determined by total phenolic substance analysis, total flavonoid substance analysis, DPPH* scavenging activity and antioxidant power[1,2]. Among the bee breads examined, the highest total phenolic content was found in the product obtained from the Ayancık district of Sinop, while the lowest was found in the product obtained from the Devrek district of Zonguldak. The total flavonoid content was found in the product obtained from the Amasra district of Bartın, while the lowest was found in another sample collected from the same district. The highest antioxidant activity was found in the Devrek district of Zonguldak and the lowest in the Boyabat district of Sinop. This study shows that bee breads obtained from the Western Black Sea Region have very strong bioactivity.

References:

1) Fathi Hafshejani; & Shahnaz et al. Correlation between total phenolic and flavonoid contents and biological activities of 12 ethanolic extracts of Iranian propolis. Food science & nutrition vol. 11,7 4308-4325. 21 Apr. 2023, doi:10.1002/fsn3.3356
2) Uzunca, Hüsamettin, et al. Characterisation of Kastamonu honeys by palynological and physicochemical methods. Grana, 2023, 62.3: 192-205.

PP46

Electrochemical And Spectroscopic Approaches on The Interaction Of Nabumetone With Double-Stranded DNA

Ruqia Khan[a,b], Cigdem Kanbes Dindar[b], Arzu Karayel[c], Bengi Uslu[b*]

[a]*Quaid-I Azam University Islamabad, 45320, Pakistan*
[b]*Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, 06560, Ankara, Türkiye*
[c]*Hitit University, Faculty of Arts and Sciences, Department of Physics, Çorum, Türkiye*

**buslu@pharmacy.ankara.edu.tr*

Nabumetone, an Non Steroidal Anti-Inflammatory Drug (NSAID); It is a potent inhibitor of cyclo-oxygenase (Cox-1 and -2) that blocks the formation of prostaglandins, which are important mediators in pain and inflammatory pathways.[1] Nabumeton is a prodrug and exerts its anti-cyclo-oxygenase activity only after absorption and activation in the liver. Like other NSAIDs, it has analgesic, antipyretic and anti-inflammatory activities.[2] The development of precise, cost-effective, and quick techniques for detecting calf thymus double-stranded deoxyribonucleic acid (ct-dsDNA), and understanding the structural alterations that develop in ct-dsDNA as a result of exposure to active pharmaceutical components, is of critical importance. Within this framework, the objective of this research is to create an electrochemical ct-dsDNA biosensor with the purpose of quantifying Nabumetone and elucidating the mechanism by which it interacts with DNA. Through the use of Differential Pulse Voltammetry, Fluorescence, and UV Spectroscopy, this research endeavored to understand the mechanism of interaction that exists between Nabumetone and DNA. Glassy carbon electrode (GCE), platinum wire and Ag/AgCl reference electrode were used for electrochemical investigation of the interaction. The Shimadzu 1601PC double beam UV-Vis absorption spectrophotometer and Agilent Cary Eclipse fluorescence spectrophotometer linked to a Peltier heat-regulated cell holder were used for spectroscopic and fluorometric studies. The results of the electrochemical experiment showed that Nabumetone significantly interacts with dsDNA, as seen by the decreased oxidation signals of dGuo and dAdo when Nabumetone presents. The binding constant (K_{sv}) between nabumeton and ct-dsDNA was calculated as 4.98 $x10^3$, 4.27 $x10^4$,1.12 $x10^5$ at 3 different temperatures (293,303,308 Kº), respectively, using spectrofluorometric measurements. Furthermore, quantitative evaluation of thermodynamic data (ΔS = +36.58 cal mol-1 K-1 and ΔH = +9.46 kcal mol-1) for the Nabumeton - ct-dsDNA complex predicted the contribution of hydrophobic bonds in Nabumeton - ct-dsDNA. The interaction between nabumetone and dsDNA is verified by molecular docking studies.

References :

1. Helfgott S. M. (1994). Nabumetone: a clinical appraisal. Seminars in arthritis and rheumatism, 23(5), 341–346. https://doi.org/10.1016/0049-0172(94)90029-9 .
2. S.M. Helfgott, Nabumetone: A clinical appraisal, Semin. Arthritis Rheum. 23 (1994) 341–346. https://doi.org/https://doi.org/10.1016/0049-0172(94)90029-9.

PP47

Novel Nano Plasma Carbon Decorated Electrochemical Sensor for Determination of Salicylic Acid

Melike AKAN[a,b], Cigdem KANBES-DINDAR[a,c*], Nazife ASLAN[a], Bengi USLU[c]

[a]*Ankara Hacı Bayram Veli University, Polatlı Science and Arts Faculty, Chemistry Department, 06900, Ankara, Türkiye*
[b]*Ankara Hacı Bayram Veli University, Institute of Graduate Programs and Department of Chemistry, Ankara 06900, Türkiye*
[c]*Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, 06560, Ankara, Türkiye*

** ckanbes@gmail.com*

Salicylic acid (SCC) is a phenolic molecule characterized by an aromatic ring and hydroxyl functional groups, found naturally in plants[1]. In this work, an electrochemical sensor for the SCC determination was proposed. A screen-printed carbon electrode (SPCE) was modified by air cold plasma to obtained homogeneous nano plasma carbon electrode surface (NPCS/SPCE). The resulting amount of SCC was observed by differential pulse voltammetry. Under optimal conditions, the sensor exhibited one wide linearities ranging from 0.3 to 8 µM with the reliability coefficient of determination of 0.9922. The limit of quantification (LOQ) was also estimated to be 0.13 µM. Moreover, the NPCS/SPCE suggested high selectivity in the presence of several interfering agents. Additionally, the NPCS/SPCE revealed superior recovery values for chicken meal. Furthermore, the fabricated sensor exhibits excellent selectivity, stability, reproducibility, and repeatability, indicating a great perspective in the monitoring of SCC. Therefore, it can be speculated that the proposed electrode could be effectively applied to determine SCC in chicken meal samples. The text of abstract should be formatted as follow: Calibri, 11 pt, regular, 1.15 line spacing, justified. Citations should be numbered in the text, indicated by superscript after punctuation. The list of references at the end of the abstract should be given in order of their first appearance in the text.

References:

1) Aljabri, M. D., Alam, M. M., Rabbee, M. F., Ahmed, J., Al-Humaidi, J. Y., Abdel-Fadeel, M. A., Rahman, M. M. Electrochemical detection of salicylic acid in fruit products with ternary ZnO/CuO/Y2O3 nanocomposites embedded PEDOT: PSS by differential pulse voltammetry. Measurement, 2025, 240: 115583.

PP48

Evaluating the Interaction Between the Antiviral Drug Entecavir and Double-stranded DNA Using Electrochemical and Spectroscopic Methods

Ruqia Khan[a], Cigdem Kanbes-Dindar[b,c], Ali Haider[a], Bengi Uslu[b]

[a]Quaid-i-Azam University, Department of Chemistry, 45320, Islamabad, Pakistan
[b]Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, 06560, Ankara, Türkiye
[c]Ankara Hacı Bayram Veli University, Polatlı Science and Arts Faculty, Chemistry Department, 06900, Ankara, Türkiye

**buslu@pharmacy.edu.tr*

Chronic hepatitis B virus (HBV) infection is a significant cause of mortality in the human population[1]. Entecavir (ETV) is one of the most frequently used drugs against HBV[2]. In this context, the aim of this study is to develop an electrochemical ct-dsDNA biosensor to quantify ETV and elucidate its DNA interaction mechanism. In this study, the interaction mechanism between ETV and DNA was investigated by Differential Pulse Voltammetry, Fluorescence and UV Spectroscopy. The electrochemical experiment results indicated a significant interaction between ETV and dsDNA, as seen by the reduced oxidation signals of deoxyguanosine (dGuo) and deoxyadenosine (dAdo) in the presence of the drugs. The binding constant (Kb) between ETV and ct-dsDNA was calculated as 5.75 x 104 M at room temperature by using spectrofluorometric measurements. Also, quantitative evaluation of thermodynamic data ΔS = 165.20 cal mol^{-1} K^{-1} and ΔH = 43.54 kcal mol^{-1} for ETV - ct-dsDNA complex predicted the contribution of hydrophobic forces in the ETV - ct-dsDNA.

References :

1) Li ZB, Chen DD, Jia YF, He QJ, Cui L, Du FX, Kang YJ, Feng X, He M, Jin XY, Chen J, Wang Y, Ji D, Lau G, Wu SG. Risk factors related to low-level viraemia in chronic hepatitis B patients receiving entecavir treatment. *Front. Cell. Infect. Microbiol*., **2024**, 14: 1413589.
2) Lumley SF, Delphin M, Mokaya JF, Tan CCS, Martyn E, Anderson M, Li KC, Waddilove E, Sukali G, Downs LO, Said K, Okanda D, Campbell C, Harriss E, Shimakawa Y, Matthews PC.. A systematic review and meta-analysis of the risk of hepatitis B virus (HBV) resistance in people treated with entecavir or tenofovir. J. Clin. Virol., **2024**, 174: 105711.

PP49

Investigation of Electrochemical Properties Associated with the Sensitive and Selective Quantification of Cinecalcet Using a Sensor Based on Molecularly Imprinted Polymer

Ipek Kucuk[a,b], Selenay Sadak[b,c], Sacide Altınöz[a], Bengi Uslu[c*]

[a] *Başkent University, Faculty of Pharmacy, Department of Analytical Chemistry,06790, Ankara,Türkiye*
[b] *Ankara University, The Graduate School of Health Sciences, 06110, Ankara, Türkiye*
[c] *Ankara University, Faculty of Pharmacy, Department of Analytical Chemistry, 06560, Ankara, Türkiye*

** buslu@pharmacy.ankara.edu.tr*

Cinacalcet (CIN) is a calcium-sensing receptor agonist used to treat hypercalcemia in the parathyroid. The improved mineral metabolism provided by CIN treatment results in a significant reduction in oxidative stress[1]. Electropolymerization of the functional monomer o-phenylenediamine (o-PD) on a glassy carbon electrode (GCE) in the presence of a template molecule CIN was used to create the newly developed MIP-based sensor (MIP@o-PD/GCE) utilizing cyclic voltammetry (CV). To improve the efficiency of the MIP-based electrode for CIN measurement, several factors, including monomer ratio, removal time, removal agent, and rebinding time, were carefully optimized. Differential pulse voltammetry (DPV) and electrochemical impedance spectroscopy (EIS) techniques were employed for removal and rebinding processes, optimization of conditions, as well as for performance evaluation of MIP@o-PD/GCE using $[Fe(CN)_6]^{3-}/^{4-}$ as the redox probe[2]. The limit of detection (LOD) was found to be 0.17×10^{-12}, while a linear range of $1.0\times10^{-12} - 1.0\times10^{-11}$ M was found. The analytical performance of the MIP-based electrochemical sensor was controlled by preparing and using the non-imprinted polymer (NIP) based GCE. The validity of the developed sensor was checked by CIN detection in tablet dosage form and, human serum the recovery results were found to be 99.75% and, 100.19%, respectively. The selectivity study was conducted against common cations, anions, and compounds such as, caffeine, glucose, ascorbic acid and, uric acid. Imprinting factor (IF) analysis was performed on CIN impurities, and the relative IF values indicated the selectivity of the sensor developed for CIN[3].

References :

PP50

Determination of bioactivity properties of some propolis produced in the Western Black Sea region.

Serhat Karabıcak[a], Oktay Bıyıklıoğlu[a*], Derya Keleşoğlu[a], Şenol Alan[b], Mahmut Gür[a], Talip Çeter[a]

[a] *Kastamonu University, Faculty of Science, Department of Biology*
[a] *Zonguldak Bulent Ecevit University, Faculty of Science, Department of Biology*
**oktayman@gmail.com*

Propolis has been used for many purposes from ancient times to the present. In the early ages, it was frequently used for mummification of the dead and for the protection of wounds. Today, propolis has a wide range of uses. It is used in the treatment of wounds and burns, tissue regeneration, psoriasis, leg ulcers and gingivitis, in the treatment of many diseases such as flu and cold, in injuries, for anesthetic purposes, as an immune booster, hypotensive and anti-inflammatory. It is also used as an active ingredient for cosmetic purposes in products such as ointments, toothpastes, face creams and lotions[1]. Bees use propolis to protect their hives from parasites and to regulate air intake and output. The health use of propolis is closely related to its bioactivity properties. In this study, the bioactivity properties of 11 propolis collected from Karabük, Sinop, Bartın and Zonguldak provinces representing different regions where chestnut, forest rose, linden and flower honey producers are located; total phenolic content analysis, total flavonoid content analysis and DPPH* scavenging activity[2]. When the total phenolic contents of the examined propolises were compared, the propolis with the highest phenolic content was found in the Çaycuma district of Zonguldak, and the lowest in the Ayancık district of Sinop. The highest total flavonoid contents were found in the Ulus district of Bartın, and the lowest in the Ayancık district of Sinop. When the antioxidant activities of the examined propolises were compared, the propolis with the strongest antioxidant effect was found in the propolis obtained from the Amasra district of Bartın, while the weakest antioxidant effect was found in the propolis obtained from the Boyabat district of Sinop. When the nectar sources of the regions where the examined propolises were supplied are taken into consideration, it is seen that the bioactivity values of the propolises do not show a correlation with the nectar sources.

References :

1) Kuropatnicki, A. K.; Szliszka, E.; & Krol, W., Historical Aspects of Propolis Research in Modern Times. Evidence-Based Complementary and Alternative Medicine, 2013
2) Fathi Hafshejani; & Shahnaz et al., Correlation between total phenolic and flavonoid contents and biological activities of 12 ethanolic extracts of Iranian propolis. Food science & nutrition vol. 11,7 4308-4325. 21 Apr. 2023, doi:10.1002/fsn3.3356

PP51

Development of a Novel Electrochemical MIP-based Sensor for Early Diagnosis of Alzheimer's Disease

Kübra Turan[a]*, Gözde Aydoğdu Tığ[a]

[a]*Ankara University, Faculty of Science, Department of Chemistry, Ankara, 06100, Türkiye*

**kturan@ankara.edu.tr*

Alzheimer's disease (AD) is identified as one of the most significant medical and social challenges of the present era, largely due to its elevated prevalence.[1] In recent years, the prevalence of AD has increased considerably; therefore, the research on the early detection of AD has attracted significant attention in the scientific community. An accurate diagnosis is as crucial as the appropriate treatment of a disease. Biosensor technology offers many advantages, making it one of the most significant methods for diagnosing AD. Consequently, scientific research has focused on identifying novel biomarkers such as Aβ, fosforile tau [pTau], and kynurenic acid (KYNA) for diagnosing AD.[2-4] Among these biomarkers, KYNA has been identified as a new potential biomarker for AD due to its presence in the blood.[5]

In this study, we developed a stable, low-cost, and reliable electrochemical biosensor based on copper-silver bimetallic structure (Cu-Ag BS) PEDOT-MIP film via electropolymerization of 3,4-ethylene dioxythiophene (EDOT) for the selective and sensitive detection of KYNA for the early diagnosis of AD. A comparison was conducted between the MIP sensor and the NIP sensor which was prepared without KYNA. Differential pulse voltammetry measurements were performed in 0.1 potassium chloride solution containing 5.0 mM ferri/ferro cyanide solution. A series of studies were investigated to assess the linear working range, detection limit, selectivity, reproducibility, and stability of the MIP/Cu-Ag BS/GCE and NIP/Cu-Ag BS/GCE sensors. The practical utility of the developed sensors was evaluated by determining the KYNA molecule in commercially available fetal bovine and human serum samples. The high recovery results demonstrated that the fabricated MIP-based KYNA sensor is a promising candidate for clinical approaches.

References:

1) Serafín, V.; Gamella, M.; Pedrero, M.; Montero-Calle, A.; Razzino, C. A., Yáñez-Sedeño, P.; Barderas, R.; Campuzano, S.; Pingarrón, J. M. *J. Pharm. Biomed. Anal.* **2020**, *189*, 113437.
2) Hansson, O.; Lehmann, S.; Otto, M.; Zetterberg, H.; Lewczuk, P. 2019. *Alzheimer's Res. Ther.* **2019**, *11*, 34.
3) Bilal, M.; Barani, M.; Sabir, F.; Rahdar, A.; Kyzas, G. Z. *NanoImpact*, **2020**,100251.
4) Teunissen, C. E.; Verberk, I. M.; Thijssen, E. H.; Vermunt, L.; Hansson, O.; Zetterberg, H.; ... & Del Campo, M. Lancet Neurol. **2022**, *21(1)*, 66-77.
5) Marrugo-Ramírez, R., Rodríguez-Núñez, M., Marco, M. P., Mir, M., Samitier, J. *Biosens*. **2021**, *11*, 20.

Acknowledgments: This study was financially supported by the Scientific and Technological Research Council of Türkiye (TÜBİTAK) under the 1002 project number 123Z658.

PP52

Ultrasensitive Electrochemical Detection of Hepatocellular Carcinoma Biomarker Alpha-fetoprotein

Nazlıcan Candaş, İnci Uludağ Anıl, Ayça Özel, Elif Nur Üstün, Mustafa Kemal SEZGİNTÜRK

Bioengineering Department, Engineering Faculty, Çanakkale Onsekiz Mart University, Çanakkale, Turkey

** nazlicancandas@gmail.com*

Alpha-fetoprotein (AFP) is an a single-chain oncofetal glycoprotein. AFP is the most prevalent and researched tumor biomarker in patients with hepatocellular carcinoma (HCC). Hepatocellular carcinoma (HCC), strongly associated with chronic liver disease, is the majority of primary liver malignancies, accounting for 70 to 85% of cases. It ranks as the sixth most prevalent malignancy and is the third foremost cause of cancer-related mortality worldwide[1]. Alpha-fetoprotein (AFP) is an alpha1-globulin typically seen in elevated concentrations in fetal serum, while serum AFP levels are markedly low in adults[2]. Increased AFP levels are associated with microvascular and macrovascular invasion. This work intended to build a biosensing system utilizing electrochemical impedance spectroscopy (EIS) based on antigen-antibody interaction for the sensitive, fast, and cost-effective detection of AFP protein. The EIS approach is employed to facilitate sensitive detection systems for low antigen concentrations. All measurements for the biosensors under development were performed utilizing the Gamry Potentiostat/Galvanostat, Reference 600 (Gamry Instruments, Warminster, USA). In this study, an innovative immobilization procedure for AFP detection was developed and focused on optimization to obtain a high efficiency. Three different concentrations of 3-MPTMS solution (0.1%, 0.5% and 1%) and three different concentration of antibody (5ng, 10ng and 20ng) were investigated and the results were evaluated. The optimization of appropriate parameters for the immunosensing system and the characterisation of AFP biosensor investigations are ongoing. The study aims to enhance the detection of the AFP marker due to its crucial significance as a biomarker in hepatocellular carcinoma for surveillance, diagnosis, and prognostication.

References:

1) Hu, X., Chen, R., Wei, Q., & Xu, X. (2022). The landscape of alpha fetoprotein in hepatocellular carcinoma: where are we?. *International journal of biological sciences*, *18*(2), 536.

2) Jearth, V., Patil, P. S., Mehta, S., Sundaram, S., Seth, V., Goel, M., ... & Rao, V. (2022). Correlation of clinicopathological profile, prognostic factors, and survival outcomes with baseline alfa-fetoprotein levels in patients with hepatocellular carcinoma: A biomarker that is bruised but not broken. *Journal of clinical and experimental hepatology*, *12*(3), 841-852.

P53

Evaluation of the anti-oxidant, anti-diabetic anticholinergic, and anti-glaucoma effect of Hackberries (*Celtis australis*) from the western region of Turkiye

Kübra ASLAN[a], Leyla GÜVEN[b], Hasan KARAGEÇİLİ[c], Emrah YERLİKAYA[d], İlhami GÜLÇİN[a]

[a]*Ataturk University, Faculty of Science, Chemistry Department, Erzurum 25240, Türkiye*
[b]*Ataturk University, Faculty of Pharmacy, Department of Pharmaceutical Professional Sciences, Department of Pharmaceutical Botany, Erzurum 25240, Türkiye*
[c]*Siirt University, Faculty of Health Sciences, Department of Nursing, 56100, Siirt, Türkiye*
[d]*Siirt University, Faculty of Health Sciences, Department of Nutrition and dietetics, 56100, Siirt, Türkiye*

**kubra.aslan@atauni.edu.tr*

Celtis australis, commonly known as Mediterranean hackberry, is a deciduous tree in the Cannabaceae family. It has been used in many countries as a natural remedy for cough, colic, amenorrhoea, ulcers, and stomach disorders[1]. Here, since limited study is available, the biological activity of the plant's berries was investigated through anti-oxidant capacity and enzyme inhibition assays. Also, LC-MS/MS revealed phytochemical content, and quantitative measurements of total phenolics and flavonoids were determined[2,3]. Results showed that strong metal-reducing capacity was determined through FRAP, CUPRAC, and Fe^{3+}-reducing assays compared to standard antioxidants such as BHA, BHT, Trolox, and α-tocopherol. Besides, the weak radical scavenging property was evaluated by DPPH and ABTS assays. Enzyme inhibition potential was calculated against α-amylase, acetylcholinesterase, butyrylcholinesterase, and human carbonic anhydrase I with 40.06 µg/mL, 19.95 µg/mL, 23.61 µg/mL, and 30.10 µg/mL IC_{50} values, respectively. LC-MS/MS analysis detected quinic acid, chlorogenic acid, vanillic acid, syringic acid, rosmarinic acid, and apigenin in the water extracts of the plant. Total flavonoid and phenolic contents were determined as 159,69 QE/mg of sample and 78,38 GAE/mg of sample. Biological activity results were concluded as consistent with content analysis. In conclusion, the structure/function relationship was derived.

References

1) K. Benamar, S. I. Koraichi, K. Fikri-Benbrahim, Journal of HerbMed Pharmacology 2023, 12, 54–72, DOI: 10.34172/jhp.2023.05.
2) H. Karagecili, E. İzol, E. Kirecci, İ. Gulcin, Life 2023, 13, 735, DOI 10.3390/life13030735.
3) H. Can, L. Güven, F. Demirkaya Miloğlu, A. M. Abd El-Aty, Microchemical Journal 2024, 201, 110683, DOI 10.1016/j.microc.2024.110683.