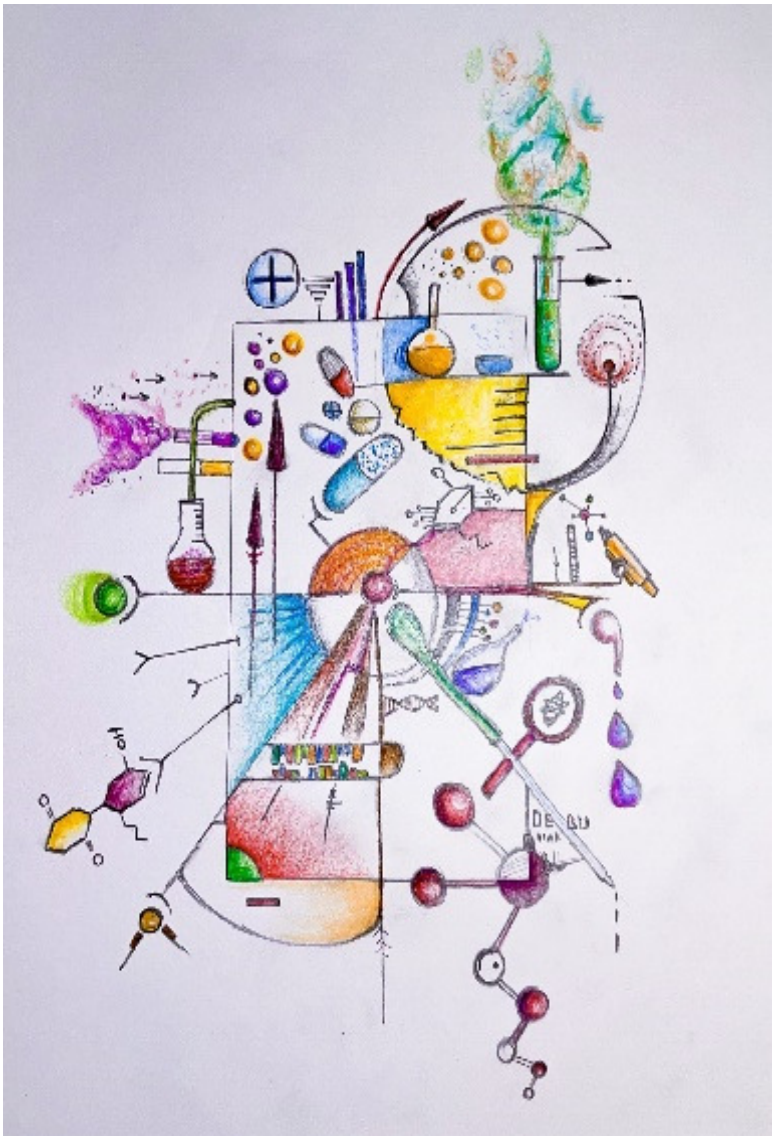
2023-1-RO01-KA131-HED-000139307-1

Bioanalytical (Tele)Monitoring for Life Sciences – Medicine, Food Control, Environmental Monitoring

BOOK OF ABSTRACTS



September, 2024
Brasov, Romania

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CONTENTS

P1. Introductory course - Bioanalytical (Tele) Monitoring for Life Sciences – Medicine, Food Control, Environmental Monitoring

Mihaela BADEA (1), Laura Elena GAMAN (2)

1-Faculty of Medicine, Transilvania University of Brasov, Romania
2-Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

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Bioanalytical telemonitoring represents a transformative technology in medicine, food control, and environmental monitoring. It uses advanced analytical techniques to measure biological substances and their effects on living organisms, ecosystems, food samples, and human health. Bioanalytical monitoring tools detect contaminants, pathogens, and toxins in food products.

Within the Erasmus Blended Intensive Programmes (BIP) - Bioanalytical (Tele)Monitoring for Life Sciences – Medicine, Food Control, Environmental Monitoring - 2023-1-RO01-KA131-HED-000139307-1 – it was held in Brașov an international interdisciplinary summer school, with courses and practical activities (https://erasmus.fshl.ro/lectures/).

The summer school aimed to expose students from Romania (Brasov, Bucharest), Slovenia (Ljubljana), Spain (Zaragoza), Italy (Brescia, Turin), and Portugal (Guarda, Beja) to current research developments and the most recent technologies in bioanalytical (tele)monitoring fields for life sciences—medicine, food control, and environmental monitoring.

The 38 participating students were encouraged to actively participate in the discussions regarding the lectures given by internationally recognised professors from Romania (Brasov, Bucharest, Sibiu, Targu Mures), Slovenia, Italy (Milan, Trieste, Brescia, Turin), France (Perpignan), Portugal (Lisbon, Beja), Czech Republic (Pardubice), Republic of Moldova (Chisinau), USA (Duke University), Republic of China (Shanghai).

Students were involved in practical laboratory work in various didactic/research fields: electrophoretic analyses, microbiology, electrochemical determinations, and high-performance chromatographic determinations. They also used some of the equipment recently acquired by the Center for Basic Research and Preventive Strategies in Medicine (C17A) from the Research and Development Institute of the Transilvania University of Brasov (Romania).

Students received 3 ECTS upon fulfilling the summer school's requirements (attendance at lectures and laboratory hours, presentations of laboratory work results).

These activities will strengthen students' problem-solving skills (from bachelor's, master's and doctoral programs), stimulated by teamwork, participation in discussions and oral communication. The students benefited from the interaction with colleagues from other European universities and made connections that opened the direction of further professional collaborations.

P2. Electrophoresis – from basic applications to proteomics

Mihaela BADEA, Cristina GĂLBĂU, Ligia CHELMEA

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Electrophoresis separates electrically charged compounds in a continuous electric field without reaching the electrodes.
During the presentation, the factors that influence the migration speed of the compounds will be mentioned and commented on as being correlated with their nature and electrical charge, the properties of the migration environment, and the experimental conditions.
The variability of work methods and equipment will be mentioned. The method is versatile and allows the use of various biological problems, with applications for one-dimensional separations (simple or gradient), two-dimensional electrophoresis analyses, and modern proteomics techniques.

Mihaela BADEA

- Professor of biochemistry, laboratory techniques, analytical chemistry, and methodology of scientific research at the Faculty of Medicine, Transilvania University of Brasov, Romania
- Habilitation in Medicine (2017) - University of Medicine and Pharmacy Carol Davila from Bucharest
- PhD in Chemistry (2005) - Babes-Bolyai University of Cluj-Napoca
- PhD in Medicine (2021) – Transilvania University of Brasov
- Member of the Academic Nutritional Science PhD's staff of the University of Milan (Italy) (since 2019).
- Nov. 2019 – Coordinator Research Center for Fundamental Research and Preventive Strategies in Medicine -ICDT UNITBV

Relevant activities in the field of the thematic area

The senior researcher has previous managerial experience in coordinating national grants and acting as Romanian coordinator for an international FP7 project (PlantLIBRA- KBBE-2009-245199), as well as team member in international projects (funded by Balkan Environmental Associations-COSMOTE) and national projects.

She successfully coordinated conferences and International Scientific Committees-EnvEdu2005, New Trends on Sensing-Monitoring- Telediagnosis for Life Sciences- NT SMT-LS 2024, NT SMT-LS 2022, NT SMT-LS 2020, NT SMT-LS 2018, NT SMT-LS 2017, NT SMT-LS 2015, NT SMT-LS 2014; Healthy Nutrition and Public Health- IC-HNPH 2011; Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences- ICANMBES 2010. Dr Badea was chairing the organisation of International Summer Schools- Food Safety and Healthy Living – FSHL 2018-2022 (every year); Telemonitoring and Telediagnostic for Life Sciences – TTLS 2013; Bioanalytical Methods for Life Sciences – BMLS 2011.

Research interests

- Development and optimisation of bioanalytical methods with applications in the life sciences
- Studies on the involvement of antioxidant systems in different biochemical mechanisms and cell cultures
- Correlation of environmental factors with chronic diseases
- Toxicological studies for the detection of contaminants in different environments
- Studies of herbal dietary supplements – composition, safety, beneficial effects, consumer profile
- Telemonitoring-telediagnosis in life sciences
- Biocompatibility studies for new biomaterials

Researcher ID: Z-1490-2018
ORCID: http:// orcid.org/0000-0003-4824-2175

Selected publications

- Mohammadinejad, A.; Gaman, L.E.; Aleyaghoob, G.; Gaceu, L.; Mohajeri, S.A.; Moga, M.A.; **Badea, M**. Aptamer-Based Targeting of Cancer: A Powerful Tool for Diagnostic and Therapeutic Aims. Biosensors 2024, 14, 78. https://doi.org/10.3390/bios14020078
- Chelmea, L.; **Badea, M.;** Scarneciu, I.; Moga, M.A.; Dima, L.; Restani, P.; Murdaca, C.; Ciurescu, D.; Gaman, L.E. New Trends in Uric Acid Electroanalysis. Chemosensors 2023, 11, 341. https://doi.org/10.3390/chemosensors11060341
- Majdinasab, M.; **Badea, M**.; Marty, J.L. Aptamer-Based Lateral Flow Assays: Current Trends in Clinical Diagnostic Rapid Tests. Pharmaceuticals 2022, 15, 90. https://doi.org/10.3390/ph15010090
- **Badea M**, Gaman L, Delia C, Ilea A, Leașu F, Henríquez-Hernández LA, Luzardo OP, Rădoi M, Rogozea L., (2019), Trends of lipophilic, antioxidant and hematological parameters associated with conventional and electronic smoking habits in middle-age Romanians., J Clin Med.;8(5). pii: E665
- **Badea M**, Luzardo OP, González-Antuña A, Zumbado M, Rogozea L, Floroian L, Alexandrescu D, Moga M, Gaman L, Radoi M, Boada LD, Henríquez-Hernández LA., Body burden of toxic metals and rare earth elements in non-smokers, cigarette smokers and electronic cigarette users., Environ Res. 2018;166:269-275.

P3. Emerging marine algal toxins poisoning

Silvio SOSA, Aurelia TUBARO

Department of Life Sciences, University of Trieste, Italy

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Globalization and climate change seem to be responsible for the increasing frequency of emerging algal and/or bacterial toxins in edible marine organisms and/or seawater that can be potentially dangerous to humans. Algal toxins seem to be related to different health problems in humans, both after oral consumption of contaminated seafood and after marine aerosol exposure on the shore produced by the breakdown of small bubbles at the sea surface.

Since the last decades, the presence of palytoxin-related compounds along the Mediterranean Coast has caused adverse effects in different marine organisms (*i.e.* marine stars and sea urchins), as well as in humans (respiratory, dermal and ocular signs) mainly along the Italian coast during recreational/working activities, concomitantly to *Ostreopsis* cf. *ovata* blooms. Palytoxin-like compounds were subsequently detected in marine aerosol along the Tuscany coasts of Italy. Surprisingly, no problem was referred after seafood consumption in the same period, despite high levels of these toxins were detected in mussels. Preliminary *in vitro* and *in vivo* data on acute oral toxicity of ovatoxin-a, the main palytoxin analogue detected in *Ostreopsis* cells from the Mediterranean Sea, suggest its low toxic potential in comparison to that of palytoxin, whose mechanism of action involves its interaction with Na^+/K^+ ATPase and its conversions in to a non-selective cation channel.

More recently, other very dangerous toxins, tetrodotoxins (TTXs), were detected in marine gastropods and bivalves, besides their well-known presence in puffer fish. Due to the high toxicity of these compounds, the consumption of these organisms represents a serious health threat. TTXs bind to site 1 of the voltage-gated Sodium Channels, blocking the channel pore and intracellular Na^+ influx. This effect impairs the action potential generation and neuronal impulse transmission causing mussel paralysis.

The presence of *Gambierdiscus* algal species producing ciguatera toxins was also referred in Mediterranean Sea with the detection of ciguatoxins in fish along the coasts of South of Spain. Several fish could be contaminated by these toxins, whose consumption induces cold allodynia and other peripheric neurological symptoms.

Aurelia TUBARO

- Full professor of Toxicology at the Department of Life Sciences, University of Trieste (Italy).
- Specialization in Toxicology at the University of Milan (Italy).
- Master Degree in Pharmacy (110/110 cum laude) at the University of Trieste (Italy).
- E-mail: tubaro@units.it

Relevant activities in the field of the thematic area

2020 – 2021: Expert of the European Food Safety Authority (EFSA) for algal toxins, involved in the activities of the Working Group on Scallops.
2012 – 2021: Council member of the International Society for the Study of Harmful Algae (ISSHA).
2012 – 2017: Coordinator of the Master Degrees of Pharmacy and of Pharmaceutical Chemistry & Technology at the University of Trieste (Italy).
2013 – 2015: Member of the Commission for updating the guidelines of the Italian Ministry of Health on the risk management for *Ostreopsis* in recreational seawaters.
2009 – now: Member of EFSA's (European Food Safety Authority) expert database.
2009 – now: Member of RENTIC (National Register of Italian Certified Toxicologists).
2006: Chair of the "Palytoxin and Ostreocins" working Group of the Presidential Task Force of AOAC (Association of Official Analytical Chemists).
2005: Topic Advisor of Yessotoxins for AOAC.
2004: Voting member of the International Presidential Task Force on Marine and Freshwater Toxins of AOAC and Chairman of the Working Group on Yessotoxins.
1998 – 2005: Associate professor of Pharmaceutical Biology at the Faculty of Pharmacy, University of Trieste (Italy).
1997: Visiting professor at the Tohoku University (Sendai, Japan), with a fellowship granted by the Ministry of Education, Science, Sports and Culture of Japan, in the frame of the project "Toxins in mussels and in Phytoplankton from the Adriatic Sea".
1987: Visiting researcher at the Institute of Pharmaceutical Biology, University of Munich (Germany).
1995: Member of the International directory of experts in toxic and harmful algae of UNESCO and National Marine Fisheries Service of the United States.
1983 – 1998: Researcher at the Faculty of Pharmacy, University of Trieste (Italy).
1980 – 1983: Fellowship at the Institute of Pharmacology and Pharmacognosy of the University of Trieste (Italy).

Research interests

Her research activity is focused on the pharmacological/toxicological studies of natural products, individuation of their active/toxic principles and mechanisms of action. Since 1989, she is active in the algal toxins field mainly focusing on *in vivo*/*in vitro* toxicological studies on algal toxins, and set

up of methods for their detection.

Researcher ID: AAB-2601-2022
ORCID: https://orcid.org/0000-0003-2773-2589

Selected publications

Aurelia Tubaro is co-author of more than 200 scientific publications in indexed peer-review international journals (*h*-index = 42; Total citations = 6201; source: SCOPUS).

- Oshiro N, Gago-Martinez A, **Tubaro A**. (2024). Chemistry, toxicology and etiology of marine biotoxins. J Mar Sci Eng. 12: 236 doi.org/10.3390/jmse12020236.
- Tebben J, Zurhellem C, **Tubaro A**, Samdal IA, Krock B, Kilcoyne J, Sosa S, Trainer VL, Deeds JR, Tillmann U. (2023). Structure and toxicity of AZA-59, an azaspiracid shellfish poisoning toxin produced by *Azadinium poporum* (Dinophyceae). Harmful Algae. 124: 102388.
- Honsell G, Gaiani G, Hirama M, Pelin M, **Tubaro A**, Tsumuraya T, Campàs M. (2022). Cell immunolocalization of ciguatoxin-like compounds in the benthic dinoflagellate *Gambierdiscus australes* M. Chinain & M.A. Faust by confocal microscopy. Harmful Algae. 120: 102353.
- Sosa S, Pelin M, Ponti C, Carlin M, **Tubaro A.** (2022). Acute toxicity by oral co-exposure to palytoxin and okadaic acid in mice. Mar Drugs. 20: 735 doi: 10.3390/md20120735.
- Cavion F, Pelin M, Ponti C, Della Loggia R, **Tubaro A**, Sosa S. (2022). Ecotoxicological impact of the marine toxin palytoxin on the micro-crustacean *Artemia franciscana.* Mar Drugs. 20: E81 doi: 10.3390/md20020081.
- Carlin M, Pelin M, Ponti C, Sosa S, **Tubaro A.** (2022). Functional and structural biological methods for palytoxin detection. J Mar Sci Eng. 10: 916.
- Schrenk D, Bignami M, Bodin L, del Mazo J, Grasl-Kraupp B, Hogstrand C, Chipman KJ, Leblanc J-C, Nebbia CS, Nielsen E, Ntzani E, Petersen A, Sand S, Schwerdtle T, Vleminckx C, Wallace H, Gago Martinez A, Gerssen A, **Tubaro A**, Cascio C, Cortiñas Abrahantes J, Steinkellner H, Hoogenboom LR. (2021). Evaluation of the shucking of certain species of scallops contaminated with lipophilic toxins with a view to the production of edible parts meeting the safety requirements foreseen in the Union legislation. EFSA J. 19: doi: 10.2903/j.efsa.2021.6422.
- Pelin M, Stocco G, Florio C, Sosa S, **Tubaro A**. (2020). *In vitro* cell sensitivity to palytoxin correlates with high gene expression of the Na^+/K^+-ATPase β2 subunit isoform. Int J Mol Sci. 21: E5833.
- Cavion F, Fusco L, Sosa S, Manfrin C, Alonso B, Zurutuza A, Della Loggia R, **Tubaro A**, Prato M, Pelin M. (2020). Ecotoxicological impact of graphene oxide: toxic effects on the model organism *Artemia franciscana*. Environ Sci Nano. 7: 3605-3615. .
- Sosa S, Pelin M, Cavion F, Hervé F, Hess P, **Tubaro A**. (2020). Acute oral toxicity of pinnatoxin G in mice. Toxins (Basel). 12, pii: E87.
- Pelin M, Kilcoyne J, Florio C, Hess P, **Tubaro A**, Sosa S. (2019). Azaspiracids increase mitochondrial dehydrogenases activity in hepatocytes: involvement of potassium and chloride ions. Mar Drugs. 17: pii: E276.

- Ninčević Gladan Ž, Arapov J, Casabianca S, Penna A, Honsell G, Brovedani V, Pelin M, Tartaglione L, Sosa S, Dell'Aversano C, **Tubaro A**, Žuljević A, Grbec B, Čavar M, Bužančić M, Bakrač A, Skejić S. (2019). Massive occurrence of the harmful benthic dinoflagellate *Ostreopsis* cf. *ovata* in the Eastern Adriatic Sea. Toxins (Basel). 11: pii: E300.
- Pelin M, Sosa S, Brovedani V, Fusco L, Poli M, **Tubaro A**. (2018). A novel sensitive cell-based immunoenzymatic assay for palytoxin quantitation in mussels. Toxins (Basel). 10(8): pii: E329.
- Pelin M, Kilcoyne J, Nulty C, Crain S, Hess P, **Tubaro A**, Sosa S. (2018). Toxic equivalency factors (TEFs) after acute oral exposure of azaspiracid 1, -2 and -3 in mice. Toxicol Lett. 282: 136-146.
- Tartaglione L, Pelin M, Morpurgo M, Dell'Aversano C, Montenegro J, Sacco G, Sosa S, Reimer JD, Ciminiello P, **Tubaro A**. (2016). An aquarium hobbyist poisoning: Identification of new palytoxins in *Palythoa* cf. *toxica* and complete detoxification of the aquarium water by activated carbon. Toxicon. 121: 41-50.
- Brovedani V, Sosa S, Poli M, Forino M, Varello K, **Tubaro A**, Pelin M. (2016). A revisited hemolytic assay for palytoxin detection: Limitations for its quantitation in mussels. Toxicon. 119: 225-233.
- Pelin M, Florio C, Ponti C, Lucafò M, Gibellini D, **Tubaro A**, Sosa S. (2016). Pro-inflammatory effects of palytoxin: an *in vitro* study on human keratinocytes and inflammatory cells. Toxicol Res. 5: 1172-1181.
- Pelin M, Forino M, Brovedani V, Tartaglione L, Dell'Aversano C, Pistocchi R, Poli M, Sosa S, Florio C, Ciminiello P, **Tubaro A**. (2016). Ovatoxin-a, a new palytoxin analogue isolated from *Ostreopsis* cf. *ovata* Fukuyo: biological activity and ELISA detection. Environ Sci Technol. 50: 1544-1551.
- Pelin M, Brovedani V, Sosa S, **Tubaro A**. (2016). Palytoxin-containing aquarium soft corals as an emerging sanitary problem. Mar Drugs. 14(2). pii: E33.
- Sosa S, **Tubaro A**. (2016). Okadaic acid and other diarrheic toxins: toxicological profile. In "Toxinology. Marine and Freshwater Toxins". Gopalakrishnakone P, Haddad Jr V, Kem WR, Tubaro A, Kim E Eds., Springer, Dordrecht, pp. 147-168.
- Pelin M, Brovedani V, Sosa S, **Tubaro A**. (2016). Palytoxin-containing aquarium soft corals as an emerging sanitary problem. Mar Drugs. 14: doi: 10.3390/md14020033.
- Pelin M, Sosa S, Pacor S, **Tubaro A**, Florio C. (2014). The marine toxin palytoxin induces necrotic death in HaCaT cells through a rapid mitochondrial damage. Toxicol Lett. 229: 440-450.
- Ciminiello P, Dell'aversano C, Dello Iacovo E, Forino M, Tartaglione L, Pelin M, Sosa S, **Tubaro A**, Chaloin O, Poli M, Bignami G. (2014). Stereoisomers of 42-hydroxy palytoxin from Hawaiian *Palythoa toxica* and *P. tuberculosa*: stereostructure elucidation, detection, and biological activities. J Nat Prod. 77: 351-357.
- Del Favero G, Sosa S, Poli M, **Tubaro A**, Sbaizero O, Lorenzon P. (2014). *In vivo* and *in vitro* effects of 42-hydroxy-palytoxin on mouse skeletal muscle: structural and functional impairment. Toxicol Lett. 225: 285-293

P4. Putting impacts on the map: cumulative impact assessment on marine ecosystems

Stanislao BEVILACQUA

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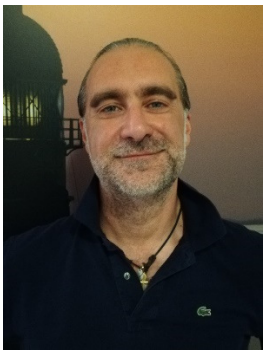
Worldwide, marine coastal systems are threatened by increasing human pressures, often acting simultaneously, and the need for a deeper understanding of the effects of multiple stressors is one of the most challenging questions for ecosystem-based management. The recognition that human activities and their potential impacts are spatially explicit has led to the development of the cumulative pressure and impact assessment (CPIA) approach, which focuses on mapping the distribution of human pressures and expected impact on marine ecosystem. This analytical process and resulting maps provide flexible tools for regional and global efforts to allocate conservation resources; to implement ecosystem-based management; and to inform marine spatial planning, education, and basic research.

Stanislao BEVILACQUA



- Associate Professor of Ecology, Department of Life Sciences, University of Trieste, Italy
- National Academic Qualification as Associate Professor in Zoology
- PhD in Basic Ecology (2005) - University of Salento, Italy
- Academic Board of the School of Doctorate in Life and Environment, University of Trieste, Italy
- Member of the Scientific Community of the Stazione Zoologica Anton Dohrn, Naples, Italy

ORCID: 0000-0002-6417-7134

Relevant activities in the field of the thematic area

- Involved in more than 30 research projects at national and international level working on marine habitat mapping, environmental monitoring, management of natural resources, biodiversity conservation. 2021-2023 Coordinator of the project MITFISH-N2K “Mitigation and monitoring of interactions between artisanal fishery and fish assemblages, seabirds and benthic habitats within Natura 2000 sites”, funded by the EU Fund for Maritime Affairs and Fisheries.

Research interests

- Research activity currently focuses on the relationships between alfa, beta, and gamma diversity of marine community and how these relationships could be instrumental to the assessment of human impacts, conservation strategies, e new approaches to biological monitoring.

Selected publications

- Piccardo, M., Vellani, V., Anselmi, S., Grazioli, E., Renzi, M., Terlizzi, A., Pittura, L., D'Errico, G., Regoli, F., **Bevilacqua, S.**; 2024. The application of the Weight-Of-Evidence approach for an integrated ecological risk assessment of marine protected sites. *Ecological Indicators*, 159, 111676.
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- **Bevilacqua, S.**, Airoldi, L., Ballesteros, E., Benedetti-Cecchi, L., Boero, F., Bulleri, F., Cebrian, E., Cerrano, C., Claudet, J., Colloca, F., Coppari, M., Di Franco, A., Fraschetti, S., Garrabou, J., Guarnieri, G., Guidetti, P., Guerranti, C., Halpern, B.J., Katsanevakis, S., Mangano, M.C., Micheli, F., Milazzo, M., Pusceddu, A., Renzi, M., Rilov, G., Sarà, G., Terlizzi, A.; 2021. Mediterranean rocky reefs in the Anthropocene: present status and future concerns. *Advances in Marine Biology*, 89, 1–51.
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P5. Mastication/food preparation and cognitive impairment

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The aim is to highlight the results of new basic and clinical research studies (more than 100 articles in the international literature in the last 5 years, all in agreement), which clearly reveal the relationship between masticatory function and memory and cognition, both during development and ageing. The results of tests carried out in three different experimental conditions show that the impairment of masticatory function is clearly related to a reduction in the number of neurons and the number of synapses in the hippocampus (dentate gyrus nuclei CA1 and 3) and subventricular zone. A number of clinical studies following these results have also been published.

Mechanoreceptors, cognitive decay, masticatory function during development and social aspects of nutrition / food choice-preference are important in order to better understand the impact of masticatory function on cognition. The aim is to establish a deeper understanding of the neurophysiology of mastication to improve the quality of life of patients, to prevent or delay the onset of neurodegenerative diseases in the elderly and to allow the development of the child's full cognitive potential.

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- Honorary Fellowship (since 2008) and Visiting professor (2010) at King's College of London. Honorary Visiting professor (since 2018) at Hong Kong University Faculty of dentistry. Fellowship ad hominem of The Royal College of Surgeons of Edinburgh (UK) and Royal College of Surgeons of Ireland (EI).

Research interests

- Cleft Lip / Palate and Down syndrome patients
- Corrosion and biocompatibility testing
- Development of mathematical model of the periodontal ligament
- Biomechanics of dental implants used in orthodontics
- Stem cells from pulp of extracted bicuspids for orthodontic reasons
- Dental Education
- Mastication, nutrition and the role in the cognitive impairment

Selected publications

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Research interests

- Masticatory function physiology and pathology
- Neural motor control of masticatory function
- Role of masticatory function on memory and cognition
- Nutrition
- Histology and Biomolecular aspects of masseter muscles
- Temporo-mandibular joint physiology and pathology
- Juvenile Idiopathic Arthritis
- Spine posture
- Functional Orthognathodontics
- Cleft lip/palate
- Functional evaluation after Orthognathic surgery
- 3D Cephalometry

Selected publications

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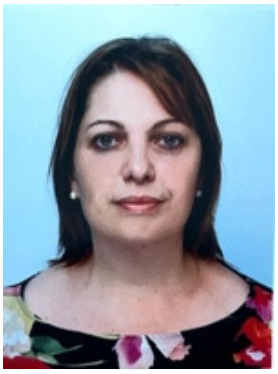

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Research interests

- Masticatory function
- Temporo-mandibular joint physiology and pathology
- Functional Orthognathodontics

Selected publications

- Tortarolo A, di Benedetto L, Tonni I, Tepedino M, **Vallelonga T,** Piancino MG. Improvement in the transverse dimension of dental arches in mixed dentition patients with posterior crossbite treated with functional therapy. Angle Orthod. 2023 Jan 31;93(3):289–95. doi: 10.2319/091622-647.1.
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Research interests

- Masticatory function
- Chewing patterns in malocclusions
- Muscular activity during chewing before and after therapy
- Masticatory function and cognition
- Temporomandibular joint function and disfunction

Selected publications

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P6. Safe hospital discharge planning to prevent unplanned readmission in less than 30 days

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In the United States, hospitals and hospital medicine groups are experiencing increasing gridlock of patients on their clinical services. This is due nursing and staffing shortages, aging population, limited availability of beds at the skilled care facility and payor dynamics. These issues have been addressed in many ways, but the most impactful interventions have often been costly and require building infrastructure outside of the capacity of teams in the hospital. According to Medicare, discharge planning is a process that determines the kind of care a patient needs after leaving the hospital. Discharge plans should ensure that a patient's transition from the hospital to another medical facility or to their home is as safe and smooth as possible.
Across all Duke facilities, efforts have been made to identify patient's needs early and have led to implementation of strong multi-disciplinary rounding. Specialty-focused service lines and case managers have all been successful in reducing the length of stay and solving discharge roadblocks. Duke University Hospital Medicine has multiple interventions to address early discharge and ideally shorten length of stay. Patients who may benefit from more specialized discharge planning support can have multiple phenotypes:

- Patient with well described barriers to self-care or access to caregivers
- Patients with multiple identified social determinants of health barriers
- Patients with complex medical comorbidities unable to get care in their homes or post-acute care facilities
- Patients with functional decline due to illness
- Patients with complex medical risk factors (frailty, complex wound care, high BMI, stretcher dialysis)
- Patients who are un- or under-insured

These patients, when acutely ill and admitted to DUH services, benefit from enhanced discharge planning, accounting for medical conditions and mental health and socio-economic factors. The population of patients with these complex needs is growing, and these patients are spread among our many service lines without a standard handoff process or consistent approach to solving needs. This patient population would benefit from discharge planning that mobilizes resources to ensure care is not fragmented in the early days of hospital stay. Once medical stability is achieved and discharge barriers are well defined, a systematic review of the care plan and progress is needed to ensure adjustments are made if indicated.

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Research interests

- Complex hospital discharge planning
- Patient-reported outcomes
- Translational research
- Quality of life for patients with multiple comorbidities

Selected publications

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P7. Wearable electrochemical sensors

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Monitoring the concentration of molecules related to physiological metabolism in biofluid (such as blood, sweat, saliva, urine, tears, and interstitial fluid) is a widely adopted strategy for health management and disease diagnosis and treatment. E.g., uric acid (UA) serves as a biomarker for hyperuricemia and gout; glucose is an indicator of diabetes or hypoglycemia; pH levels are reflective of metabolic health and acid-base balance.

Clinically, the most prevalent biofluid sampled for health or disease monitoring-related biomarkers is blood. However, invasive blood collection typically necessitates trained medical personnel, exposes the subject to infection risks, and imposes considerable psychological stress. Alternatively, non-invasive or minimally invasive biomarker sampling offers a new avenue for health monitoring and disease diagnosis, facilitating convenient and rapid testing for related conditions. This approach can empower personalized medicine, precision therapy, and individual self-health management.

Traditional biomarker detection methods, including gas chromatography, high-performance liquid chromatography, enzyme-linked immunosorbent assay, and so on, are time-consuming, high-cost, requiring complex equipment and professional operators. The electrochemical sensing platform offers a high-sensitivity, low-cost, compact, and portable assessment tool for metabolic compounds. In this presentation, we will introduce several wearable sensors that our group has investigated, with the aim of sparking inspiration and potentially contributing to the audience's future scientific endeavors.

Zhanhong LI

- Bachelor degree in Chemical Biology, Xiamen University, China, 2009
- Ph.D. degrees in Physical Chemistry, Xiamen University, China, 2014; Chemistry, University of Perpignan, France, 2015
- Lecturer, Shanghai Polytechnic University, China, 2014-2020
- Visiting Scholar, University of California San Diego, USA, 2018–2019
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Research interests

- The research interest is focused on the field of healthcare and wellness, with research directions encompassing electrochemical sensors, wearable sensors, flexible electronics, biosensors, and electrocatalysis.
- To date, nearly 40 articles have been published in ISI journals, with an H-index of 17 and over 1,100 citations recorded in Web of Science.
- He is serving as a Review Editor for Frontiers in Materials and Frontiers in Chemistry, as well as a Guest Editor for Sensors. He is also an active reviewer for several journals, including Talanta, Applied Biochemistry and Biotechnology, and so on.

Selected publications

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P8. Personalised medicine: what it is and why we need it

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The current practice of medicine is largely a "one-drug-fits-all" approach based on the assumptions that a standard dose of drug can suit every patient with the same diagnosis regardless of his individual makeup and that the prescribed drug dose is “reasonably safe”. Indeed, in clinical practice, treatments are not tailored to a single patient, but they are given according to average results of drug efficacy and drug-related adverse effects obtained in previously tested populations.
Each individual is however unique, and each person is slightly different from everyone else’s because of age, genetic background, environment and lifestyle. The individual profile matters! That is why the patient's clinical response is often unpredictable, and efforts to treat patients are not always straightforward and often require trials and errors to optimise therapy. Modern medicine's challenge is bringing the patient makeup into the cure, understanding how differences among individuals should account for more effective and targeted therapies. This approach-known as personalized, individualised or precision medicine- aims at providing “the right drug at the right dose to the right patient” from the very beginning of the treatment, optimizing therapy in terms of both improved therapeutic success and decreased occurrence of drug-related adverse effects.

Raffaella FRANCA

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Research interests

- Her main research interests are in pharmacology, with topics related to therapy personalization and a major focus on pediatric therapies, particularly those in the hemato-oncological field.

- She teaches pharmacology in medical and medical-related classes at the University and is a member of the Italian Society of Pharmacology.

SELECTED PUBLICATIONS

- **Franca** et al., Impact of Mercaptopurine Metabolites on Disease Outcome in the AIEOP-BFM ALL 2009 Protocol for Acute Lymphoblastic Leukemia. Clin Pharmacol Ther. 2023 Nov;114(5):1082-1092.
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P9. The role of AI in mental health, well-being and networking support for different categories of people like students, teachers, medical staff or migrants

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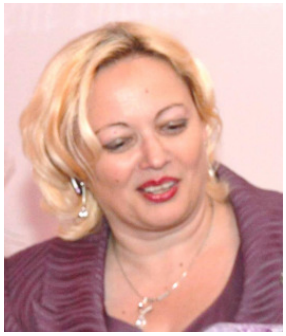
Artificial intelligence has recently become one of the most often invoked tools in the development of intervention mechanisms, including in the field of health and health promotion. AI's ability to approximate the decision-making process in a given situation, based on the experience it has access to, can be the basis for improving the quality of prevention programs.
Systematizing information about AI and how it has a transformative effect on mental health, well-being, or how it can provide the necessary support for reintegration into a new society or support adaptation to stressors ensures not only the use of AI appropriately, but also ensures its development in the future.
Articles from the last 10 years from the main databases (Google Scholar, PubMed, Scopus) on mental health, well-being were analysed.
AI can have the potential for innovation and contribute to the development of models as long as there is a series of experiences behind it to use as a model, but this is also the one that requires understanding that AI can be trained with non-representative data especially in the case of previously unexplored categories, so that it can lead to models based on inequality, discrimination or ableist models, etc., requiring human intervention and evaluation on the basis of unanimously recognized moral and ethical values.
AI helps to support both temporary and permanent mobility, both for students, teachers or medical staff benefiting from mobility grants, and for migrants who choose permanent mobility.

Acknowledgement: Project Entrepreneurs' well-being and mental health in a crisis- EntrepWellbeing, 2023-1-ES01-KA210-ADU-000151300

Liliana Marcela ROGOZEA



- MD, Senior specialist in Public Health, PhD in Medicine
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Research interests

Ms. Liliana Rogozea is a professor, MD, PhD, and vice-rector with public relations. Her teaching and research fields are counselling in ethics, health promotion, and human behaviour.

She has expertise in curriculum development, design of research methods in international project activities (e.g. Tempus S-JEP –12156 –97, Leonardo da Vinci RO/2006/97125/EX), and is a member of MATRA Project „Reinforcement of the Integrated System of Extramural Mental Health Care Services in Three Counties in Romania" coordinator de: HealthNet-TPO M, September 2006, and in coordination with international co- operations, in conferences organizing.

Other international projects coordinated by prof Rogozea are: "RING – TransferRING Supports for Caregivers" (LLP- LDV-TOI-09-IT-0446), Health Rehabilitation through Physical Exercise (HARPE, Project no. 503202-LLP-1- 2009-1-UK-ERASMUS-ECDSP), Healthy Europe through learning practice (HELP, LEONARDO DA VINCI, 2011-1-GB2-LEO05-05499), "Pervasive development disorders (Autism, Asperger Syndrome, ADHD)" (P_ASA LLP-LdV/VETPRO/2011/RO/309), Moldova Higher Education Leadership and Management / MHELM 609656-EPP-1-2019-1-MD-EPPKA2-CBHE-SP.

She is also a member of the management team of "Equal opportunities for health: action for development" (CUAMM, OCI-NSA ED/2011/239-187) and has several publications abroad.

111 paper index in Web of Science (original article, review, editorial material, meeting abstract and proceeding).

She is the editor or co-editor of four journals and a reviewer for several national and international medical journals.

Selected publications

- Popescu, I. G., Sechel, G., Leaşu, F. G., Ţânţu, M. M., Cotoi, B. V., & **Rogozea, L. M**. (2018). Correlations on the protection of personal data and intellectual property rights in medical research, Rom J Morphol Embryol, 59(3), 1001-1005

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- Mosoiu D, **Rogozea L,** Landon A, Bisoc A, Tint D. Palliative care in heart failure: A public health emergency. American Journal of Therapeutics. 2020 Mar 1;27(2):e204-23.
- Badea M., Gaman, L., Delia, C., Ilea, A., Leașu, F., Henríquez-Hernández, L. A., ... & **Rogozea, L.** (2019). Trends of Lipophilic, Antioxidant and Hematological Parameters Associated with Conventional and Electronic Smoking Habits in Middle-Age Romanians. Journal of clinical medicine, 8(5), 665.
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P10. Effect of protein consumption on health: focus on type 2 diabetes mellitus

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The effect of protein consumption on different health outcomes has been the focus of the scientific community in recent years. Several decades ago, nitrogen balance studies showed that a protein intake of 0.8 g/kg/day was enough to meet protein requirements in humans. However, scientific evidence in recent years reveals that a higher consumption has an outstanding physiological impact and would induce weight loss benefits, helping to achieve and maintain an adequate body weight, to better maintenance of muscle mass and could even associate benefits on cardiometabolic parameters. These parameters include blood pressure, lipid profile (especially triglycerides), glucose metabolism or adipose tissue functionality, among others.
Proteins and amino acids have an essential role in glucose homeostasis and high-protein diets have demonstrated to improve glycemic parameters regardless of weight loss. Though the mechanisms are not fully established, this effect is mostly attributed to the insulinotropic activity of amino acids. In this way, the protein source appears to play a fundamental role in their physiological effects. Beyond the food matrix, the type of amino acids that make up the protein (determining its biological value) or even the presence of certain sequences of these (such as the bioactive peptides found in dairy products) has an important impact on the effects of the protein on health.
Further investigation is needed to solidly establish the quantity, quality and type of protein that should be advised to subjects to prevent or manage weight loss and cardiometabolic diseases, such as type 2 diabetes.

Rocío MATEO GALLEGO

- Degree in Human Nutrition and Dietetics (2007), Master's Degree in Child and Adolescent Nutrition (2009) and Master's Degree and Diploma in Public Health (2011) at the University of Zaragoza.
- PhD in Medicine at the same University in 2015, obtaining the Extraordinary Doctorate Award.
- Lecturer in Degree in Human Nutrition and Dietetics (Physiatry and Nursing Department). Coordinator and Vice Dean in the Degree of Human Nutrition and Dietetics at University of Zaragoza since 2020.
- Researcher in Primary Dyslipidemia group (Health Research Institute of Aragon, Zaragoza, Spain) since 2008.
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Research interests

In 2008, I began my professional activity in the field of research, becoming part of the Primary Dyslipidemia group, led by Prof. Fernando Civeira, within Health Research Institute of Aragon. My professional activity has been specifically carried out in the Clinical and Research Unit in Lipids and Atherosclerosis, where I have developed both clinical and research activity, mainly in patients with cardiometabolic diseases in the field of clinical nutrition, public health and epidemiology.

In 2016, I spent four months in the Cardiovascular Epidemiology group, led by Professor Dariush Mozaffarian, at the Friedman School of Nutrition Science and Policy at Tufts University (Boston, United States). I developed a project focused on the study of the modulation effect of diet on the impact of risk factors on cardiovascular disease. I had the opportunity to learn different techniques in the field of epidemiology.

Nowadays, I am lecturer, Coordinator and Vice Dean in the Degree of Human Nutrition and Dietetics at University of Zaragoza since 2018.

I have participated in 12 national and international competitive research projects and scientific networks in the field of cardiovascular disease, lipids and nutrition. I have led five of these projects, including those with funding from European (Horizon 2020) or national (Carlos III Health Institute or National Institute for Agri-Food Research (INIA)).

My scientific production includes almost 90 publications in scientific journals, participation in the preparation of several books, the presentation of more than 50 scientific communications in

national and international congresses (>10 of them as first author). I have done the scientific review of about 15 manuscripts for journals such as Clinical Nutrition, British Journal of Nutrition, Nutrition Research and PLOS One.

My general quality indicators include:

- Total citations: 964 (925 without self-citations); Total publications: 88; H-Index: 17.
- Two six-year periods of research activity granted by the ACPUA and the CNEAI (2009-2014 and 2015-2020).
- Five outstanding positive teaching evaluations (academic years 2017/18, 2018/19, 2019/20, 2020/21, 2021/22), University of Zaragoza.

Selected publications

From a total of 88 publications, I have selected the following 10 as the most relevant. Please, see ORCID profile or the following link for a complete list of publications:
https://pubmed.ncbi.nlm.nih.gov/?term=mateo-gallego+r&sort=date

- **Mateo-Gallego R**, Moreno-Indias I, Bea AM , Sánchez-Alcoholado L , Fumanal AJ, Quesada-Molina M, Prieto-Martín A , Gutiérrez-Repiso C , Civeira F , Tinahones FJ. An alcohol-free beer enriched with isomaltulose and a resistant dextrin modulates gut microbiome in subjects with type 2 diabetes mellitus and overweight or obesity: a pilot study. Food Funct. 2021;12(8):3635-3646.
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P11. Mitochondrial diseases: diagnostic and research strategies

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Mitochondria are essential regulators of eukaryotic metabolism. They contain their own genome (mtDNA), which is present in almost all eukaryotic cells. In humans, mtDNA encodes only 13 proteins, which are subunits of the oxidative phosphorylation (OXPHOS) system, responsible for ATP production inside mitochondria. Additionally, mtDNA encodes necessary elements of the mitochondrial gene expression system: 22 tRNAs and 2 rRNAs. The expression of mitochondrial DNA encoded genes is a crucial process, with approximately 25% of the mitochondrial proteome dedicated to the replication, transcription, and translation of mtDNA. In fact, mitochondrial translation is linked to the assembly of mitochondrial respiratory complexes. In addition, translation inside the *organelle* is integrated into the cellular metabolic context, influencing and being influenced by different cellular processes, and is therefore an essential process for cellular homeostasis. Failures in this mechanism will lead to significant mitochondrial dysfunction, which is associated with diseases. Interestingly, similar defects in mitochondrial translation, a central process of mitochondrial biogenesis, cause diverse phenotypes such as hypertrophic cardiomyopathy, micropolygyria, multi-organ disease, or non-syndromic deafness. However, the molecular mechanisms that determine why mutations present in all cells of the organism only affect specific tissues remain completely understood.

Using cells derived from patients carrying mutations in factors related to mitochondrial translation has allowed us to develop cellular models (iPSCs) capable of differentiating into specific tissue cells, and we have observed that the molecular defects caused by mutations in mitochondrial translation factors manifest differently depending on the cell type and identified response mechanisms whose differential action in different tissues could contribute to this specificity of symptoms. Once we have studied cellular responses to mitochondrial damage and how their differential action could contribute to tissue specificity in these diseases, we must identify the molecular triggers of these responses in different tissues to design therapeutic. In addition, we took advantage of click-chemistry to monitor mitochondrial translation and gain spatial resolution within the cell. In that way we could not only visualize the context of mitochondrial gene expression in different cellular contexts but also

design approaches to increase the number of factors modulating mitochondrial translation. These strategies will not only elucidate the determinants of tissue-specificity of mitochondrial disorders, but will also improve the diagnostic tools and therapeutical targets available for these rare disorders.

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- Postdoctoral Fellow. University Medical Center Göttingen, Germany, 2012-2013
- Alexander von Humboldt Postdoctoral Fellow. University Medical Center Göttingen, Germany, 2013-2015
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- Assistant Professor, Faculty of Health and Sport Sciences, University of Zaragoza, Huesca, Spain. 2020-2022
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Research interests

- mtDNA population variation
- Diagnosis of mitochondrial diseases
- Biogenesis of respiratory chain complexes
- Mitochondrial protein translocation
- New factors regulating Mitochondrial Gene Expression
- New cellular models for mitochondrial disorders (iPSCs)
- Click-chemistry monitoring mitochondrial translation
- mtDNA variation and familial hypercholesterolemia

I have published almost 40 scientific articles and 2 book chapters (10 as first author, 4 as last author, 6 as second author, 5 as corresponding author, more than 2/3 published in first decile or first quartile journals, including top journals like Cell, Cell Metabolism, EMBO, EMBO reports, Current Biology, Circulation Research. I have participated in more than 15 national/EU competitive projects (6 supporting my own independent research lines). I have been awarded with 1 research

scholarship, 3 research fellowships, and 3 research awards. I have presented 30 (oral/poster) contributions in international and national conferences.
I am Review Editor and have been Associated Editor of Cellular Biochemistry of Frontier Journals. I have been actively involved in article reviewing for more than 20 journals. I have evaluated Research Grants for the Royal National Institute for Deaf People (RNID, UK), the "fundación CAI-IBERCAJA" (Spain) and the Dutch Research Council. I have been selected as evaluator for Spanish State Investigation Agency (AEI) and I am the director of the Biomedicine Section of "Instituto de Estudios Altoaragones" (Spain).

Selected publications

- Ruiz-Pesini E, Bayona-Bafaluy MP, Sanclemente T, Puzo J, Montoya J, **Pacheu-Grau D**. Mitochondrial Genetic Background May Impact Statins Side Effects and Atherosclerosis Development in Familial Hypercholesterolemia. Int J Mol Sci.2022 Dec 28;24(1):471
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- **Pacheu-Grau D**, Rucktäschel R, Deckers M. Mitochondrial dysfunction and its role in tissue-specific cellular stress. Cell Stress. 2018 Jul 13;2(8):184-199.
- **Pacheu Grau, D**.; Bareth, B.; Dudek, J,…, Rehling P*, Deckers, M.. 2015. Cooperation between COA6 and SCO2 in COX2 maturation during cytochrome c oxidase assembly links two mitochondrial cardiomyopathies. Cell metabolism 2015. 21-6, pp.823-856.
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- Pacheu-Grau, D.; Gómez Durán, A.; López Gallardo, E.; Pinós, T.; Andreu, AL.; López Pérez, MJ.; Montoya, J.; Ruiz Pesini, E.2011. 'Progress' renders detrimental an ancient mitochondrial DNA genetic variant. Human molecular genetics. 20-21, pp.4224-4255.

P12. Fruits and vegetables at the core of the Mediterranean diet

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The lesson aims to make students aware of the importance of fruits and vegetables in the Mediterranean Diet and their impact on consumer health and well-being. Due to their variety of colours, flavours, and tastes, fruits and vegetables are essential to the Mediterranean way of eating.
The following points will be addressed:

- Impact of a diet rich in fruits and vegetables. Nutritional and health benefits.
- Fundamental differences between fruits and vegetables.
- Fruit and vegetables during post-harvest.
- Average composition of fruit and vegetables. Relevance for bioactive composition.
- Key attributes of quality.
- Consume fresh or processed products? Processing impact on quality and shelf-life.

Margarida MOLDÃO

- Associate Professor of the Department of Sciences and Engineering of Biosystems (DCEB) of the Instituto Superior de Agronomia (ISA, School of Agriculture), University of Lisbon (ULisboa), Portugal
- Researcher at LEAF—Linking, Landscape, Environment, Agriculture and Food Research Center.

She got the Habilitation in 2004 and the PhD in 1995 in Agro-Industrial Engineering at the ISA, Universidade Técnica de Lisboa (UTL; Technical University of Lisbon).

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Her research is mainly focused on: (i) biodegradable and active edible films and coatings (ii) recovery of bioactive compounds from industrial residues, renewable resources, herbs and species and their stabilization for food applications, (iii) Abiotic stresses to promote fruit and vegetables quality and (iv) Fresh-cut fruit and vegetables. Conducting research in close collaboration with companies and actively participating in the transfer of knowledge from the university to the industry. Coordinates/participates several research projects. Performs consultancy and project evaluation activity.

Teaching activities

Coordinator of the teaching areas: Food Processing and Preservation (1st Cycle: Food Engineering, ISA); Emerging Processes and Environmental Management (Master: Food Engineering, ISA); Fruit and Vegetables Technology (Master: Food Engineering, ISA)

- Food Technology (1st cycle: Food Engineering, ISA)
- Industrial Project (Master: Food Engineering, ISA).

Selected publications

- Alegria, C.; Gonçalves, E.M.; **Moldão-Martins, M**.; Abreu, M.. Multi-Target Alternative Approaches to Promoting Fresh-Cut Carrots' Bioactive and Fresh-like Quality. Foods 2022, 11, 2422. https:// doi.org/10.3390/foods11162422
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P13. Olive oil characterization, extraction and health claims

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The Mediterranean diet has been related to people longevity and reduced risk of morbidity. Olive oil is used as the main source of fat in this diet. The virgin olive oil (VOO) has recognized health benefits related to its high content in (i) monounsaturated fatty acids (mainly oleic acid), (ii) polyphenolic compounds with different biologic activities (e.g. antioxidant, anti-inflammatory and anti-microbial) and (iii) tocopherols with antioxidant and vitaminic properties. Health benefits of specific olive oil phenolic compounds is already recognized by the EU as "Olive oil polyphenols" health claim (COMMISSION REGULATION (EU) No 432/2012 of 16 May 2012). However, not all virgin olive oils meet the requirement of this health claim. It is dependent on olive cultivar, fruit ripening, agronomic practices and geographical location, post-harvest, olive oil extraction and storage. Moreover, the phenolic composition of VOO has important impact on the sensory properties, since they are responsible for positive sensory attributes of bitterness and pungency.
Olive oil is extracted from healthy olive fruits only by mechanical processes and under conditions that will preserve its high quality. This paper addresses the extraction process and the main good practices that must be followed to preserve the compounds responsible for the health benefits and unique flavour of VOO.

Suzana FERREIRA-DIAS

- Associate Professor with Habilitation of the Instituto Superior de Agronomia (ISA, School of Agriculture), University of Lisbon (ULisboa), Lisbon, Portugal.
- 2004: Habilitation, Instituto Superior de Agronomia (School of Agriculture), Universidade Técnica de Lisboa (UTL; Technical University of Lisbon)
- 1994: PhD in Agro-Industrial Engineering, Instituto Superior de Agronomia, UTL

- 1989: Master in Biotechnology (Biochemical Engineering), UTL
- 1984: Graduation in Agro-industrial Engineering (6 years), ISA, UTL

Teaching activities

Food Engineering Processes I & II (1st Cycle: Food Engineering, ISA); Food Biotechnology (1st Cycle: Food Engineering, ISA), Food Technology (1st cycle: Food Engineering, ISA); Sensory Analysis (Master: Food Engineering, ISA); Technology of Oils and Fats (Master: Food Engineering).

Research interests

- Food engineering.
- Biocatalysis (use of lipases in non-conventional media)
- Oils and fats (focus on olive oil)
- Structured lipids
- Sensory analysis

Suzana Ferreira-Dias is a member of the Editorial Boards of Bioresource Technology (Elsevier), Grain & Oil Science Technology (Elsevier), and Associate Editor of the Journal of the American Oil Chemists Society (Wiley)

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Selected publications

- Peres, F., Marques, M.P., Mourato, M., Martins, L.L., **Ferreira-Dias, S**. (2023) Ultrasound assisted coextraction of Cornicabra olives and thyme to obtain flavored olive oils, Molecules 28, 6898. https://doi.org/10.3390/molecules28196898
- Souza-Gonçalves, J., Fialho, A., Soares, C.M.F., Osório, N.M., **Ferreira-Dias, S**. (2023) Continuous Production of Dietetic Structured Lipids using Crude Acidic Olive Pomace Oils, Molecules, 28: 2637, https://doi.org/10.3390/molecules28062637
- Sousa, G., Alves, M.I., Neves, M., Tecelão, C., **Ferreira-Dias, S. (**2022) Enrichment of Sunflower Oil with Ultrasound-Assisted Extracted Bioactive Compounds from Crithmum maritimum L., Foods, 11, 439. (https://doi.org/10.3390/foods11030439)
- Heinzl, G.C., Mota, D.A., Martinis, V., Martins, A.S., Soares, C.M.F., Osório, N., Gominho, J., Nampoothiri, K.M., Sukumaran, R.K., Pereira, H., **Ferreira-Dias, S.** (2022) Integrated Bioprocess for Structured Lipids, Emulsifiers and Biodiesel Production using Crude Acidic Olive Pomace Oils, Bioresource Technology, 346, 126646 (https://doi.org/10.1016/j.biortech.2021.126646)
- Peres, F., Roldão, M., Mourato, M., Martins, L.L., **Ferreira-Dias, S.** (2021) Co-processed olive oils with Thymus mastichina L. – new product optimization, Life,11, 1048. https://doi.org/ 10.3390/life11101048

- Sousa, G., Trifunovska, M., Antunes, M., Miranda, I., Moldão, M., Alves, V., Vidrih, R., Allen Lopes, P., Aparicio, L., Neves, M., Tecelão, C., **Ferreira-Dias, S.** (2021) Optimization of ultrasound-assisted extraction of bioactive compounds from Pelvetia canaliculata to sunflower oil, Foods, 10, 1732. (https://doi.org/10.3390/foods10081732).
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- Miranda, I., Simões, R., Medeiros, B., Nampoothiri, M., Sukumaran, R.K., Rajan, D., Pereira, H., **Ferreira-Dias, S**. (2019) Valorization of lignocellulosic residues from the olive oil industry by production of lignin, glucose and functional sugars, Bioresource Technology, 292: 121936 (https://doi.org/10.1016/j.biortech.2019.121936).
- Tecelão, C., Perrier, V., Dubreucq, E., **Ferreira-Dias, S.** (2019) Production of human milk fat substitutes by interesterification of tripalmitin with ethyl oleate catalyzed by Candida parapsilosis lipase/acyltransferase, Journal of the American Oil Chemists' Society, 96: 777–787 (https://doi.org/10.1002/aocs.12250)

P14. Electroanalysis of lipophilic vitamins and related compounds

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Lipophilic vitamins, namely vitamins A, D, E, and K, are non-polar organic compounds that represent an important group of food additives. Esters of lipophilic vitamins are also very often added to cosmetics and pharmaceuticals. It is evident that analysis of the presence and levels of these vitamins and related compounds is justified, especially for food quality control. They are generally determined by various HPLC techniques in normal-phase or reversed-phase systems, usually with spectrophotometric detection. However, the sample preparation can involve up to several steps, e.g., a saponification process is necessary for cosmetics with a high content of triglycerides. An extraction into an organic solvent seems to be sufficient for samples with a less complex matrix. Nevertheless, these vitamins are also electroactive and can be analyzed using suitable voltammetric methods.
This contribution summarizes the advances in the electroanalysis of lipophilic vitamins and their related compounds. Several electrochemical methods were recently proposed which enable fast, sensitive, and low-cost assays with results comparable to those obtained using standardized HPLC methods. Moreover, hazardous organic solvents used in sample preparation might be replaced with less toxic alternatives, or the detection can be performed in aqueous supporting electrolytes after accumulation/extraction of the analyte directly into the electrode material in organic media and a medium-exchange procedure. Although it is generally not possible to determine individual forms of vitamins as in HPLC, attempts were made for the quantification of tocopherol isoforms after careful optimization of experimental conditions and voltammetric signals evaluation. Electroanalysis, in some cases, also allows the simultaneous determination of several lipophilic vitamins in the sample.

Radovan METELKA

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Research interests

Research interests are focused mainly on modified heterogeneous carbon electrodes, especially carbon paste and screen-printed electrodes, and boron-doped diamond electrodes as electrochemical (bio)sensors for food, environmental, and clinical analysis. Scientific interests also include research on ordered porous metal film electrodes, using carbon-based electrodes in the electroanalysis of organic compounds (e.g., vitamins, pesticides, and pharmaceuticals), or designing miniaturized electrochemical detectors for flow systems. Recent research is in developing electrochemical immunosensors for detecting various proteins, such as food allergens or ovarian cancer biomarkers.

Selected recent publications

- Matvieiev O, Selesovská R, Marton M, Hatala M, **Metelka R**, Weis M, Vojs M: Effect of different modification by gold nanoparticles on the electrochemical performance of screen-printed sensors with boron-doped diamond electrode. Scientific Reports 13 (2023) 21525.
- Kovarova A, Kastrati G, Pekarkova J, **Metelka R**, Drbohlavova J, Bilkova Z, Selesovska R, Korecka L: Biosensor with electrochemically active nanocomposites for signal amplification and simultaneous detection of three ovarian cancer biomarkers. Electrochimica Acta 469 (2023) 143213.
- Jashari G, Fruhbauerova M, Mikysek T, Svancara I, **Metelka R**, Sys M: New electroanalytical method for the determination of trans-anethole in spices and sweets. Food Chemistry 408 (2023) 135167.

- Kozak J, Tyszczuk-Rotko K, **Metelka R**: Voltammetric quantification of anti-cancer antibiotic bleomycin using an electrochemically pretreated and decorated with lead nanoparticles screen-printed sensor. International Journal of Molecular Sciences 24 (2023) 472.
- Brozkova I, Cervenka L, Motkova P, Fruhbauerova M, **Metelka R**, Svancara I, Sys M: Electrochemical Control of Biofilm Formation and Approaches to Biofilm Removal. Applied Sciences-Basel 12 (2022) 6320.
- **Metelka R**, Vlasakova P, Smarzewska S, Guziejewski D, Vlcek M, Sys M: Screen-Printed Carbon Electrodes with Macroporous Copper Film for Enhanced Amperometric Sensing of Saccharides. Sensors 22 (2022) 3466.
- Skowron E, Spilarewicz-Stanek K, Guziejewski D, Koszelska K, **Metelka R**, Smarzewska S: Analytical Performance of Clay Paste Electrode and Graphene Paste Electrode-Comparative Study. Molecules 27 (2022) 2037.
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- Brycht M, Lukawska A, Fruhbauerova M, Pravcova K, **Metelka R**, Skrzypek S, Sys M: Rapid monitoring of fungicide fenhexamid residues in selected berries and wine grapes by square-wave voltammetry at carbon-based electrodes. Food Chemistry 338 (2021) 127975.
- Jashari G, Muriqi S, Arbneshi T, **Metelka R**, Svancara I, Sys M: A new voltammetric approach for the determination of beta-carotene in vegetables and pharmaceutical capsules using a gold electrode. Talanta 227 (2021) 122088.
- Jashari G, Musliu A, Sys M, Arbneshi T, Mikysek T, Svancara I, **Metelka R**: Simultaneous Determination of Lipophilic Vitamin Esters Using Square-Wave Voltammetry at the Glassy Carbon Electrode. Electroanalysis 33 (2021) 537-542.
- Kastrati G, Jashari G, Sys M, Svecova B, Arbneshi T, **Metelka R**, Bilkova Z, Korecka L: Simultaneous Determination of Vitamin E and Vitamin K in Food Supplements Using Adsorptive Stripping Square-Wave Voltammetry at Glassy Carbon Electrode. Applied Sciences-Basel 10 (2020) 4759.
- Frangu A, Ashrafi AM, Sys M, Arbneshi T, **Metelka R**, Adam V, Vlcek M, Richtera L: Determination of Trolox Equivalent Antioxidant Capacity in Berries Using Amperometric Tyrosinase Biosensor Based on Multi-Walled Carbon Nanotubes. Applied Sciences-Basel 10 (2020) 2497.
- Morawska K, Jedlinska K, Smarzewska S, **Metelka R**, Ciesielski W, Guziejewski D: Analysis and DNA interaction of the profluralin herbicide. Environmental Chemistry Letters 17 (2019) 1359-1365.

- Sýs M, Jashari G, Švecová M, Arbneshi T, **Metelka R**: Determination of vitamin K-1 using square wave adsorptive stripping voltammetry at solid glassy carbon electrode. Journal of Electroanalytical Chemistry 821 (2018) 10-15.
- Čadková M, Kovářová A, Dvořáková V, **Metelka R**, Bílková Z, Korecká L: Electrochemical quantum dots-based magneto-immunoassay for detection of HE4 protein on metal film-modified screen-printed carbon electrodes. Talanta 182 (2018) 111-115.

P15. Tyrosinase electrochemical biosensors monitoring medicinally significant substances

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2-J. Heyrovský Institute of Physical Chemistry of the Czech Academy of Sciences, Prague, Czech Republic
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Nowadays in biosensing, development of analytical techniques is focused on improvement for monitoring biologically active species in living organisms, especially in real-time analysis. This oral presentation provides an overview of applications of electrochemical tyrosinase biosensors in the analysis of medicinally significant substances, also known as biomarkers.
At the beginning, special attention is paid to characterisation of the tyrosinase enzyme, explanation of reaction mechanisms of tyrosinase with various types of electrochemical transducers and techniques needed for stable immobilization of this biocatalyst on the transducer surface used. In this case, amperometric transducers represent the most frequently used type of electrochemical sensing because they usually provide sensitive current response to the presence of analyte in the sample.
Many scientific works suggest that these very selective bioanalytical devices could find application in the clinical diagnosis of various serious diseases because they represent the effective analytical tools for diagnosis of neurodegenerative disorders, detection of microbial pathogens responsible for foodborne illness and diagnosis of cytopathology, especially melanoma cancer. Additionally, various kinds of electrochemical tyrosinase biosensors are presented, which were developed to determine the catalytic activity of other enzymes significant for human metabolism, medicaments and their metabolic products, several hormones, amino acids, and proteins.
Despite all their advantages, it is necessary to state that tyrosinase biosensors are still not used in routine laboratory practice due to their relatively short service life, which is not longer than one month, unfortunately. The never-ending development of biomimetic catalysts or catalytically active polymers, both imitating the tyrosinase active site, could be one of the ways to solve this serious drawback.

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Research interests

Research interests are focused mainly on preparation and characterisation of green composite carbonaceous materials which can be used for development of voltammetric sensors and amperometric biosensors applicable in food safety control. The most frequently determined substances in food include nutrients (antioxidants and lipophilic vitamins), additives (preservatives, terpenes, alkaloids, and organic dyes), contaminants (heavy metals, pesticide residues, pharmaceutical residues, and chlorophenols).

Selected publications

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- Jashari G., Švancara I., **Sýs M.**: Characterisation of carbon paste electrodes bulk-modified with surfactants for measurements in nonaqueous media. Electrochim. Acta 410, 140047 (2022).

- Brycht M., Lukawska A., Frühbauerová M., Pravcová K., Metelka R., Skrzypek S., **Sys, M.**: Rapid monitoring of fungicide fenhexamid residues in selected berries and wine grapes by square-wave voltammetry at carbon-based electrodes. Food Chem. 338, 127975 (2021).
- Arbneshi T., Frangu A., Frühbauerová M., Červenka L., Berisha L., Kalcher K., **Sýs M.**: Flow injection amperometric evaluation of trolox equivalent antioxidant capacity of chocolates with different cocoa content at a boron-doped diamond electrode. Food Technol. Biotechnol. 59, 194–200 (2021).
- **Sýs M.**, Obluková M., Kolivoška V., Sokolová R., Korecká L., Mikysek T. Catalytic properties of variously immobilized mushroom tyrosinase: A kinetic study for future development of biomimetic amperometric biosensors. J. Electroanal. Chem. 864, 14066 (2020)

P16. Electrochemistry in pharmaceutical analysis

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Analytical chemistry plays a critical role in the development of a compound from its synthesis to its marketing as part of a drug formulation. The instrumental methods most commonly used for quantitation in a pharmaceutical laboratory fall into four basic categories: chromatographic, spectrophotometric, electrochemical, and radiometric analysis. Among these four, electrochemical analysis is the least often employed. This is historically attributable to a lack of trained personnel and dependable commercial instrumentation. The relative neglect of electroanalytical chemistry is indeed unfortunate since many problems of pharmaceutical interest can easily be solved with a high degree of accuracy and precision employing this approach.
The purpose of this oral presentation it to demonstrate on various examples the practical use of electroanalytical methods in pharmaceutical analysis, whether it is the determination of the active form, pharmaceutical excipients, and possible contaminants originating from synthesis, or pharmacokinetics applied in the study of drug release from various dosage forms, description of xenobiotic metabolism, and real-time monitoring of metabolites levels in body fluids.

P17. Electroimmunoassays for fast and sensitive analysis of proteins

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The specific reactivity between the analyte of interest and a corresponding antibody is the general basis of all immunoanalytical methods applied in clinical practice. The unique nature of this biospecific reaction, which employs multiple non-covalent bonds formed by the mutual surface complementarity of interacting molecules, enables the sensing of target analyte (antigen) also in complex heterogeneous samples. Thanks to such highly biospecific reactions, the presence of even large and structurally complicated molecules, such as proteins, can be easily monitored and quantified with almost no sample pretreatment; only pre-dilution of the sample is recommended in some cases. The results of the immunoanalysis can provide useful information about the presence or quantity of, e.g., cancer biomarkers in different body fluids or food allergens in foodstuffs. However, due to the need for the acquisition of an automatic bioanalyzer, expenses of required reagents, and labor costs in operating a laboratory, the price for a single analysis is still high. In countries with advanced health care, a whole range of these tests is routinely performed, and their frequency continues to rise despite the increased costs. Such traditional methods are also instrumentally challenging and must be performed by analytical experts in fully equipped laboratories.

Combinations of immunochemical and electrochemical methods are becoming more attractive today, mainly because of their wide accessibility, ease of implementation, lower costs of instrumentation, and ability to perform measurements even outside the laboratories. The advantages of coupling the immunochemical analysis methods with electrochemical detection using disposable screen-printed sensors and magnetic particles will be demonstrated for detecting ovarian cancer biomarkers HE4, CA125, and AFP and food allergen ovalbumin.

P18. Oxidative stress and well-being

Mihaela HORHOCEA (STEFAN) (1,2), Gabriela MARIN-STEFAN (2), Mihaela BADEA (1)

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Oxidative stress results from increased pro-oxidant radicals (ROS) production and a defective defence of the body's antioxidant system. Oxidative stress has been involved in many diseases, including diabetes, neurological diseases, and cardiovascular diseases. This "attack" alters the essential functions: enzymes and receptors inactivation and changes in cell permeability. If it is not neutralized, increased ROS can lead to lipids and protein peroxidation and DNA oxidation. But, it is a lot of studies which focus on the adverse effects, ignoring the possible benefits of reactive species.
This review aims to highlight the positive effects of oxidative stress, as well as the risks of consuming high doses of antioxidants.

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Research Interests

Research activities are mainly focused on oxidative stress, antioxidants in human health.

Conferences

- Lipid peroxidation and oxidative stress, New Trends on Sensing-monitoring-Telediagnosis for Life Science, September 2022, Food Safety and Healthy Living – FSHL 2022 – Book of Abstracts
- Stresul oxidativ si statusul hidric asociate cu activitatile sportive (Oxidative stress and hydration status associated to physical activities, National Conference of the Romanian Association of Laboratory Medicine with International participation, september 2020; Romanian Journal of Laboratory Medicine suplim 1- VOL. 28, Nr. 4, oct. 2020 Rev Romana Med Lab ISSN 1841-6624 • ISSN online: 2284-5623

- Oxidative Stress and Biochemical Changes Associated to Physical Activity, New Trends on Sensing-monitoring-Telediagnosis for Life Science, July 2020, Food Safety and Healthy Living – FSHL 2020 – Book of Abstracts

Selected publications

- **Horhocea M,** Horhocea D, Marin-Ștefan G, Chelmea L, Badea M, Efectele pozitive ale stresului oxidativ (Oxidative stress benefits on human health), Jurnalul Medical Brașovean nr.1, 2022, https://doi.org/10.31926/jmb.2022.1.2.
- Marin-Ștefan G, **Horhocea M**, Horhocea D, Badea M, Hidratarea – o problemă de sănătate publică (Hydration - a public health issue), Jurnalul Medical Brașovean, nr.1, 2022, https://doi.org/10.31926/jmb.2022.1.3
- Zahiu RI, **Ștefan M**, Chelmea L, Badea M., Modificări ale metabolismului lipidic la pacienții diabetici-studiu pilot (Changes in lipid metabolism in diabetic patients- pilot study), Jurnalul Medical Brașovean nr. 2, 2021, https://doi.org/10.31926/jmb.2021.2.10.
- Zahiu RI, Chelmea L, **Ștefan M**, Badea M, Importanța corelațiilor între parametrii de laborator la pacienții diabetici- Studiu de caz (The importance of correlation between laboratory parameters in diabetic patients - Case study), Jurnalul Medical Brasovean nr. 2, 2021, https://doi.org/10.31926/jmb.2021.2.13.
- **Ștefan M.**, Stefan G, Rogozea L, Vârciu M., Badea M., Practicarea activitatilor sportive frecvente - O cale pentru o viata de calitate (Practice of frequent sports activities- a way for a quality life), Jurnalul Medical Brasovean nr. 2, 2019, https://doi.org/10.31926/jmb.2019.2.7.

P19. Exploring metformin's neuroprotective potential

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Metformin, a commonly prescribed antihyperglycemic agent, has attracted attention for its potential neuroprotective effects that extend beyond its conventional use in diabetes management. This review investigates the several complex ways in which metformin may protect the brain, such as its effects on cellular energy metabolism, decrease of oxidative stress, and control of inflammatory pathways. Research indicates that metformin improves mitochondrial activity and stimulates AMP-activated protein kinase (AMPK), a key factor in preserving brain health and function. Moreover, the capacity of metformin to traverse the blood-brain barrier and its shown efficacy in diminishing neuroinflammation underscore its potential as a therapeutic intervention for neurodegenerative disorders including Alzheimer's disease and Parkinson's disease. The potential of metformin to protect the brain is also being investigated in terms of its impact on the growth of new neurons and the ability of synapses to change, which are important elements in cognitive performance and the brain's ability to recover from damage. Further clinical study is required to elucidate the efficacy and mechanisms of metformin as a neuroprotective medication, which has the potential to provide a novel therapeutic strategy for the treatment of neurodegenerative diseases.

Laura Mihaela ISOP

- MD, Transilvania University of Brasov, 2018
- In the present is doctoral candidate at Transilvania University of Brasov
- Teaching assistant at the Department of Clinical, Fundamental and Prophylactic Sciences at Transilvania University of Brasov

Research interests

She is interested in primary healthcare and clinical pharmacology. Her doctoral work focuses on elderly polypharmacy, adherence, and medication beliefs. As a teaching assistant, she covers

primary care-related subjects, including end-of-life care, chronic illnesses, preventative care, and general pharmacology.

Selected publications

- **Isop, L. M.,** Neculau, A. E., Necula, R. D., Kakucs, C., Moga, M. A., & Dima, L. (2023). Metformin: The Winding Path from Understanding Its Molecular Mechanisms to Proving Therapeutic Benefits in Neurodegenerative Disorders. *Pharmaceuticals (Basel, Switzerland)*, *16*(12), 1714. https://doi.org/10.3390/ph16121714
- Lăcătuș, A. M., Atudorei, I. A., Neculau, A. E., **Isop, L. M.,** Vecerdi, C. A., Rogozea, L., & Văcaru, M. (2024). Inappropriate Use of Emergency Services from the Perspective of Primary Care Underutilization in a Local Romanian Context: A Cross-Sectional Study. Healthcare (Basel, Switzerland), 12(7), 794. https://doi.org/10.3390/healthcare12070794

Lorena DIMA

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- Management of the scientific research activity, quality management of the didactic process, organization and monitoring of the training process of the students in the study programs of the department
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Research interests

My main research interests are in neuropsychopharmacology and pharmacology of plant compounds. The studied topics include inflammatory processes and oxidative stress in the pathophysiology of psychiatric disorders and/or the adverse effects of psychiatric drugs, mainly

antipsychotics, the anti-inflammatory or antioxidant effects of some active compounds in plants, and the exploration of the therapeutic potential of active compounds from plants in neuropsychiatric disorders. Furthermore, in the last years, the effects of bioactive compounds from plants on the gynecological pathologies have become an area of major interest.

Selected publications

- **Dima L,** Bălan A, Moga MA, Dinu CG, Dimienescu OG, Varga I, Neculau AE. Botulinum Toxin a Valuable Prophylactic Agent for Migraines and a Possible Future Option for the Prevention of Hormonal Variations-Triggered Migraines. Toxins (Basel). 2019 Aug 8; 11(8). pii: E465.
- Di Lorenzo C, Dell'Agli M, Badea M, **Dima L**, Colombo E, Sangiovanni E, Restani P,Bosisio E. Plant Food Supplements with Anti-Inflammatory Properties: A Systematic Review (II). Critical Reviews in Food Science and Nutrition 2013; 53(5): 507-516.
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- Paunescu H, **Dima L**, Ghita I, et al. A Systematic Review of Clinical Studies on the Effect of Psychoactive Cannabinoids in Psychiatric Conditions in Alzheimer Dementia. Am J Ther. 2020; 27(3):e249-e269.
- Balan A., Moga M.A., **Dima L.,** Dinu C.G., Martinescu C.C., Panait D.E., Irimie C.A., Anastasiu C.V. An Overview on the Conservative Management of Endometriosis from a Naturopathic Perspective: Phytochemicals and Medicinal Plants. Plants. 2021, 10, 587.
- Bobescu E., Balan A., Moga M.A., Teodorescu A., Mitrica M., **Dima L**. Are There Any Beneficial Effects of Spirulina Supplementation for Metabolic Syndrome Components in Postmenopausal Women? Marine Drugs. 2020, 18(12), 651.

P20. Edible plants – the challenge for diet and health

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Edible plants are a diverse group of plant species consumed by humans for their nutritional value and therapeutic properties. These plants provide essential nutrients, including carbohydrates, proteins, fats, vitamins, and minerals, crucial for maintaining health. Many edible plants also contain bioactive compounds, such as flavonoids, alkaloids, and phenolics, which possess antioxidant, anti-inflammatory, and antimicrobial properties.

The biochemical composition of edible plants varies widely depending on species, environmental conditions, and cultivation practices. For example, leafy vegetables like spinach and kale are rich in vitamins A, C, and K, while legumes such as beans and lentils are excellent sources of protein and fiber. Consuming a wide variety of edible plants contributes to a balanced diet and is associated with a reduced risk of chronic diseases such as cardiovascular disorders, diabetes, and certain cancers.

Laura Elena GAMAN

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Relevant activities in the field of the thematic area

She successfully coordinated conferences and International Scientific Committees- New Trends on Sensing-Monitoring- Telediagnosis for Life Sciences- NT SMT-LS 2022, NT SMT-LS 2020, NT SMT-LS 2018, NT SMT-LS 2017. Dr. Gaman was chairing the organisation of International Summer Schools- Food Safety and Healthy Living –FSHL 2018-2022 (every year).

Research interests

Main research interest is the oxidative stress associated with different diseases: mitochondrial disease in children, atherosclerosis and cardiovascular disease, neurological disease like schizophrenia and Alzheimer's, diabetes, chronic renal disease.
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Personal webpage: https://www.researchgate.net/profile/Laura-Gaman

Selected publications

- Bucurica S, **Gaman L**, Jinga M, Popa AA, Ionita-Radu F. Golgi Apparatus Target Proteins in Gastroenterological Cancers: A Comprehensive Review of GOLPH3 and GOLGA Proteins. Cells. 2023; 12(14):1823. https://doi.org/10.3390/cells12141823
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- **Gaman L**, Delia CE, Luzardo OP, Zumbado M, Badea M, Stoian I, Gilca M, Boada LD, Henríquez-Hernández LA. Serum concentration of toxic metals and rare earth elements in children and adolescent. Int J Environ Health Res. 2020 Dec;30(6):696-712. doi: 10.1080/09603123.2019.1626353
- Badea M, **Gaman L**, Delia C, Ilea A, Leașu F, Henríquez-Hernández LA, Luzardo OP, Rădoi M, Rogozea L. Trends of Lipophilic, Antioxidant and Hematological Parameters Associated with Conventional and Electronic Smoking Habits in Middle-Age Romanians. Journal of Clinical Medicine. 2019; 8(5):665. https://doi.org/10.3390/jcm8050665
- **Gaman L**, Dragos D, Vlad A, Robu G C, Radoi M P, Stroica L, Badea M, Gilca M., Phytoceuticals in acute pancreatitis: targeting the balance between apoptosis and necrosis, Evidence-Based Complementary and Alternative Medicine, 2018, Article ID 5264592, 27 pages

P.21. Classic and novel microbial determination methods in life sciences

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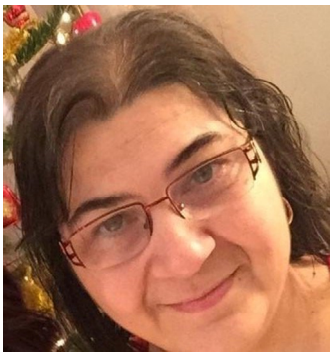
The following work represents a comprehensive review of the most important methods used for bacterial detection in the microbiology laboratory, highlighting the principles behind them, the main application, advantages and limitations.
For more than a century, culture-based methods, microscopy and biochemical testing have been the gold standard in bacteriology. Traditional techniques are easy to use and don't require special training for laboratory personnel, are cost effective and specific. However, they have a series of disadvantages such as time consumption and low sensitivity.
To overcome these obstacles, new innovative technologies have been developed. They revolutionised laboratory diagnostics by being rapid, sensitive and specific. Polymerase Chain Reaction (PCR), Whole Genome Sequencing (WGS), next-generation sequencing (NGS) and more recently CRISPR-based diagnostics are at the forefront of molecular approaches for bacterial identification.
This review aims to evaluate the advantages and disadvantages of both classical and modern met regarding costs, efficacy and practicality in clinical and environmental settings Moreover, it will discuss their applicability in detecting and limiting antibiotic resistance through immediate identification and facilitation of choosing the adequate treatment. The discussion also addresses future directions and potential challenges in implementing these testing methods, emphasizing the need for an integrative approach for a complete and accurate diagnostic.

Mihaela Elena IDOMIR



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- Master's Degree in healthcare management (2006), Faculty of Medicine, "Lucian Blaga" University of Sibiu, Sibiu, Romania

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Research interest

Dr. Mihaela Elena Idomir, MD, has an extensive academic experience, occupying the role of Associate Professor of the Faculty of Medicine at ”Transilvania University” Brasov, since 2007, where she teaches Microbiology, Virology and Parazitology.

Over the years she published many articles in local and international journals touching on subjects such as antimicrobial resistance and the spectrum of infections generated by different microorganisms. Her work is an important contribution to better understanding the phenomenon of healthcare-associated infections, thus raising awareness amongst medical professionals on this subject matter to further improve patient care.

Teaching undergraduate and graduate students is also an important part of her activity. She is the author of several books on microbiology, which serve as adjuvants during the medical training of students and resident doctors.

She participated in various clinical studies and coordinated a research project to improve the quality of work in the microbiology department of clinical laboratories.

Selected publications

- Adochițe C.S, Vițelaru C., Parau A.C, Kiss A.E., Pană I., Vlădescu A, Costinaș S., Moga M.A., Muntean R., Badea M., **Idomir M.E**, Synthesis and Investigation of Antibacterial Activity of Thin Films Based on TiO2-Ag and SiO2-Ag with Potential Applications in Medical Environment, Nanomaterials, Volume 12, Issue 6, 2022
- Vițelaru C., Parau A.C, Kiss A.E., Pana I., Dinu M., Constantin L.R., Vladescu A., Tonofrei L.A., Adochitei C.S., Costinas S., Rogozea L., Badea M., **Idomir M.E**, Silver-containing thin films on transparent polymer foils for antimicrobial applications, Coatings, Volume 12, Issue 2, 2022
- Fan H., Gao X, Wang H., **Idomir M.E**., Rogozea L., Cazan A.M, Bidulescu A., Badea M., Disparities of perceived wellness by smoking and professional status among young individuals in Brasov, Brasov County, Romania, SAGE Open Medicine Volume 8, 2020.
- Ursu M.A, Nicoara D.L., **Idomir M.E**, Grupul Proteeae – implicații în patologie și perspective terapeutice la pacienți spitalizați, Jurnal Medical Brasovean nr.1, 2023, p. 31 – 37.
- **Idomir M.E**., Nicoară D.L., Klebsiella species – the spectrum of infections and the pattern of resistance in hospitalized patients. Bulletin of the Transilvania University of Braşov Series VI – Medical Sciences, 2023, No.1, p.1-8.

- **Idomir M.E**.- Assessment of the etiological spectrum of urinary infections in diabetic patients and of the resistance patterns of the uropathogenic germs involved. Bulletin of the Transilvania University of Braşov Series VI – Medical Sciences, 2023, No.2, p.11-18.
- **Idomir M.E.**, Assessment of the sensitivity to carbapenems of gram-negative bacilli isolated from hospitalized patients, Bulletin of the Transilvania University of Braşov Series VI – Medical Sciences, 2021, No.2, p.31-36.
- **Idomir M.E**., Providencia species – Involvement in pathology and multidrug resistance in a romanian county hospital, Bulletin of the Transilvania University of Braşov Series VI Medical Sciences, 2021, No.1, p.43-50.
- **Idomir M.E**., Costinas C.S., Evaluation of Antimicrobial Resistance of Uropathogenes Involved in Urinary Tract Infections in ICU Patients, Bulletin of the Transilvania University of Braşov Series VI- Medical Sciences, 2020, p.27-36.
- **Idomir M.E.,** Assessment of the sensitivity to carbapenems of gram-negative bacilli isolated from hospitalized patients, Bulletin of the Transilvania University of Braşov, vol 14(63), nr.2, 2021, p.31-36.
- **Idomir.M.E**- Providencia Species – Involvement in Pathology and Multidrug Resistance in a Romanian County Hospital, Bulletin of the Transilvania University of Braşov, vol 14(63), nr.1, 2021, p.43-50.
- Adochitei C.S., Costinas C.S., Badea M., Rogozea L., Vitelaru C., **Idomir M.E.**, Strategii de testare in vitro a suprafețelor neporoase cu proprietați antibacteriene, Jurnal Medical Brașovean, nr. 1, 2021.
- Sbera R., Badea M., Rogozea L., **Idomir M.E.**, Contaminarea telefoanelor personalului medical și posibilitatea dezinfectării acestora, Jurnal Medical Brașovean, nr. 2, 2020
- Mihaela Elena Idomir- Evaluarea rezistenței la antibiotice a germenilor uropatogeni la pacienți spitalizați, Jurnal Medical Brașovean, nr. 1, 2020.
- **Idomir M.E**., Costinas C.S.- Evaluation of antimicrobial resistance of uropathogenes involved in urinary tract infections in ICU patients, Bulletin of the Transilvania University of Braşov, vol 13(62), nr.2, 2020, p. 27-36.
- **Idomir M.E.**- Studiu asupra rezistenței la carbapeneme a bacililor gram negativi. Implicați în patologie la pacienți spitalizați, Jurnal Medical Brașovean, nr. 2, 2019.
- **Idomir M.E**., Laculiceanu A. - Studiu asupra distribuției, implicării etiologice și fenotipurilor de rezistență la antibiotice a tulpinilor de enterococcus de la pacienți spitalizați, Jurnal Medical Brașovean, nr. 1, 2019.

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- Teaching Asisstent (2023-present), Department of Fundamental, Prophylactic and Clinical Disciplines, Faculty of Medicine, ”Transilvania” University of Brașov
- Medical microbiology resident doctor (2023-present), Clinical Emergency County Hospital Brasov
- Bachelor's degree in Medicine (2022), Faculty of Medicine, Transilvania University of Brasov
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Research interest

The main research interest in the field of microbiology is the behavior of Klebsiella Species in relation to different antimicrobial treatments and the resistance genes responsible for the selection of multi-drug resistant strains in hospital environments. Other research interests consist of observing how different biochemical and hematological parameters vary in patients affected by infections produces by these bacterial strains.

Selected publications

- Idomir M.E., **Nicoară D.L.**, Klebsiella species – the spectrum of infections and the pattern of resistance in hospitalized patients, Bulletin of Transilvania University of Brașov, Vol. 14 (65) No.1 (2023), https://doi.org/10.31926/but.ms.2023.65.16.1.1
- Ursu A.M., **Nicoară D.L.**, Idomir M.E., Proteeae group – implications in pathology and therapeutic perspectives in hospitalized patients, J.M.B. No.1 (2023), original studies sections, 2024-04-03, https://doi.org/10.31926/jmb.2023.1.6

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- Resident Physician - Laboratory Medicine - Brasov County Emergency Hospital (2020-present)
- Associate Professor, Department of Microbiology, Faculty of Medicine, „Transylvania" University of Brasov. (2021-present)
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Research interests

Research activities are mainly focused on bacteriology, with special emphasis on antimicrobial susceptibility testing and mechanisms of antibiotic resistance.

Selected publications

- **Costinaș C.S.,** Acinetobacter species resistance pattern and pathogenic role in hospitalized patients, 8th Emirates Pathology and digital pathology Conference, 8EPUCG2021 10-12 August 2021, online
- Adochițe C-Ș, Vițelaru C, Parau AC, Kiss AE, Pană I, Vlădescu A, **Costinaș S**, Moga M, Muntean R, Badea M, et al. Synthesis and Investigation of Antibacterial Activity of Thin Films Based on TiO2-Ag and SiO2-Ag with Potential Applications in Medical Environment. Nanomaterials. 2022; 12(6):902. https://doi.org/10.3390/nano12060902
- Vitelaru C, Parau AC, Kiss AE, Pana I, Dinu M, Constantin LR, Vladescu A, Tonofrei LE, Adochite CS, **Costinas S**, et al. Silver-Containing Thin Films on Transparent Polymer Foils for Antimicrobial Applications. Coatings. 2022; 12(2):170. https://doi.org/10.3390/coatings12020170
- Adochiței, C., **Costinaș, C.S**., Badea, M., Rogozea L., Vitelaru, C., Idomir, M.E., Strategies for in vitro testing of non-porous surfaces with antibacterial properties, JMB, 1(2021), https://doi.org/10.31926/jmb.2021.1.16
- **Costinas C.S.** , The importance of serum C-reactive protein levels in COVID-19, JMB, 1(2021), https://doi.org/10.31926/jmb.2021.1.2
- Idomir M.E., **Costinaș CS**, Evaluation of antimicrobial resitance of uropathogens involved in urinary tract infections in ICU patients, 2020, Bulletin of the Transilvania University of Brașov, series VI, vol 13(62), No.2, 10.31926/but.ms.2020.62.13.2.4
- Costinaș B., **Costinaș C. S.**, Medical data regarding incidence of melanocytiv nevi affecting children, 12th edition of International congress for medical students and young medical resident doctors congress, 2-5 April 2015, Iași, Romania.
- **Costinaș CS**, Study concerning the modification at the vertebral column level, 12th edition of International congress for medical students and young medical resident doctors Congressis, 2-5 April 2015, Iași, Romania.

- Costinaș C.S., Costinaș B., Hair follicles regenerative process, 1st International Society of Regenerative Medicine and Surgery, ISRMS 14-15 April 2015, Bucharest, Romania.

P22. Nutritional potential of marine biomass

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The pressure on global food systems will likely increase in the coming years. Population growth, increasing urbanization and changes in eating habits are trends that set the stage for a growing demand for food. The UN's Food and Agriculture Organization (FAO) has estimated that projected demand requires a 70% increase in global food production by 2050.
A sustainable blue economy is part of the EU's strategy to increase the use of marine resources to produce new foods and food supplements. Increased use of marine resources for alternative food production will help alleviate pressure on land resources for agriculture, mitigate climate change, and ensure food security and sustainability.
The paper presents the objectives, research methodology and part of the results of the ERANET SuMaFood project (www.sumafood.eu). SuMaFood is an international partnership between 3 industrial partners, 3 universities and R&D research institutes from Greece, Norway, Romania and Spain, coordinated by SINTEF Energy Research (Norway). The objective of the project is to design new and innovative methods of processing and preservation, including improved solutions for fish residue separation and fractionation, low-temperature stabilization, hydrolysis and drying. In addition, macroalgae (seaweed *Saccharina Latissima*) raw materials were dried, analyzed and tested as a food ingredient.
The ingredients, (seaweed *Saccharina Latissima* and hydrolysed cod fish protein) were supplied in the form of a powder with reduced moisture. They were included separately in various baking recipes, with a replacement degrees of wheat flour of 0%, 1.5%, 3 %, 4.5%, 6%. Chemical potential, rheological and enzymatic properties, and consumer acceptability were evaluated. Textural analyzes were performed for 96 hours of storage. The results showed great nutritional potential, given the high value of fish proteins as well as the high fiber content, Ca, Fe, P, K, Mg, I, in the case of the algae used. The rheological and enzymatic analyzes were carried out with the Mixolab equipment and the Chopin + method, according to the ICC173 standard. They showed very good baking characteristics when adding a maximum of 4.5% of hydrolyzed proteins. In the case of adding algae, the breadability characteristics are maintained at acceptable values for a degree of substitution of a maximum of 3%.

The sensory evaluation of the bakery products obtained showed a pronounced after-taste in the case of fish protein, which limited the addition to a value of 1.5%. In the case of algae, consumers penalized the sour, salty and bitter taste of bakery products by adding 4.5% and 6%.
Textural analyzes of bread samples showed an increase in firmness and gumminess over time and with increasing algae addition; in the case of fish protein, an increase in firmness and a decrease in cohesiveness were observed over time and with increasing protein addition.
Experimental research on bakery samples offers exciting possibilities for using marine resources, aiming at a safe and secure future food system.

Liviu GACEU

- professor at Transilvania University of Brasov, Faculty of Food and Tourism
- coordinator of the research center: “Ecobiotechnologies and equipment for food and agriculture”.
- Promoter of design research for hygienic purposes of equipment in the food industry, the implementation of agro-food sanogenesis, gastronomic engineering and sustainable mountain agro-tourism. Scientific researcher gr. 1 at the Romanian Academy - INCE/CE-MONT Center and associate researcher at the Agro-Zoo-Forestry Biodiversity Center - CSCBAS, with complex activities to promote the food product from the mountain areas of Romania;
- Studies and innovation activities of the agri-food field in Romania through the national implementation of the European concepts of: "hygienic design" (as president of EHEDG - Romania). Special activities regarding increasing food safety and security as a Global Harmonization Initiative ambassador.
- Implementation activities of ICT concepts in the agri-food field as president of ROSITA (Romanian Society for ICT in Agriculture, Food, Environment and Tourism).
- From 2005: editor-in-chief of the Journal of EcoAgriTourism (ISSN: 1844-8577), indexed in international databases CABI, Global Health, EBSCO, etc., indexed CNCSIS category B+ (http://rosita.ro /jeat/).

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Selected publications

- Oprea, OB; Popa, ME; Apostol, L; **Gaceu, L**, Research on the Potential Use of Grape Seed Flour

in the Bakery Industry, FOODS Volume: 11 Issue: 11 Article Number: 1589 DOI: 10.3390/foods11111589

- Luntraru, CM; Apostol, L; Oprea, OB; Neagu, M; Popescu, AF, Tomescu, JA, Multescu, M, Susman, IE; **Gaceu,** Reclaim and Valorization of Sea Buckthorn (Hippophae rhamnoides) By-Product: Antioxidant Activity and Chemical Characterization, Foods Volume: 11 Issue: 3 Article Number: 462 DOI: 10.3390/foods11030462
- Pencheva, M., Petkova, Z., Dincheva, I., Kostova,I; Damyanova, S; Stoyanova, A, **Gaceu, L** Phytochemical And Biological Profiles of Fennel Fruits (Foeniculum Vulgaremill. Var. Dulce Mill.), Carpathian Journal of Food Science and Technology Volume: 14 Issue: 4 Pages:28-49 DOI: 10.34302/crpjfst/2022.14.4.3
- Gruia, R; Florescu, GI; **Gaceu, L**; Oprea, OB; Tane, N, Reducing Environmental Risk by Applying a Polyvalent Model of Waste Management in the Restaurant Industry, Sustainability Volume: 13 Issue: 11 Article Number: 5852 DOI:10.3390/su13115852
- Spirchez, C, Lunguleasa, A., **Gaceu, L,** Comparative Study Referring To Physical And Calorific Properties Of Pelletsobtained From Grape Biomass, Environmental Engineering And Management Journal Volume: 20 Issue:3 Pages: 361-369

P23. Functional bakery products

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Approximately one-third of the food produced for human consumption is wasted annually on a global scale. Over half of food losses in industrialized nations occur upstream in the food supply chain, whereas over 40% of losses happen at the retail and consumer levels. Food waste contributes significantly to greenhouse gas emissions in the supply chain, waste disposal, and needless use of land, water, and energy. In terms of associated costs, food security, and ensuring global political, economic, and societal development, this has a detrimental effect on the economy as well. In addition, the world's population is expected to increase to 9.6 billion people by 2050, which will increase demand for food and suggest that food sustainability is a significant global issue.
Several investigations done into the frame of the SUMAFOOD project (https://www.sumafood.eu) valorised the by-products from fish processing by producing FPH (Fish protein hydrolysate) with remarkable functional characteristics. FPH stands out from fish protein isolates and concentrates as a valuable addition to the dried minced fish product family because of its improved digestibility. Proteins are broken down into small peptides and amino acids by the hydrolysis process, which also yields high nutritional value and superior functional properties, including bioactivities like antihypertensive, antithrombotic, immunomodulatory, and antioxidative effects.
Fish protein hydrolysate (FPH) flour is added to bakery products in different amounts (1.5%, 3%, 4.5%, and 6%) as part of a production recipe to investigate the possibility of increasing the protein content. Using Mixolab equipment, the obtained mixtures of wheat flour and FPH underwent a thorough analysis to assess their nutritional, rheological, and enzymatic qualities. The polyphenol content and antioxidant value of FPH demonstrate its significant potential as a high-quality protein source, as demonstrated by the results. Furthermore, it appears that using fish hydrolysed proteins is a workable way to lessen the amount of water used in food production. As a result, FPH flour had an 80.21% protein content, 1452 mg GAE/100 g of polyphenols, and 294 mg TE/100 g of antioxidant activity.
Although the rheological behaviour of the bread samples made from wheat flour combined with FPH was satisfactory, the strong fish scent and aftertaste negatively affected consumer acceptance. Remarkably, the bread sample with 1.5% added FPH was the only one that satisfied the consumers' organoleptic preferences, earning a remarkable 6.2 total acceptability score. Along with showing better texture analysis results than the control sample, this sample also had a longer shelf life.

Oana Bianca OPREA

- PhD (2022) Engineering and Management – Transilvania University of Brasov;
- Associate Professor, Faculty of Food and Tourisn, Castelului street no.148, Brasov, Romania

• Scientific Researcher (2021-present), Transilvania University of Brasov, in the projects:
- SuMaFood - Sustainable preservation of marine biomasses for an enhanced food value chain - ERANET no. 245, BlueBio;
- FoodClic - Integrated urban FOOD policies – developing sustainable Co-benefits, spatial Linkages, social Inclusion and sectoral Connections to transform food systems in city-regions - HORIZON-IA - Project Number: 101060717.
- SMARTER - Experiential Learning tools to obtain supply chain competences – Erasmus + KA220-HED 2022-1-FI01-KA220-HED-000086152
- European Hygienic Engineering and Design Group: member since 2016;
- Global Harmonization Initiative: member since 2015;
- Romanian Society for Agriculture, Foood, Environment and Tourism: member since 2011;
- Assistant Editor of the Journal of EcoAgroturism, member since 2009, www.rosita.ro/jeat
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Research interests

- Food Science and Technology, Food Processing and Engineering, Food Quality Management, Food Safety, Food Industry, Food Waste Management, Consumer Behavior, Montanology.

Selected publications

- **Oprea, O.B.,** Tolstorebrov, I., Claussen, I.G., Sannan, S., Apostol, L., Moșoiu, C., and Gaceu L. Potential for Saccharina latissima Flour as a Functional Ingredient in the Baking Sector. Foods 2023, Vol. 12(24) ISSN 2304-8158;
- Luntraru, CM., Apostol, L., **Oprea, O.B.*,** Neagu, M., Popescu, AF., Tomescu, J., Multescu, M., Susman, E., Gaceu, L., Reclaim and Valorization of Sea Buckthorn (Hippophae rhamnoides) By-Product: Antioxidant Activity and Chemical Characterization, Foods, 2022, Vol.11(3), DOI10.3390/foods11030462;
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- Apostol L., Belc N., Gaceu L., Vladut V., **Oprea O.B.,** Chemical composition and rheological parameters of helianthus tuberosus flour used as a source of bioactive compounds in bakery, Revista de Chimie, Vol. 70, nr. 6, 2019, pag. 2048 - 2053, ISSN 0034-7752;
- **Oprea O.B.,** Apostol L., Bungau S., Cioca G., Samuel A.D., Badea M., Gaceu L., Researches on the Chemical Composition and the Rheological Properties of Wheat and Grape Epicarp Flour Mixes, Revista de Chimie, Vol.69, Nr. 1, 2018, pag.70-75, ISSN 2537-5733;
- Apostol L., Berca L., Mosoiu C., Badea M., Bungau S., **Oprea O. B.**, Cioca G., Partially defatted pumpkin (cucurbita maxima) seeds–a rich source of nutrients for use in food products, Revista de Chimie, Vol.69, Nr. 6, 2018, pag.70-75, ISSN 1398-1402;

P24. Mycotoxins: innovative approaches based on aptamers

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The analysis of foods to assess the presence of chemical contaminants is crucial for ensuring food safety and quality. Over the past decade, food safety control has mainly been carried out through product testing rather than process control. Chemical contaminants can be present in foods and feed mainly as result of the use of agrochemicals, such as residues of pesticides and veterinary drug contamination from environmental sources (water, air and soil pollution), cross contamination or formation during the food processing, migration from food packaging materials, presence or contamination of natural toxins.

Natural toxins are defined as poisonous substances synthesized by various organisms, such as animals, certain plant species, or microorganisms. Due to their ubiquitous occurrence and the wide range of chemical structures of produced toxins, they represent an important economic and health risk.

Among them, mycotoxins are naturally occurring toxic, small chemical compounds (MW ~700) that are produced as secondary metabolites by certain fungi contaminating food and feed, during crop growth or processing products. According to the United Nations of Food and Agriculture Organization report, 25% of the word's food is significantly contaminated with mycotoxins. These toxins include ochratoxins (OT), aflatoxins (AF), fumonisins (F), patulin (P), zearalenone (ZON) and trichothecenes. The WHO-International Agency of Research on Cancer (WHO-IARC, 1993) underlined the carcinogenic potential of OT, AF, F, ZON, and trichothecenes in 1993

The classical techniques have some drawbacks, such as high cost and less sensitivity, etc. To address these issues, various methods have been developed. Among these, biosensors are considered a promising tool in assessing mycotoxin food contamination. Electrochemical and optical aptasensors are promising methods. Hence, there is a necessity for highly sensitive and selective detection systems that can quantify these organic toxins in various matrices. The classical strategies are based on the use of antibodies. Our strategies are based on aptamer-based affinity interactions. Aptamer-based platforms offer enhanced recognition capability and have attracted significant attention. Aptamers are synthetic short sequences of single stranded (ss) oligonucleotides (ssRNA or DNA), which are developed by an in-vitro selection process known as "Systematic Evolution of Ligands by Expo-

nential Enrichment (SELEX)" technique. Among the receptors available for biosensing, aptamers exhibit the advantages of high specificity, selectivity, stability, facile labelling and modification, which makes them ideal candidates for the development of new biosensing applications. Herein, we devised and demonstrated the development of facile, label free and disposable aptasensor for quantitative determination of mycotoxins using various strategies

This presentation mainly focuses on method development in the sense that mycotoxins can be detected using new, emerging bio-analytical approaches. Several applications of the determination of mycotoxins in food and feed will be discussed.

Jean-Louis MARTY

- Worked in University of Perpignan Via Domitia (UPVD) from 1975 to 2018
- Full professor from 1993 to 2018
- Since 2018 Honorary Professor of University of Perpignan Via Domitia
- 2000- Co-founder of the company GTP Technology.
- 2019- Creation of the company Sensbiotech which works as consulting in the field of Biotechnology
- E-mail : sensbiotech@gmail.com

Education

- Doctorat d'Etat, Université de Perpignan Via Domitia, 1987
- PhD in Biochemistry, Université de Montpellier, 1980
- Engineer in Biochemistry, INSA Lyon 1973

Career

- Vice President for International Relations 2012-2016
- Responsible ERASMUS Exchanges 2008-2012
- Director of IMAGES Laboratory 2003-2008

Honours

- Invited Professor by Tokyo Medical and Dental University (Japan): November 2018 Invited Professor by University Federal de Marhanao (Brazil) October 2018
- Invited Professor by JST (Japan Science Technology) 2010
- Invited Professor by JST (Japan Science Technology 2007
- Honorary Professor of Transylvania University of Brasov (2005)

- Doctor Honoris Causa of University of Bucharest (2000)
- He has over 300 publications- including book chapters and text books. He supervised 30 PhD with students from 12 nationalities.
- He belongs to the Editorial Advisory Boards of some journals

Research interests

- Stabilization of enzymes and biomolecules and immobilization on various supports; Development of biosensors for the detection of pollutants in the environment; toxins and mycotoxins in food
- Studies of additives for neutraceutics and functional food
- Analytical chemistry
- Optical sensor
- Smart packaging. The objective is to develop recyclable packaging with antioxidant and antimicrobial activities. All the compounds used for the fabrication will be issued from bio-production

Selected publications

- Lakavath K., Kafley C., Jana S., **Marty J-L**., Goud-Kotagiri Y, Progress on electrochemical bio-mimetic nanosensors for the detection and monitoring of agricultural toxins, Toxins, accepted on 23 May 2024
- Teniou A, Rhouati A**, Marty JL**. Recent Advances in Biosensors for Diagnosis of Autoimmune Diseases. Sensors (Basel). 2024 Feb 26;24(5):1510. doi: 10.3390/s24051510.
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- Teniou A, Rhouati A, Rabai S, Catanante G, **Marty JL.** Design of a label-free aptasensor for electrochemical determination of hemoglobin: investigation of the peroxidase-like activity of hemoglobin for the sensing of different substrates. Analyst. 2023 Aug 7;148(16):3899-3908. doi: 10.1039/d3an00345k.
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- Majdinasab M, Badea M, **Marty JL**. Aptamer-Based Lateral Flow Assays: Current Trends in Clinical Diagnostic Rapid Tests. Pharmaceuticals (Basel). 2022 Jan 13;15(1):90. doi: 10.3390/ph15010090
- Tang X, Zhang Q, Isabel Pividori M, Zhang Z, **Marty JL**, Catanante G. A Sensitive Aptasensor Using Biotin-Streptavidin System for Patulin Detection in Apple Juice. Biosensors (Basel). 2022 Jan 23;12(2):59. doi: 10.3390/bios12020059.

P25. Techniques for the preparation of bioactive coatings on metal-based implants to control of degradation in body solutions

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The use of bioactive coatings on metallic orthopedic implants marks a major advancement in biomaterials research, addressing crucial issues of implant biocompatibility, osseointegration, and infection control. These coatings, typically made of bioactive ceramics, polymers, and metallic glasses, are designed to improve the biological performance of implants by encouraging bone cell adhesion, proliferation, and differentiation while preventing bacterial colonization and biofilm formation. This study examines the development, characterisation, and application of various bioactive coatings for metallic orthopedic implants, emphasizing their potential to enhance clinical outcomes and patient recovery.

By utilizing advanced deposition techniques like RF magnetron sputtering and electrodeposition, we have developed coatings with controlled degradation rates, superior mechanical properties, and enhanced bioactivity. In vitro assessments demonstrate that these bioactive coatings significantly improve the osseointegration process, minimize the risk of aseptic loosening, and offer robust antimicrobial protection. Including bioactive elements such as Si, Ag, and Sr within the coatings further enhances their osteoconductive and antibacterial properties.

EDS and XRD techniques were employed to analyze the elemental and phase compositions of the films. Scratch tests and surface profilometry were conducted to assess hardness, adhesion, and roughness. The films' corrosion resistance was also a critical focus, with the corrosion rate determined after experiments conducted in SBF at 37°C. Uncoated Ti alloys served as the reference samples for all tests. Following the electrochemical tests, the morphology of the generated films was examined to evaluate their structural integrity and performance.

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Alina VLĂDESCU (DRAGOMIR)

- Dr. Eng. Alina Vladescu (Dragomir), has a B.S. in Materials Science and Engineering from the University Politehnica of Bucharest (2002) and an MS in Biomaterials from the Department of Bioengineering and Biotechnology, University Politehnica of Bucharest (2004).
- Her PhD is in Materials Science from University Politehnica of Bucharest (2011).

She works at National Institute of RD for Optoelectronics INOE2000, Department for Advanced Surface Processing and Analysis by Vacuum Technologies (since 2002).

She is also associate professor in Surface Engineering at University Politehnica of Bucharest. She is also affiliated as research scientist at National Research Tomsk Polytechnic University.

Expertise: • Functional coatings (metals, nitrides, carbides, oxides and oxynitrides) deposited by magnetron sputtering and cathodic arc techniques), especially for optics, optoelectronics, mechanical and tribological applications, but also with special properties, such as corrosion resistant and biomaterials. • Oxide thin films by electron gun evaporation technique, especially for optoelectronics applications and (again) for biomaterials. • Analysis and characterization of thin films using various spectroscopies (UV-Vis-NIR, EDS), X-ray diffraction, morphological, mechanical, anticorrosion and tribological characterization.

Reviewer for ISI journals: ♦Surface and Coating Technology; ♦Thin Solid Films; ♦RSC Advances; ♦Applied Surface Science; ♦Vacuum; Materials Science and Engineering B.

Guest Editor: Frontiers in Materials (2016-2017), Composite Interfaces (2016), Coatings (2019-present).

Consequently, she has over 152 ISI papers, and over 250 presentations, 17 patents, 7 books, 11 awards at Invention Exhibitions. Hirsh score is 28 (according to Web of Science).

P26. Photocatalytic materials for advanced wastewater treatment

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Due to water scarcity at a global level, the need to implement a water circular economy has increased. Therefore, water recovery and reuse are essential and this can be made through (advanced) wastewater treatment. In certain cases, advanced wastewater treatment methods such as photocatalysis can be employed to remove very low concentrations (ppm and ppb level) of toxic, organic pollutants. The most well-know and frequently-used photocatalyst is titanium dioxide which is a low-cost, non-toxic, chemically stable semiconductor with high photocatalytic efficiency. It has two main disadvantages: (1) activation only in the UV region, which represents <10% of the solar spectrum and (2) a high recombination rate of electrons and holes which leads to the inactivation of the photocatalytic process. To overcome this, TiO_2 can be coupled with 2D carbon derivatives (such as graphene oxide, GO, and graphitic nitride carbon, g-C_3N_4) which decrease the TiO_2 bandgap energy, promoting Vis-activation. Moreover, these fillers act as electron scavengers, delaying the recombination of electrons and holes.

Another discussion topic in the field of photocatalysis is the use of photocatalytic powders versus thin films. (Nano)powders have a higher surface area but are difficult or costly to recover and reuse, whereas thin films can easily be recovered but have a much lower area available for pollutant adsorption. In order to benefit from the advantages of both options, it is recommended to use thin photocatalytic films deposited on small spherical substrates (beads).

A case study is presented wherein thin composite films based on TiO_2 and GO or, alternatively on TiO_2 and g-C_3N_4 were obtained through the sol-gel method on quartz-like beads. Their photocatalytic efficiency in the degradation of two pollutants: methylene blue and imidacloprid under simulated solar radiation, UV radiation and no irradiation (adsorption), was evaluated over three testing cycles.

Maria COVEI

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Research interests

Her main research interests include: thin films, photocatalysis with a focus on VIS- or Solar-active materials and processes, sol-gel materials and self-cleaning coatings. She has published 29 papers in ISI journals (hWoS=11, around 220 citations), was/is part of 12 grants (3 as coordinator) and co-authored 4 pending patents.

Selected publications

- Simeonov S., Szekeres A., **Covei M.**, Stroescu H., Nicolescu M., Chesler P., Hornoiu C., Gartner M., *Sol-Gel Multilayered Niobium (Vanadium)-Doped TiO_2 for CO Sensing and Photocatalytic Degradation of Methylene Blue*, Materials 17 (2024) 1923 (FI=3.4)
- Gartner M., Szekeres A., Stroescu H., Mitrea D., **Covei M.**, Gutzov S., *Advanced Nanostructured Coatings Based on Doped TiO_2 for Various Applications*, Molecules 28 (2023) 7828 (FI=4.6)
- **Covei M.**, Bogatu C., Gheorghita S., Duta A., Stroescu H., Nicolescu M., Calderon-Moreno J.M., Atkinson I., Bratan V., Gartner M., *Influence of the Deposition Parameters on the Properties of TiO_2 Thin Films on Spherical Substrate*, Materials 16 (2023) 4899 (FI=3.4)
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- **Covei M.**, Perniu D., Bogatu C., Duta A., Visa I., *Photocatalytic composite thin films with controlled optical properties based on TiO_2, WO_3 and rGO*, Surfaces and Interfaces 31 (2022) 102075 (FI=6.2)

- **Covei M.**, Perniu D., Visa I., Duta A., *Self-Cleaning Spray Deposited Thin Films Based on TiO_2 and WO_3 for Glazings*, International Semiconductor Conference Proceedings, 2020, ISSN: 1545-827X.
- **Covei M.**, Bogatu C., Perniu D., Duță A., Vișa I., *Self-cleaning thin films with controlled optical properties based on WO_3-rGO*, Ceram. Int. 45 (2019) 9157-9163 (FI=4.126).
- **Covei M.**, Bogatu C., Perniu D., Tismănar I., Duță A., *Comparative study on the photodegradation efficiency of organic pollutants using n-p multi-junction thin films*, Catal. Tod. 328 (2019) 57-64 (FI=5.825).
- **Covei M.**, Perniu D., Bogatu C., Duță A., *CZTS-TiO_2 thin film heterostructures for advanced photocatalytic wastewater treatment*, Catal. Tod. 321–322 (2019) 172-177 (FI=4,636).

P27. Exploring the chemical and biological characterization of invasive knotweed species

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The presentation will focus on the extraction and characterization of bioactivities derived from invasive knotweed species. Knotweeds, known for their rapid spread and ecological impact, possess a diverse array of bioactive compounds with potential applications across multiple sectors. This presentation will delve into the optimization of extraction procedures for bioactive molecules from invasive knotweed species (*Fallopia japonica*, *F. sachalinensis*, and *F. x bohemica*). The findings will encompass an assessment of their bioactivity, including antioxidant, antimicrobial, antidiabetic, and neuroprotective properties, along with discussions on their potential applications. This interdisciplinary approach integrates methodologies from botany, chemistry, pharmacology, and environmental science to comprehensively understand the bioactivity profile of invasive knotweed species. Moreover, discussions will explore sustainable utilization strategies and the implications of knotweed bioactivities in mitigating environmental challenges and promoting human health.

Lea POGAČNIK DA SILVA

- PhD (2001) in Chemistry (Biochemistry), University of Ljubljana,
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Teaching activities

- Chemistry, Biochemistry, Food Analytical Chemistry, Analytical Biotechnology for BSc and MSc students of Food Science and Nutrition, Biotechnology, Agronomy, Animal Sciences
- Mentor of 2 PhD thesis, 13 MSc thesis, 39 BSc thesis

Research interests

- preparation and evaluation of bioactivities in extracts of different tissues of alien knotweed species, namely Japanese knotweed (*Fallopia japonica*), Giant knotweed (*F. sachalinensis*) and their interspecific hybrid – Bohemian knotweed (*F. x bohemica*)
- preparation and characterisation of cianobacteria species *Arthrospira platensis* extracts before and after the lactic acid fermentation
- evaluation of brain accessibility and neuroprotection of different polyphenols, namely quercetin, epigallocatechin gallate (EGCG), cyanidin-3-glucoside (C3G), and nicotine
- simulation of digestion and evaluation of the stability of pomegranate juice anthocyanins

Selected publications

- Silva, R F. M., **Pogačnik, L.** Neuroprotective properties of food-borne polyphenols in neurodegenerative diseases. *Antioxidants*. 2021, vol. 10, iss. 11, p. 1-3
- Jamnik, P, Mahnič, N, Mrak, A, **Pogačnik, L**, Jeršek, B, Niccolai, A, Masten, J, Ogrinc, N, Dušak, Larisa, F, Blaž, Korošec, M, Cerar, A, Lazar, B, Lovše, U, Pungert, T, Fabjan, P, Poklar Ulrih, N. Fermented biomass of arthrospira platensis as a potential food ingredient. *Antioxidants*. 2022, vol. 11, iss. 2, p. 1-15
- Silva, R F. M., **Pogačnik, L**. Polyphenols from food and natural products : neuroprotection and safety. *Antioxidants*. 2020, vol. 9, iss. 1, p. 1-13
- **Pogačnik, L**, Bergant, T, Skrt, M, Poklar Ulrih, N, Viktorová, J, Ruml, T. In vitro comparison of the bioactivities of Japanese and Bohemian knotweed ethanol extracts. *Foods*. 2020, vol. 9, iss. 5, p. 1-12
- Gois Ruivo Da Silva, M, Skrt, M, Komes, D, Poklar Ulrih, N, **Pogačnik, L**. Enhanced yield of bioactivities from onion (Allium cepa L.) skin and their antioxidant and anti - [alpha] - amylase activities. *International journal of molecular sciences*. 2020, vol. 21, no. 8, str. 1-16
- Silva, R F. M., **Pogačnik, L**. Food, polyphenols and neuroprotection. *Neural Regeneration Research*, ISSN 1673-5374, Apr. 2017, vol. 12, iss. 4, p. 582-583
- Osojnik C, Ilja G, Skrt, M, Šeremet, D, Sterniša, M, Farčnik, D, Štrumbelj, E, Poljanšek, A, Cebin, N, **Pogačnik, L,** Smole Možina, S, Humar, M, Komes, D, Poklar Ulrih, N. Waste streams in onion production: bioactive compounds, quercetin and use of antimicrobial and antioxidative properties. *Waste management*. [Print ed.]. 2021, vol. 126, p. 476-486,
- **Pogačnik, L,** Ota, A, Poklar Ulrih, N. An overview of crucial dietary substances and their modes of action for prevention of neurodegenerative diseases. *Cells*. 2020, vol. 9, iss. 3, p. 1-25
- **Pogačnik, L**, Poklar Ulrih, N. Invasive knotweed species as a rich source of antioxidants. *Journal of EcoAgroTourism*, 2018, vol. 14, no. 1, p. 5-10
- **Pogačnik, L**, Rogelj, A, Poklar Ulrih, N. Chemiluminescence method for evaluation of antioxidant capacities of different Invasive knotweed species. Analytical letters, 2016, vol. 49, no. 3, str. 350-363

- **Pogačnik, L,** Pirc, K, Palmela, I, Skrt, M, Kim, K S., Brites, D, Brito, MA, Poklar Ulrih, N, Silva, R F. M. Potential for brain accessibility and analysis of stability of selected flavonoids in relation to neuroprotection in vitro. Brain research, 2016, vol. 1651, p. 17-26,
- Pirc, K, Škarabot, M, **Pogačnik, L**, Žerovnik, E, Poklar Ulrih, N. The effect of tyrosine residues on [alpha]-synuclein fibrillation. Acta chimica slovenica, 2015, vol. 62, no. 1, p. 181-189
- **Pogačnik, L,** Poklar Ulrih, N. Application of optimized chemiluminescence assay for determination of the antioxidant capacity of herbal extracts. Luminescence, 2012, vol. 27, no. 6, p. 505-510

P28. Neurodegeneration and brain ageing

Rui F.M. SILVA (1), Lea Pogačnik DA SILVA (2)

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Neurodegenerative diseases are among the main causes of death worldwide and include a vast array of pathological conditions and injuries, where among the most recognised are Alzheimer's disease, Parkinson's disease, frontotemporal dementia, vascular dementia and Huntington's disease. These diseases commonly lead to brain dementia and represent an enormous economic and social burden, in terms of human suffering, social distress, and financial costs. Furthermore, recent trends indicate a global increase in the incidence and prevalence of neurodegenerative diseases and dementia.

Most neurodegenerative diseases are chronic, with disabling effects that aggravate along years, and still without cure. It is well known that in most neurodegenerative diseases, neurodegeneration occurs long before the onset of the first symptoms, where a large population of brain neurons are already lost. Although with distinct pathologic symptoms and specific pathways many neurodegenerative diseases share common mechanisms such as neuroinflammation, protein aggregation and oxidative stress.

Although dementia is mainly an age-related syndrome, with a particular incidence in the elderly population, it is not a normal feature of ageing. Nonetheless, the process of ageing leads to several alterations in brain structure and function that can make it more susceptible to pathological conditions. The main biomarkers of brain ageing are classified as primary, antagonistic, and integrative, and together they can lead to a deregulated brain metabolism more vulnerable to alterations and less able to recover from injury.

Collective all-body alterations in the ageing process culminate in a situation of frailty, where organs like the skin, bones, joints, vessels and also the immune system lose their normal function and accumulate distress factors. Any product or activity that can maintain and improve physical and mental health, can contribute to increasing the independence and quality of life along ageing.

Rui SILVA

Professor of Histology & Embriology and of Neurobiology at Universidade de Lisboa, Faculdade de Farmácia, Portugal.
He is an expert on cell biology, namely nerve cell cultures, cell signalling, cell death mechanisms and neurotoxicology.

His main research interests are in the neurosciences area, in the topics of neurobiology, neurotoxicology, neurodevelopment and glial function associated with neurologic conditions and neurodegeneration. Neuroprotection mechanisms are the most relevant area of intervention, embracing the neuroprotective properties of natural food products and food-borne molecules, either introduced in the regular diet or as additives or medicines, by several cell and molecular mechanisms beyond the traditional antioxidant properties described for food polyphenols.
He has published over 90 research articles, mentored over 30 post-graduate students, and given over 150 communications in scientific meetings in several countries.
He is an Editorial Board Member of scientific journal Antioxidants, guest editor of special issue Dietary Polyphenols and Neuroprotection (Antioxidants) and Associate Editor of Frontiers in Cellular Neuroscience- Non-Neuronal Cells.

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Selected publications

- **Silva RFM**, Lea Pogacnik. Neuroprotective properties of food-borne polyphenols in neuro-degenerative diseases. Antioxidants, 2021, 10:1810.
- Brites D, **Silva RFM**. Bilirubin neurotoxicity: a narrative review on long lasting, insidious, and dangerous effects. Pediatric Medicine 2021; 1-24.
- **Silva, R. F. M**. and L. Pogacnik. Polyphenols from Food and Natural Products: Neuroprotection and Safety. Antioxidants 2020; 9: 61.
- **Silva RFM** and Pogačnik L. Food, polyphenols and neuroprotection. Neural Regeneration Res 2017; 12: 582-3.
- Garcia G, Nanni S, Figueira I, Ivanov I, McDougall GJ, Stewart D, Ferreira RB, Pinto P, **Silva RF**, Brites D, Santos CN. Bioaccessible (poly)phenol metabolites from raspberry protect neural cells from oxidative stress and attenuate microglia activation. Food Chem 2017; 15: 274-83.

P29. Multiplex PCR- role in the diagnosis of infectious disease

Anca ILEA (1,2), Andrada BANCILA (2), Robert NEGOI (2)

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Polymerase Chain Reaction (PCR) is a transformative biochemical process enabling the exponential and rapid amplification of specific DNA sequences, which has become a cornerstone in microbiology. The advancement of multiplex PCR has significantly enhanced the diagnosis of infectious diseases by allowing the simultaneous detection of multiple pathogen DNA targets in a single assay. This capability is crucial for diagnosing diseases with overlapping clinical symptoms caused by different pathogens. Syndromic testing, a rapid molecular diagnostic approach, utilises comprehensive panels to identify the causative agents of infection by detecting bacterial, viral, and fungal pathogens in a single reaction.

This presentation underscores the critical role of innovative diagnostic techniques, such as multiplex PCR, in the swift and accurate identification of infectious agents. Furthermore, we present a study conducted at the Brasov County Clinical Emergency Hospital, illustrating the impact of implementing multiplex PCR on sepsis diagnosis highlighting improvements in diagnostic accuracy and patient outcomes.

Anca ILEA

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- MD, Senior specialist in Laboratory Medicine, Head of Hematological department, Clinical Emergency County Hospital Brasov, Brasov, Romania
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Research interests

With over 25 years of experience in microscopy and hematological cytology, and more than 15 years in the molecular diagnosis of leukemias, I have dedicated my career to advancing laboratory diagnostic techniques in hematology, particularly focusing on malignant hemopathies. My work emphasizes the integration of cutting-edge molecular biology techniques to enhance the speed and accuracy of diagnoses for serious pathologies. I have extensive experience in the application of molecular methods such as PCR and sequencing to identify genetic mutations and biomarkers critical for the diagnosis and prognosis of hematologic malignancies. Additionally, I am committed to the education and training of young resident doctors and actively engage in university-level didactic activities.

Selected publications

- Terciu, M.; Luca, I.; Panait, E.; Leibovitz, E.; Mitrica, M.; Popovici, B.; **Ilea, A**.; Falup-Pecurariu, O.G. Early Outcome of Multisystem Inflammatory Syndrome in Neonates Diagnosed following, Prenatal Maternal COVID-19 Infection: A Three-Case Series. Pediatr. Rep. 2023, 15, 591-598. https://doi.org/10.3390/pediatric15040054
- White, H.E., Salmon, M., Albano, F. **A,Ilea** et al. Standardization of molecular monitoring of CML: results and recommendations from the European treatment and outcome study. Leukemia (Nature) 36,1834–1842 (2022). https://doi.org/10.1038/s41375-022-01607-z. 2-year IF 11.4.
- D.Voda, Matache C, **Ilea A**, Polycythemia vera with Budd-Chiari Syndrome-A case Report Bulletinof the Transilvania University of Braşov Series VI: Medical Sciences • Vol. 13 (62) No. 1 – 2020 https://doi.org/10.31926/ but.ms.2020.62.13.1.8
- Badea, M.; Gaman, L.; Delia, C.; **Ilea, A**.; Leașu, F.; Henríquez-Hernández, L.A.; Luzardo, O.P.; Rădoi, M.; Rogozea, L. Trends of Lipophilic, Antioxidant and Hematological Parameters Associated with Conventional and Electronic Smoking Habits in Middle-Age Romanians. J. Clin. Med. 2019, 8, 665. https://doi.org/10.3390/jcm8050665
- **Ilea A.**, Vladareanu A. M., Niculescu-MizilE., The simultaneous occurrence of the Bcrabl translocation and the Jak2V617F mutation. Detection and dynamics evolution in a case of chronic myeloproliferative neoplasm, Bulletin of the Transilvania University of Braşov, Series VI: -Medical Sciences, Vol. 9 (58) No. 1- 2016 : 21-26, ISSN 2065- 2216

Andrada Maria BĂNCILĂ

- Paediatric Pulmonology resident doctor at the Emergency Clinical Hospital for Children Brașov
- MD, Faculty of Medicine, Transilvania University of Brașov, 2023
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Relevant activities in the field of thematic area
Retrospective, analytical and observational study on the Importance of Multiplex RealTime PCR in Diagnosing Respiratory Infections in Children – Insights from the Emergency Clinical Hospital for Children Brașov - June to December 2022

Research interests
As a paediatric pulmonology resident, I am profoundly interested in paediatric respiratory medicine. My academic and professional pursuits focus on the precise and efficient diagnosis of respiratory infections in children, with a particular emphasis on advanced methodologies such as Multiplex Real-Time PCR. I am committed to exploring cost-effective diagnostic and therapeutic solutions while ensuring patient safety and quality care. Additionally, I am deeply concerned with the issue of antibiotic resistance in paediatric respiratory infections, aiming to contribute to the improvement of therapeutic management and the development of strategies for its prevention and control.

Robert NEGOI

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Relevant activities in the field of thematic area
Study on the implementation of newly Introduced Multiplex Real-Time PCR for Sepsis Diagnosis, a comparative analysis with Blood Cultures and the experience from County Clinical Emergency Hospital Brașov.

Research interests
Research interests are centered around advancing molecular diagnostic tests to enhance precision and efficiency in clinical and research settings. Specifically, I am focused on exploring novel methodologies and technologies that improve the detection, characterization, and monitoring of diseases at the molecular level. Through these research endeavors, the main goal is to contribute to integrating robust, sensitive, and cost-effective molecular diagnostic tests for clinical practice, ultimately improving healthcare delivery and patient outcomes.
Key areas of focus include:

- Integration of Novel Assays in Daily Routine: Exploring innovative molecular assays, like Real-Time PCR Multiplex, for the accurate and early detection of diseases, with a particular emphasis on infections.

- Point-of-Care Testing (POCT): Exploring rapid and portable molecular diagnostic platforms that can be deployed at the point of care, enabling timely decision-making and improving patient outcomes.
- Bioinformatics and Data Analysis: Utilizing advanced bioinformatics tools and computational techniques to analyze complex molecular data sets, extracting meaningful patterns and correlations that inform diagnostic strategies

P30. Tropane and pyrrolizidine alkaloids in foods and food supplements: analytical problems and risk assessment for general and at-risk populations

Patrizia RESTANI, Corinne BANI, Francesca MERCOGLIANO, Chiara DI LORENZO

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In the presentation, some classes of alkaloids, in particular tropanes and pyrrolizidines, will be described as they are increasingly cited among the emerging risks in food. Tropane alkaloids are secondary metabolites produced by plants belonging to *Brassicaceae, Solanaceae, Rhizophoraceae and Erythroxylaceae*. Among the tropane alkaloids, atropine and scopolamine are particularly known for their activity/toxicity; these two molecules have anticholinergic activity, meaning they can block muscarinic acetylcholine receptors, with consequences at both the central and peripheral nervous system. The symptoms mainly include ataxia, speech disorders, dilation of the pupils, reduction of salivation and respiratory rate and at very high doses, hallucinations and even death.

Pyrrolizidine alkaloids (PA) are a group of molecules, which *Boraginaceae, Asteraceae, Orchidaceae, and Leguminosae* produce for the purpose of fighting parasites and repelling herbivores. Some of these molecules are potential genotoxic carcinogens and represent an important risk to human health when taken chronically. The problem of PA contamination is not a new phenomenon, as cases of intoxication due to the ingestion of *Senecio, Heliotropium*, and *Crotalaria* have already been reported since the last century.

Tropane and pyrrolizidine alkaloids can be present in food and food supplements, as just a few weeds per hectare of cultivated surface are enough to compromise edible plants.

Patrizia RESTANI

Prof. Dr Patrizia Restani graduated in Pharmaceutical Chemistry and Technology and obtained a PhD in Toxicology at the Università degli Studi di Milano. Retired from 11.2022, she was a Full Professor in Food Chemistry, at the School of Pharmacy, Università degli Studi di Milano, where she was responsible for the teachings: 1) Food Chemistry; 2) Dietetic Products; 3) Analytical methods for detection of xenobiotics in foods.

She is still an adjunct professor at the Università degli Studi di Milano teaching “Dietetic Products” and “Analytical methods for detection of xenobiotics in foods”. She is the author or co-author of more than 350 publications in national and international journals and books.
She was the coordinator of the school in Scienze e Sicurezza Chimico-Tossicologiche dell'Ambiente (Chemical Safety and Toxicological Environmental Sciences), Università degli Studi di Milano from 2011 to 2017 and from 2019 to 2022.

She has been involved in numerous national and international research programs in the field of Food Safety, Dietetic products, Risk and Benefit Assessment. She has managed several scientific projects both as the project coordinator and as responsible for research units. She coordinated the European Project PlantLIBRA (Plant Food Supplements: Level of Intake, Benefit and Risk Assessment) in the context of the 7th EU Framework Program, involving 25 partners distributed in 4 continents. She received the title of Honorary Professor at the Transylvanian University of Brasov (Romania).

She is the scientific secretary of Commission IV "Safety and Health" at the OIV—International Organization of Vine and Wine—and a member of the Italian Delegation (Ministry of Agriculture) at the same organisation. She is also a member of the technical committee for Nutrition and Animal Health—Section for Dietetics and Nutrition of the Italian Ministry of Health.

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Important publications

- Martini D., Ragone G., Cazzini F., Cheli F., Formici G., La Porta C.A.M. , Pinotti L., Pomodoro L., **Restani P.**, Scaffardi L., Tedeschi G., Riso P., Violini L.. The need for a multidisciplinary approach to face challenges related to food, health, and sustainability: The contribution of CRCI-WE. Sustainability 13, 13720, 2021, doi: 10.3390/su132413720
- **Restani P.**, Colombo F., Biella S., Bani C., Mercogliano F., Di Lorenzo C., Diet, Polyphenols, and Human Evolution. Applied Sciences 12, 63, 2022, doi: 10.3390/app12157805
- Piazza S., Colombo F., Bani C., Fumagalli M., Vicentini O., Sangiovanni E., Martinelli G., Biella S., Silano M., **Restani P.**, Dell’Agli M., Di Lorenzo C. Evaluation of the potential anti-inflammatory activity of black rice in the framework of celiac disease. Foods 12, 7805, 2022 doi.org: 10.3390/foods12010063
- Bani C., Di Lorenzo C., **Restani P.**, Mercogliano F., Colombo F, Phenolic profile and in vitro antioxidant activity of different corn and rice varieties. Plants 12, 448, 2023 https://doi.org/10.3390/plants12030448
- Colombo F., Cappa C., Bani C., Magni M., Biella S., **Restani P.**, Di Lorenzo C., Characterization of color, phenolic profile, and antioxidant activity of Italian pigmented rice varieties after different technological treatments. Food Bioscience 53, 102674, 2023

P31. Gluten-free bread sensory and texture properties

Maria João CARVALHO (1,2,4), Rita S. INÁCIO (1,2,3), Silvina F. PALMA (1,2), Liliana FIDALGO (1,2,5), José F. PALMA (1,2), Manuela COSTA (1), Célia LAMPREIA (1), Miguel FLORO (1), Fernanda FRAGOSO (1), Augustová MONIKA (6)

1- Instituto Politécnico de Beja, Beja, Portugal
2- MED-Instituto Mediterrâneo para a Agricultura, Ambiente e Desenvolvimento, Évora, Portugal
3- CBQF – Centro de Biotecnologia e Química Fina, Universidade Católica Portuguesa, Escola Superior de Biotecnologia, Porto, Portugal
4- MARE- Marine and Environmental Science Centre, Politécnico de Leiria, Peniche, Portugal
5- LAQV-REQUIMTE, Departamento de Química, Universidade de Aveiro, Aveiro, Portugal
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Knowledge of celiac disease led to gluten-free products. Gluten is the main structuring protein in baked products, allowing a network that provides cohesion, viscosity and elasticity to the dough, leading to the characteristic foam and open crumbs bread structure. The absence of gluten affects its characteristics, resulting in low volume. The demand for clean labels and the sustainability of food systems is a new approach to improving gluten-free bread.

The aim of this study was to develop quality gluten-free breads using endogenous sources from Alentejo region, namely cereal and vegetable flours produced in the province. Formulations used were RCCK (rice+corn+chickpea flours), RPQB (rice+quinoa+buckwheat flours+potato starch) and CONT (wheat flour control). Nutritional characterization, plus rheological and sensory parameters were analysed.

When RCCK and RPQB were compared with CONT, it had showed a good texture and good viscoelastic network for both RCCK and RPQB. The fibber was higher in CONT (5.24%), tag along by RCCK (4.22%) and RPQB (3.38%). The lowest fat content was in CONT (1.64%), followed by RCCK (2.63%) and RPQB (4.50%). The highest protein content was in CONT, and then in RPQB and RCCK. The properties of gluten-free breads resulted in a favourable consistency of the dough, improving the volume of bread and the softness of the crumbs and favouring acceptability, overcoming the lack of structure, and enhancing its nutritional value, and highlighting the endogenous sources of the region.

Maria João BARATA DE CARVALHO

PhD in Food Technology in 2012 with the thesis *"Texture of Culinary Snacks" at* the Universidad de Extremadura, Veterinary College, Spain, and in 2008 concluded the Sufficiency of Researcher, in 2006 completed the Master's Degree in Food Technology/Quality from the NOVA University of Lisbon, Faculty of Science and Technology, and the Degree in Agroindustrial Engineering at Instituto Superior de Agronomia in Lisbon University.

- lecturer at Polytechnic Institute of Beja (IPBeja) since 2001,
- currently an Adjunct Professor integrated in the Department of Technology and Applied Sciences, Coordinator of Food Science and Technology Bachelor, has been coordinator of food science and technology graduation's international mobility
- since February 2023 - Dean of Agriculture Faculty in Polytechnic Institute of Beja.
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Her research and teaching interests include food technology (meat, fish, dairy ad vegetables technologies), food rheology, sensory analysis and food innovation. In the Department is responsible for the sensory analysis laboratory, which is an accredited laboratory (EN IEC/ISO 17 025:2018), mostly for PDO cheeses, but also other food matrices are analyzed by descriptive analytical assessments or hedonic analysis and thus most food science and technology research projects where the sensory and rheological characterization is need, the researcher is enrolled. In this context, she has been involved as a researcher in different research projects in the dairy sector, in seafood and fish sector, in meat and meat products sector and in breadmaking sector. Is the author and co-author of different articles, oral presentations and posters in the named areas of research interest, particularly related to research in the area of sensory analysis and rheological analysis collaborating in different developed food products, including in its by-product's valorization and in the characterization of traditional cheeses and its impact on technology and innovation.

Selected publications

- Afonso A, Ribeiro C, **Carvalho MJ**, Correia T, Correia P, Regato M, Costa I, Fernandes A, Almeida A, Lopes A and Carvalho F(2024). Pretreated Agro-Industrial Effluents as a Source of Nutrients for Tomatoes Grown in a Dual Function Hydroponic System: Tomato Quality Assessment". Sustainability - Special Issue from Solid Waste to Resources: Recycling,

Recovery, Valorization and Treatment Technologies. Volume 16, 315. https://doi.org/10.3390/su16010315

- Afonso, A, Regato, M; Patanita, M; Luz, S; **Carvalho, MJ;** Fernandes, A; Lopes, A; Almeida, AdelaAide; Costa, I; Carvalho, F (2023). "Reuse of Pretreated Agro-Industrial Wastewaters for Hydroponic Production of Lettuce". Water. Volume 15, Issue 10, artigo1856.
- Araújo-Rodrigues H, Martins APL, Tavaria FK, Santos MTG, **Carvalho MJ**, Dias J, Alvarenga NB, Pintado ME (2022). Organoleptic chemical markers of Serpa PDO cheese specificity. Foods 11 (13), 1898; https://doi.org/10.3390/foods11131898
- Ferro Palma S; **Carvalho MJ;** Costa M; Floro A; Viana A; Gonçalves Fidalgo L; Rodrigues C; Mata AMT; Salgado R; (2022) Influence of seasonality on the quality of oysters from the Sado and Mira rivers; Food Chemistry Vol.393, 2022,133292:
- Jenny Sumara Sozo, Ana Pardal, **Maria João Carvalho**, Adelaide Almeida, Humberto Chaves, Maria de Fátima Carvalho (2021). Sensory quality of portuguese natural mineral waters: correlation with chemical composition. Ecological Engineering & Environmental Technology, 22(3), 129–141 https://doi.org/10.12912/27197050/135618
- Diez, B., **Carvalho, M J. B.**, Costa, M, Periago, M., & Palma, S. F. (2021) Freshness Index Determination in Sardina pilchardus. Millenium, 2(14), 81-89. DOI: 10.29352/mill0214.19229
- Ferro Palma S.; Mamede N.; Fernandes I.; **Barata de Carvalho MJ** (2019) The Influence of Animal Welfare in the Quality of Bovine Meat; Journal of Dairy & Veterinary Sciences 12(2): JDVS.MS.ID.555834. DOI: 10.19080/JDVS.2019.12.555834.
- Alvarenga N, Taipina M., Raposo N, Dias J, **Carvalho MJ**, Amaral O, Santos MT, Silva MM, Cebola Lidon F. (2018) Development of biscuits with green banana flour irradiated by 60Co: Preservation in modified atmosphere packaging. Emirates Journal of Food and Agriculture. 30(6): 496-502. https://www.ejfa.me/index.php/journal/article/view/1720/1119.
- Silva, B; **Carvalho, M.J** and Ferro Palma, S. (2017). Smoked vs dry-cured "Alentejano" and white pig loins. Archives Zootecnia.
- **Carvalho MJ,**Pérez-Palacios T, Ruiz-Carrascal J. (2017). Physico-chemical and sensory characteristics of freeze-dried and air-dehydrated yogurt foam. LWT - Food Science and Technology. 80: 328-334. doi: 10.1016/j.lwt.2017.02.039
- **Carvalho MJ,** Ruiz-Carrascal J. (2017). On the crispy texture of alcohol added and CO_2 incubated tempuras in fried coated squids. Journal of Food Science and Technology. No. JFST-D-17-01169. DOI:10.1007/s13197-018-3121-2
- Pérez-Palacios T, Eusebio J, Ferro Palma S, **Carvalho MJ**, Mir-Bel J, Antequera T (2016). Taste compounds and consumer acceptance in chicken soups as affected by cooking conditions. International Journal of Food Properties. (ISSN: 1094-2912 –Print; ISSN: 1532- 2386 – Online)

P32. Analytical approaches for investigating functional properties of polyphenols

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Polyphenols are phytochemicals that are raising great interest in the scientific world for their potential health-promoting effects. These compounds are characterized by a wide range of molecules, classified as flavonoids (i.e. flavonols, flavanols, flavones, flavanones, isoflavones, and anthocyanins) and non-flavonoids (i.e. phenolic acids, hydroxycinnamic acids, lignans, stilbenes, and tannins), depending on their chemical structure. In the last years, polyphenols deriving from different food matrices, including food wastes and by-products, are being investigated for a broad spectrum of positive biological activities. Several studies have shown polyphenols ability in reducing oxidative stress and inflammation, that are common conditions mainly in chronic diseases such as type-2 diabetes, cardiovascular and inflammatory bowel diseases. These effects can be evaluted by several methods, starting with in vitro assays.
The aim of this lesson is to give an overview of the main methods that can be used to assess: 1- antioxidant activity (e.g. spectrophotometric methodologies such as 2,2-diphenyl-1-picrylhydrazyl radical scavenging- (DPPH), Folin-Ciocalteu, or ferric reducing antioxidant power (FRAP) assay, etc.); 2- anti-inflammatory activity (e.g. using in vitro models of gastric inflammation); 3- biological activity on key enzymes involved in diabetes mellitus pathway (e.g. dipeptidyl-peptidase IV).
These methods could be useful for understanding the potentiality of food polyphenols in human health and selecting the most promising molecules to formulate functional foods or dietary supplements.

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- Associate Professor in Food Chemistry and Toxicology, Department of Pharmacological and Biomolecular Sciences, University of Milan (from 2020).
- PhD in Pharmacology, University of Milan (2013)
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Research interests

The main area of research includes quality control of plant food supplements and characterization of botanical ingredients. The main analytical techniques used are chromatography (HPLC, TLC, HPTLC, GC); electrophoresis applied to food analysis and dietetic products; immunoenzymatic techniques (immunoblotting and ELISA) for the detection of food allergens in complex food matrices.

Selected publications

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P33. Machine learning methods and biosensors in pediatric healthcare

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Biosensors are devices that detect and measure physiological information(s) (eg. heart rate, blood glucose levels, oxygen saturation, body temperature, respiratory rate, etc.). In this paper, we reviewed the publications that presented the utilization of machine learning methods and biosensors data in pediatric healthcare context. We retrieved articles and review papers published in Web of Science database, between 2012-2024. We discussed frequently used machine learning technologies/strategies in the researched topic, insights regarding the variables/characteristics used as inputs in the models, features importance, models accuracy.
The application of these techniques for diagnosis, identification/detection, prediction, and treatment/monitoring is presented. Challenges, issues, and potential future work directions were also discussed. The paper provides a technical and clinical overview of trends in applying machine learning methods to biosensor data in pediatric healthcare areas, which might be useful for different stakeholders involved in the pediatric healthcare system.

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Research interests

Her current research interests include Data Mining, Bioinformatics, Educational (HEI) Policy, Network analysis.

Selected publications

- Totan M., Matacuta I.O., Hasegan A., **Maniu I.,** Vitamin D Levels in COVID-19 and NonCOVID-19 Pediatric Patients and Its Relationship with Clinical and Laboratory Characteristics, Biomedicines, 2024, 12, 905. https://doi.org/10.3390/biomedicines12040905.
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Research interests

My main research interests are in medical biochemistry, clinical laboratory and biological environmental analysis, and spectrophotometric methods applied in different aspects of day-to-day life.

Selected publications

- **Totan M.,** Matacuta I.O., Hasegan A., Maniu I., Vitamin D Levels in COVID-19 and NonCOVID-19 Pediatric Patients and Its Relationship with Clinical and Laboratory Characteristics, Biomedicines, 2024, 12, 905. https://doi.org/10.3390/biomedicines12040905.
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P34. Biosensors: current trends in clinical diagnostics

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Leland C. CLARK can be considered as the father of biosensor concept. He is the pioneer in designing intelligent electrochemical sensors based on enzymes as bio-recognition elements. Since then, many researchers worked on developing biosensors for widespread applications including but not limited to medical, agro-food and environmental interests. The research output was very promising, so governmental and private companies invested in and promoted research in the biosensor field. The number of publications increased exponentially and “start-up” companies were created to transfer the technology from laboratory to commercial applications.

In recent years, there has been an increasing demand for biosensors for medical applications. Commercial biosensors have been developed to detect glucose for diabetics, lactate for sportsmen, and urea for dialysis monitors.

It is anticipated that in the coming years, scientists will focus on monitoring the human body in all aspects: livers will be monitored to make sure that enzymes are functioning correctly in filtering out toxins, hearts will be monitored to avoid heart attacks, cancer will be detected in its earliest stages, and individual cancer cells may even be killed using another portion of the sensor. Indeed, the body will be monitored continuously to determine possible health concerns that may arise;

Protein biomarkers are one of the important classes of biomarkers, which can indicate disease state according to their high or low expression in serum. Several tumour markers found in biological fluids are important for early-stage screening of diseases because they are usually asymptomatic until advanced stages when the prognosis of survival is poor.

Diagnostic accuracy for the detection of the biomarkers is very limited; therefore, current research needs to focus on developing disposable bio-affinity sensing devices for the reliable and sensitive detection of these biomarkers. The outstanding sensitivity and selectivity of fabricated bio-affinity biosensors can potentially pave their way to be translated into point-of-care devices for early and precise detection of cancer and other diseases.

P35. Involvement of microbiota in digestive cancers

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The digestive system, a model that has been thoroughly studied, holds significant implications for understanding the interactions between the host, microbiota, and diseases.
Our research has unveiled a crucial connection between gut microbiota and cancer development, underscoring the pivotal role of specific bacterial microbiota in promoting cancer through various mechanisms. These bacteria, by triggering inflammation and interfering with cellular division by releasing genotoxins and harmful metabolites, highlight the potential for future medical practices to target these mechanisms for cancer prevention and treatment.

Sandica BUCURICA

- Associate Professor and Gastroenterologist at the University Emergency Central Military Hospital, interested in research and interdisciplinary collaboration.
- Oriented to integrating evidence-based practices and academic publication, significantly enhancing patient care and educational outcomes. Involved in teaching excellence and fostering professional growth in medical students and residents.
- PhD in Gastroenterology – Confocal Endomicroscopy
- Competency in Diagnostic and Therapeutic Digestive Endoscopy, Abdominal Ultrasound

Selected publications

- Mititelu R, Mitoi A, Mazilu C, Jinga M, Radu FI, Bucurica A, Mititelu T, **Bucurica S.** Advancements in hepatocellular carcinoma management: the role of 18F-FDG PET-CT in diagnosing portal vein tumor thrombosis.Nucl Med Commun. 2024 Aug 1;45(8):651-657. doi: 10.1097/MNM.0000000000001863
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P36. Malnutrition screening tools and food safety recommendations for oncological patients

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Almost half of oncological patients are malnourished or at high risk for malnutrition at the time of diagnosis, and it can be worse during the cancer treatments, with complications, early death, or reduced treatment outcomes. Specialists are working to elaborate specific protocols for nutritional screening, monitoring and food safety recommendations.

The first steps in nutritional healthcare are the nutrition assessment, laboratory data and the malnutrition scores, în order to detect nutritional risks or to predict clinical results. ESPEN recommends the Nutritional Risk Screening Score 2002 for hospitals, the Malnutrition Universal Screening Tool for the community, and the Subjective Global Assessment tool for hospitalized seniors. For the nutritional monitoring of oncological patients, successive screening, evaluation, monitoring, communication, and audit steps can be used. Each level has specific protocols and results and must also be adapted to the patient's age, sort of cancer, staging, localization, symptoms, and nutritional status. Also, it's important to add personalized suggestions for food safety during cancer treatment and food supplement usage.

Malnutrition screening is an important process for oncological patients at risk for malnutrition; it's easy and simple to implement, and it's an important tool that will ensure a better diet plan followed by a better quality of life and improved treatment intervention results for cancer patients.

Monica TARCEA

- University professor at the University of Medicine, Pharmacy, Sciences and Technology "George Emil Palade" from Târgu Mureș
- Head of the Discipline of Community Nutrition and Food Hygiene within the M2 Department of the Faculty of Medicine, where she teaches several subjects in the field of nutrition at all faculties and majors in the university (eg Principles of Nutrition and Dietetics, Community Nutrition, Nutrition Counseling, Health and Nutrition Education Promotion, Cancer Dietetics, etc.).

For 10 years, she was the coordinator of the undergraduate programs in Nutrition and Dietetics and the master's degree in Clinical and Community Nutrition from UMFST Tg. Mureș and initiator of the Dietitian Law (promulgated in 2015).

She works part-time at the Mureș Regional Public Health Center, as head of the Health in relation to the environment section.

She started research in the preventive field almost 30 years ago, focusing on topics such as smoking, community nutrition, obesity and lifestyle management, prevention of non-communicable diseases, dietetics and education in schools, diet in cancer, etc. being involved in over 20 national and international projects/grants.

It is a member of several national and international professional societies and annually organizes national scientific events, postgraduate courses, and school education programs.

She has published 24 books and manuals for specialists and students and 9 practical guides, and in the field of publications, she has 184 full-length studies to date.

In the administrative field, he was Dean of the Faculty of Medicine from 2013-2016, she graduated in the competencies of Public Health and Health Management, in Evidence-based Nutrition, Auditor and Manager in the food quality management system, etc.

Selected publications

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P37. The role of non-invasive evaluations in the identification and management of liver diseases in patients with metabolic syndrome and associated risk factors

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Metabolic syndrome (MetS) is a complex condition characterized by cardiovascular risk factors linked to central fat accumulation and insulin resistance (IR). Epidemiological studies show that more than one billion people worldwide are diagnosed with MetS, a figure largely driven by lifestyle factors.

These metabolic changes impact multiple organs, with the liver being especially affected. Non-alcoholic fatty liver disease (NAFLD) can both contribute to and result from IR, making it commonly associated with MetS. NAFLD has become one of the leading causes of cirrhosis in some countries, and it is projected that it will surpass viral hepatitis as the primary indication for liver transplantation. When NAFLD occurs alongside MetS and diabetes type 2, it heightens the risk of progressing to liver inflammation, leading to increased morbidity and mortality. Early diagnosis of NAFLD is crucial for optimal treatment, aiming to reduce morbidity in these patients. While liver biopsy remains the gold standard for diagnosing NAFLD, its invasiveness has led to the development of non-invasive diagnostic methods, including serum biomarkers and imaging-based biomarkers.

Non-invasive investigations are based on algorithms that combines the results obtained when determining some serum biochemical markers (alpha-2macroglobulin, haptoglobin, apolipoprotein A1, total bilirubin, gamma glutamyltranspeptidase – GGT, alanine-aminotransferase ALT, aspartate-aminotransferase AST, basal blood glucose, cholesterol, triglycerides) with age and gender of the patient to assess the degree of liver damage.

With the rising prevalence of metabolic syndrome and its association with liver conditions like NAFLD, non-invasive biomarkers are essential for early detection and monitoring, enabling timely intervention and reducing the risk of complications.

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Research interests

Main research interests are clinical chemistry, hematology, molecular biology and genetic disease- correlations between the presence of different polymorphism and clinical aspects.
Also improving quality in clinical laboratories, by implementing and monitoring specific indicators.

Selected publications

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P38. 2D and 3D models to study intrahepatic cholestasis

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Intrahepatic cholestasis is an impairment of bile flow involving the bile canaliculi. There are still clinically diagnosed cholestasis that remain unknown to the molecular mechanisms involved. It is necessary to find *in vitro* models able to maintain liver cells architecture and polarity and to self–renew. Among the models for studying rare liver diseases, established cell lines and primary hepatocytes have numerous limitations as incomplete cell polarization and invasive sampling procedure.
Induced Pluripotent Stem Cells (iPSCs) represent an important resource since they can be obtained from the patient non-invasively, can be expanded indefinitely, and can be differentiated into hepatocytes carrying the individual–specific genetic background. Moreover, iPSCs obtained from healthy donors are an ideal tool as they can be genetically modified using CRISPR – Cas9 technology, introducing specific disease-related mutations before differentiation into hepatocytes.
The Adult Hepatocytes-derived organoids (Hep-Orgs) model is based on reproducing the environment occurring during liver regeneration upon liver hepatectomy. The main benefits of this model are its long-term culture, cell maturity, and three-dimensionality.
This presentation aims to describe and analyze the two models (2D and 3D), considering the strengths and limitations of both, and proposing various applications for the study of intrahepatic cholestasis.

Benedetta BLARASIN

- PhD student (2022 – present) in Molecular Biomedicine, University of Trieste, Italy
- Master's degree in medical and Pharmaceutical Biotechnologies, University of Trieste, Italy, 2022
- Bachelor's degree in Biological Sciences and Technologies, University of Trieste, Italy, 2020
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Research interests

- Hepatology
- Intrahepatic cholestasis
- Organoids culture and applications
- iPSCs culture and applications
- Immunohistochemical and immunofluorescence characterization
- Bile efflux and functional assays
- Gene and protein expression analysis

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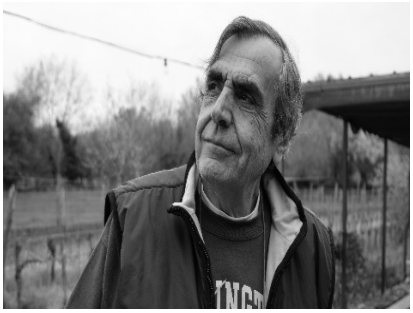
Claudio TIRIBELLI



- Scientific Director, Italian Liver Foundation NPO (FIF), AREA Science Park Basovizza, Trieste, Italy

Born in Venice in 1946, Claudio Tiribelli graduated in Medicine and Surgery at the University of Padua and specialised in Gastroenterology at the University of Trieste. After various experiences abroad, he returned to Italy Trieste and from 1989 to 2016 he was Full Professor of Gastroenterology at the University of Trieste.

- Creator and Scientific Director of the Italian Liver Foundation – NPO, research organization with an international vocation specialized in liver diseases and related pathologies, which is based in Trieste at AREA Science Park and collaborates with universities and scientific institutions from over 20 countries.

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Cristina BELLAROSA

- Senior Scientist and Deputy Director at Italian Liver Foundation, Trieste, Italy (2008 – present). She belongs to the Liver-Brain Unit Rita Moretti
- Habilitation in Clinical Pathology (2007) - University of Udine, Italy
- PhD in Biomolecular Sciences, University of Trieste, Italy (2005) Doctoral Thesis subject: "Mrp1 expression and bilirubin damage: in vitro and in vivo studies".
- Degree in Biological Science, University of Trieste, Magna cum laude (2001)

Research interests

- Hepatology
- Molecular mechanisms involved in bilirubin neurotoxicity
- Mild hyperbilirubinemia protective mechanisms
- Oxidative stress, ER-stress, Autophagy
- Intrahepatic cholestasis of unknown origin
- Organoids culture and applications
- iPSCs culture and applications

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Selected publications

- Gazzin S, **Bellarosa C**, Tiribelli C. Molecular events in brain bilirubin toxicity revisited. Pediatr Res. 2024 Feb 20. doi: 10.1038/s41390-024-03084-9. Epub ahead of print. PMID: 38378754.
- **Bellarosa C**, Tiribelli C. Bilirubin 2022: The Past, the Present and the Future. Antioxidants (Basel). 2022 Aug 23;11(9):1632. doi: 10.3390/antiox11091632. PMID: 36139706; PMCID: PMC9495766.
- Bianco A, Tiribelli C, **Bellarosa C.** Translational Approach to the Protective Effect of Bilirubin in Diabetic Kidney Disease. Biomedicines. 2022 Mar 17;10(3):696. doi: 10.3390/biomedicines10030696. PMID: 35327498; PMCID: PMC8945513.
- **Bellarosa C**, Bedogni G, Bianco A, Cicolini S, Caroli D, Tiribelli C, Sartorio A. Association of Serum Bilirubin Level with Metabolic Syndrome and Non-Alcoholic Fatty Liver Disease: A Cross-Sectional Study of 1672 Obese Children. J Clin Med. 2021 Jun 25;10(13):2812. doi: 10.3390/jcm10132812. PMID: 34202304; PMCID: PMC8268762.
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- Qaisiya M, Mardešić P, Pastore B, Tiribelli C, **Bellarosa C**. The activation of autophagy protects neurons and astrocytes against bilirubin-induced cytotoxicity. Neurosci Lett. 2017 Nov 20;661:96-103. doi: 10.1016/j.neulet.2017.09.056. Epub 2017 Sep 28. PMID: 28965934.
- Qaisiya M, Brischetto C, Jašprová J, Vitek L, Tiribelli C, **Bellarosa C**. Bilirubin-induced ER stress contributes to the inflammatory response and apoptosis in neuronal cells. Arch Toxicol. 2017 Apr;91(4):1847-1858. doi: 10.1007/s00204-016-1835-3. Epub 2016 Aug 30. PMID: 27578021.

P39. Omentin-1 in visceral adipose tissue: implications on its role in diabetes and metabolic dysfunction- associated steatotic liver disease

Noel SALVOZA (1,2, 3), Pablo GIRAUDI (2), Maria Melissa MILITO (2,3), Silvia GAZZIN (2), Deborah BONAZZA (4), Silvia PALMISANO (2,5), Nicolò DE MANZINI (5), Fabrizio ZANCONATI (4), Alan RASENI (6), Francesca SIRIANNI (6), Claudio TIRIBELLI (2), Natalia ROSSO (2)

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Obesity and diabetes are tightly linked to metabolic dysfunction-associated steatotic liver disease (MASLD). Here, we explore the potential role of VAT omentin-1, identified through in silico analysis, in the context of obesity-related MASLD and diabetes.
Omentin-1 levels were measured in obese patients with biopsy-proven MASLD and mice fed with high fat-diet (HFD) and/or ex vivo studies were conducted to investigate the effects of omentin-1 on MASLD-related pathogenesis, including steatosis, inflammation, ER stress, oxidative stress, and glucose-insulin modulation. We also analyzed the levels of omentin In vitro -1 in diabetic patients before and after 1 year of bariatric surgery.
VAT and plasma omentin-1 levels exhibit a significant stepwise reduction in MASLD patients, depending on disease severity but independent of fibrosis status. Likewise, HFD-fed mice with histological signs of MASH exhibited significantly reduced omentin-1 levels compared to their control diet counterpart. In vitro and ex vivo experiments using fat-laden hepatocytes and VAT explants, respectively, showed that omentin-1 did not affect steatosis but significantly reduced TNF-α levels, ER stress, and oxidative stress. Furthermore, omentin-1 significantly decreased the mRNA expression of NF-κB and mitogen-activated protein kinases. Ex vivo VAT explants showed that D-glucose and insulin significantly reduced omentin-1 mRNA expression and protein levels. Notably, diabetic patients exhibited a significant increase in plasma omentin-1 levels one year following bariatric surgery.
Our findings suggest that reduced omentin-1 levels contribute to the development of diabetes and MASLD. Therefore, further research is warranted to explore its role as a potential therapeutic target and/or biomarker.

NOEL C. SALVOZA

- Science & Technology Fellow (2023 – Present) – Department of Science and Technology – Philippine Council for the Health Research and Development (DOST-PCHRD)
- MD General Practitioner (2023 – Present) – Medicard Clinic-Alabang, Philippines
- PhD in Molecular Biomedicine, cum laude (2019 – 2023) – University of Trieste, Fondazione Italiana Fegato (Italian Liver Foundation) - host laboratory
- Doctor of Medicine (2014 – 2019) – West Visayas State University – College of Medicine
- Master of Science in Molecular Medicine (2010 – 2014) – St. Luke's Medical Center College of Medicine
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Research interests

- Electron microscopic and genetic abnormalities of hepatic organelles in Metabolic Dysfunction-Associated Steatohepatitis (2024 – Present)
- Molecular Profiles and Biobanking of Vector-borne Viruses in Selected Hospitals in Luzon (2024 – Present)
- Translational Approach for the Study of Metabolic Dysfunction-Associated Steatotic Liver Disease: A wide spectrum disease (Fondazione Italiana Fegato – Italy). 2019 – 2023.
- Comprehensive study on virus quasi-species and vascular permeability factors in severe dengue infection in humans for innovative epidemic and clinical managements: e-ASIA Japan, Vietnam, Philippines Research Project (Molecular Immunology Laboratory – R&B, SLMC). 2014 – 2016
- Serotyping of Dengue Virus Isolated in the Philippines (Molecular Immunology Laboratory – R&B, SLMC). 2012 – 2014
- Chikungunya Virus Research (Molecular Immunology Laboratory – R&B, SLMC). 2012 – 2014
- Identification, Characterization and Evaluation of Anti- Dengue Activity in Selected Philippine Plants (R&B, SLMC). 2010-2014.

Selected publications

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- **Salvoza N,** Bedin C, Saccani A, Tiribelli C, Rosso N. The Beneficial Effects of Triterpenic Acid and Acteoside in an In Vitro Model of Nonalcoholic Steatohepatitis (NASH). International Journal of Molecular Sciences. 2022; 23(7):3562. https://doi.org/10.3390/ijms23073562
- Giraudi PJ, **Salvoza N,** Bonazza D, Saitta C, Lombardo D, Casagranda B, de Manzini N, Pollicino T, Raimondo G, Tiribelli C, Palmisano S, Rosso N. Ficolin-2 Plasma Levels Assess Liver Fibrosis in Non-Alcoholic Fatty Liver Disease. International Journal of Molecular Sciences. 2022; 23(5):2813. https://doi.org/10.3390/ijms23052813
- **Salvoza N,** Giraudi PJ, Tiribelli C, Rosso N. Natural Compounds for Counteracting Nonalcoholic Fatty Liver Disease (NAFLD): Advantages and Limitations of the Suggested Candidates. International Journal of Molecular Sciences. 2022; 23(5):2764. https://doi.org/10.3390/ijms23052764
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- Kawashima KD, Suarez L-AC, Labayo HKM, Liles VR, **Salvoza N,** Klinzing DC, Daroy MLG, Matias RR, Natividad FF. (2014). Complete genome sequence of chikungunya virus isolated in the Philippines. American Microbiology Society, Genome Announc. 2(3):e00336-14. doi:10.1128/genomeA.00336-14.

MASLD Group

Metabolic Liver Disease Unit
https://www.fegato.it/eng/masld-group/

Members:

- Pablo Giraudi (Senior Researcher)
- Allen Laraño (PhD Student)
- Melissa Milito (PhD Student)
- Natalia Rosso (Senior Scientist)
- Melvin Bernardino (PhD Student)
- Milos Mihajlovic (Post-doc researcher Borsa Veronesi)
- Noel Salvoza (Post-Doc researcher)

Research Description

This group's research focuses on translational research in the field of MASLD, using different experimental models, such as in vitro (from monocultures to more complex co-culture systems), in vivo models, and translation to human subjects.
The Group's scientific interests can be summarized as

- the molecular mechanisms underlying the pathogenesis of the liver disease,
- the extrahepatic components involved in the onset of MASLD
- the study of bioactive properties of natural compounds as a therapeutic approach,
- the in-silico individuation and in-vivo validation of non-invasive biomarkers for the early diagnosis of MASLD (such as steatohepatitis and liver fibrosis)
- communication of science for the non-scientific audience

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P40. Enhancing the sensitivity of aptasensors: challenges and opportunities

Alina VASILESCU

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Aptasensors are analytical devices comprising an aptamer for the specific bio recognition of the target analyze and a physical transducer e g optical, electrochemical, mass-sensitive etc. The transducer translates the biorecognition event into a measurable signal.

Aptasensors are increasingly used in bioanalysis for fast, sensitive and cost-effective measurements. Highlighting the various strategies to enhance the sensitivity of aptasensors, this presentation details the challenges encountered along the optimization process. Several solutions to overcome the main difficulties are discussed in relation to the detection method and envisaged application. It is hoped that this work will guide researchers in their development efforts.

Alina VASILESCU

- Senior researcher I, International Centre of Biodynamics, Bucharest, Romania
- PhD in Chemistry (2001), joint thesis, University of Bucharest, Romania and University of Perpignan, France

Relevant expertise in the field of the thematic area

Built on a background in analytical chemistry, the researcher's work experience covers both industry and academic research and includes 11-year experience in developing aptasensors. Started with a Marie Curie International Reintegration Grant in 2011, the activity at the International Centre of Biodynamics includes 13 national and international projects as Coordinator or Partner PI.

Most recent projects are PCE E- MAP 2021-2023 (UEFISCDI, "Electrical field modulated aptasensors for proteins: sensitivity, selectivity and control of enzyme activity") and PED NanoAptadia 2022-2024 (UEFISCDI, "Development of a SERS aptasensor of high sensitivity and selectivity for medical diagnostic").

Research interests

The main research interests encompass biosensors for practical applications relevant for food safety, biomarkers and environmental monitoring.

Selected publications

- **Vasilescu A.,** Gaspar S., Mihai I., Tache A., Litescvcu S.C., Development of a label-free aptasensor for monitoring the self-association of lysozyme, Analyst, 2013, 138 (12): 3530–3537.
- Titoiu A.M., Porumb R., Fanjul-Bolado P., Epure P., Zamfir M., **Vasilescu A**., Detection of Allergenic Lysozyme during Winemaking with an Electrochemical Aptasensor, Electroanalysis 2019,31 (11)
- **Vasilescu A.,** Hrinczenko B., Swain G.M., Peteu S.F. Exhaled breath biomarker sensing Biosens. Bioelectron 2021, 182
- Kirk K.A., **Vasilescu A**., Andreescu D., Senarathna D., Mondal S., Andreescu S., Collision-Based Electrochemical Detection of Lysozyme Aggregation, Anal. Chem 2021, 93 (4)
- Polonschii, C., Potara, M., Iancu, M., ... **Vasilescu, A**., Astilean, S., Progress in the Optical Sensing of Cardiac Biomarkers, Biosensors 2023, 13(6), 632

P41. Uric acid – risk factor in metabolic syndrome in children

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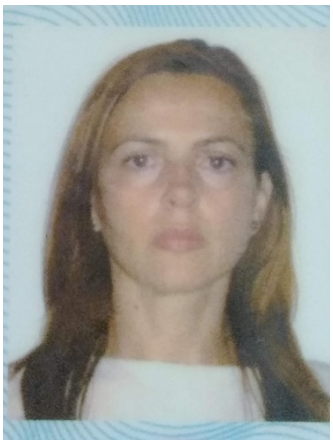
High blood level of uric acid is recognised as an important cardiovascular risk factor and one of the components of metabolic syndrome in children.
Studies performed on adult cohorts until now have shown a central role for uric acid (UA) in hypertension, metabolic syndrome, coronary artery disease, diabetes, and cardiovascular mortality as a mediator of vasoconstriction, inflammation and atherosclerosis and UA is associated with vascular endothelial disfunction independent of other cardiovascular risk factors. In children, there are few studies that analyzed this cardiovascular risk factor, but the results suggest that high blood levels of UA in childhood predict cardiovascular events in adulthood.

Bianca Elena POPOVICI



- PhD (2010) in Pediatrics, “Gr. T. Popa” University of Medicine an Farmacy Iasi
- Associate Professor, Department of Pediatrics, Faculty of Medicine, “Transilvania” University of Brasov
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Research interests

Main research interests are cardiovascular diseases in children, hypertension, obesity, metabolic syndrome and the alimentation disorders connected.

Selected publications

- Arbanas I, Monescu V, Dragomir N, Sauciuc LD, Cojocaru E, Csutak K, **Popovici BE**, Andreea P, Elena-Daniela S, Lixandru RI, Bleotu L, Falup-Pecurariu O. A 7-Year Survey (2015-2021) in One Pediatric Hospital (Brasov, Romania) on Rotavirus Gastroenteritis Specified as Community- or Hospital-Acquired Infection in Young Children. Trop Med Infect Dis. 2023 Nov 27;8(12):509. doi: 10.3390/tropicalmed8120509
- **Popovici BE**, Mitrica M, Moga M. Eating Patterns in Children, an Issue for Future Health Policy. Science Journal of Chemistry 2022; 10(1): 13-20
- Manea R, **Popovici BE**, Neculoiu CD, Minea D, Calin A., Application of the measurement of carotid intima-media thickness for prediction of the essential hypertension in children. REV.CHIM.(Bucharest) 2018; 69; no. 6.
- **Popovici BE**. Epidemiology, clinic and diagnosis of essential hypertension in childhood. Printing House StudIs, Iași, 2015. ISBN 978-606-775-044-7
- Buzinschi S., Dracea L, Epure H, Falup-Pecurariu O, **Popovici BE**, Vodă D. Nutrition in pediatrics. Printing house Lux Libris, Brașov, 2006. ISBN(10)-973-9458-72-6; ISBN(13)-978-9739458-72-6
- **Popovici B.E.**, Mitrica M., Cosor A., The influence of the alimentation pattern on adolescents' health in the Brasov region. New Trends on Sensing- Monitoring- Telediagnosis for Life Sciences, Brasov, Romania - July 24-26, 2014
- **Popovici B.E.**, Mitrica M., Moga M., Cardiovascular risk factors impact in childhood. 54th Annual Meeting European Society for Paediatric Research October 10th-14th, 2013 –Porto, Portugal, Book of Abstract; 374

AP1. Classic microbiology- inoculation, isolation and susceptibility testing

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This hands-on workshop aims to provide participants with practical skills in bacterial isolation and inoculating techniques for diagnosis and research.

- It will emphasise the importance of isolating pure bacterial cultures to study microbial properties, identify pathogens, or conduct genetic analyses.
- It is going to provide training on sterile techniques to prevent contamination during the handling of bacterial samples and media
- The participants will practise the streak plate method for isolating individual colonies.
- It is going to provide a discussion on different culture media (nutrient agar, selective and differential media) and their specific applications
- It is going to teach participants how to observe and interpret bacterial colony characteristics: size, shape, colour and texture for preliminary identification
- It is going to teach participants how to perform the Kirby-Bauer disk diffusion method for antimicrobial susceptibility testing

AP2. High-performance chromatography with applications in drug control

Cristina Stefania GĂLBĂU, Ioana STOICA, Iulia-Antoaneta DUMITRESCU, Maria Mădălina NECATU, Mihaela BADEA

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High-performance Liquid Chromatography (HPLC) is a powerful analytical technique that separates and quantifies compounds in complex mixtures. In the context of paracetamol (acetaminophen) separation, HPLC offers a robust and precise method for analyzing it in pharmaceutical formulations and biological samples.
Utilising a stationary phase ZORBAX Eclipse Plus C18, rapid resolution HD (2.1x50 mm 1.8- Micron) column and an appropriate mobile phase- Ultra Pure Water: Acetonitrile (v% 85:15), HPLC enables the effective resolution of paracetamol from other co-existing substances. During the protocol, the HPLC instrument was an Agilent 1260 Infinity II system with a DAD detector (220 nm). A calibration line will be obtained, working in duplicate for each standard sample. Analysis of commercial paracetamol tablets by interpolation will be considered in order to understand a possible application. The method has high sensitivity, specificity, and reproducibility, making it ideal for quality control in drug manufacturing and pharmacokinetic studies. Optimising parameters such as column type, mobile phase composition, and flow rate is crucial for achieving optimal separation and accurate quantification of paracetamol.

Cristina-Ștefania (ADOCHIȚE) GĂLBĂU

- Bachelor degree in Clinical Laboratory, Faculty of Medicine, Transilvania University of Brasov, 2019
- Master degree in Health' Management and Policies, Faculty of Medicine, Transilvania University of Brasov, 2021
- PhD student in Medicine field, 2022-ongoing
- In present: Assistant university at Faculty of Medicine, UnitBV

Relevant activities in the field of the thematic area

Evaluation of the toxicological and therapeutic properties of biocompounds in normal and malignant cell cultures. Research disciplines that use optimization techniques include electrochemical detections using screen-printed sensors, plant extracts' antioxidant capacity, antimicrobial testing for

coatings, and the connection of data and outcomes with the effects on the environment and human health.

Research interests

- Effects of bioactive compound on cell culture
- Antioxidants (plants extracts)
- Electrochemical methods
- Characterisation of extracts (HPLC, sensors, antioxidants capacity)
- Antibacterial tests
- Public health

Selected publications

- **Adochiţe C.Ş.**, Vițelaru C., Parau A.C., Kiss A.E., Pană I., Vlădescu A., Costinaș S., Moga M., Muntean R., Badea M., Idomir M. (2022) Synthesis and Investigation of Antibacterial Activity of Thin Films Based on TiO2-Ag and SiO2-Ag with Potential Applications in Medical Environment. Nanomaterials.; 12(6):902, https://doi.org/10.3390/nano12060902.
- Vitelaru C., Parau A.C., Kiss A.E., Pana I., Dinu M., Constantin L.R., Vladescu A., Tonofrei L.E., **Adochite C.S.**, Costinas S., Rogozea L., Badea M., Idomir M.E. (2022) Silver-Containing Thin Films on Transparent Polymer Foils for Antimicrobial Applications. Coatings; 12(2):170, https://doi.org/10.3390/coatings12020170.
- **Adochite C.**, Costinas S., Badea M., Rogozea L., Vitelaru C., Idomir M. (2021) Strategies for in vitro testing of non-porous surfaces with antibacterial properties. Jurnal Medical Brasovean (1), pp 27-36, https://doi.org/10.31926/jmb.2021.1.16.
- **Adochite C.**, Andronic L. (2021) Aquatic Toxicity of Photocatalyst Nanoparticles to Green Microalgae Chlorella vulgaris. Water 2021, 13, 77, https://doi.org/10.3390/w13010077.
- **Adochite C.**, Andronic L. (2021) Toxicity of binary mixture of TiO2 and imidacloprid to Chlorella Vulgaris. International Journal of Environmental Research and Public Health, 2021; 18 (15):7785., https://doi.org/10.3390/ijerph18157785.
- **Adochite C.S.**, Badea M. (2020). Perspectives of nanotechnologies in medicine. Jurnal Medical Brașovean (2), pp 34-41, https://doi.org/10.31926/jmb.2020.2.5.
- **Adochiţe C.S.**, Andronic L., Rogozea L., Coman G., Badea M (2019). Chromatographic methods of resveratrol detection. Jurnal Medical Brașovean (2), pp 40-44, https://doi.org/10.31926/jmb.2019.2.6.

AP3. Bioactive compound separation using electrophoretic procedures. Serum electrophoresis

Ermina Maria CODECI, Alexandra HULUBEI, Stefan TANASA, Elena POZNA, Mihaela BADEA

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Electrophoresis is a powerful laboratory technique that separates charged molecules, such as proteins, nucleic acids, and bioactive compounds, based on their size, charge, and other properties. During the practical activities, all the steps for serum electrophoresis separation will be performed, underlining all the factors that could influence the separation. The proteins separate into distinct bands based on their charge and size.
The participants will comment on the importance of serum electrophoresis in diagnostics.

Acknowledgements—The organisers are grateful to DDS Diagnostics Romania, which provided the kits used during the practical activities.

AP4. Electrochemical detection of bioactive compounds – vitamin C

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Electrochemical sensors are physicochemical tools that allow the analysis of the exchange of electrons in a liquid medium due to some redox reactions.
Vitamin C (L-ascorbic acid or ascorbate) is an essential water-soluble vitamin derived from green vegetables, fruits, other dietary supplements and an essential micronutrient. It has multiple roles in the human organism: it is involved in the immune defence system, enhances collagen production, is an antioxidant, and enhances iron absorption.
The experimental setup for the electrochemical detection of vitamin C was presented. The specific voltammograms using DPV (differential pulse voltammetry) will be obtained. The work will be performed in duplicate to determine the average between the results and standard deviations. The calibration curve was drawn, considering the parameters for each L-ascorbic acid concentration tested with the above settings. The concentration of the unknown samples was determined using interpolation.

Ligia CHELMEA

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- PhD student (2021-present) in Medicine, „Transilvania " University of Brasov.
- Infectious diseases resident doctor, Pneumophthisiology and Infectious Diseases Clinical Hospital Brasov.
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Research interests

- medicine, infectious diseases
- prevention of infectious diseases
- treatment and antibiotherapy optimisation
- microbiology
- analytical chemistry: electrochemistry, sensors, biosensors, spectral analysis.
- cell cultures

Selected publications

- **Chelmea L.**; Badea M.; Scarneciu I.; Moga M.A.; Dima L.; Restani P.; Murdaca C.; Ciurescu D.; Gaman L.E. New Trends in Uric Acid Electroanalysis. ***Chemosensors*** 2023, ***11***, 341. https://doi.org/10.3390/chemosensors11060341
- Horhocea (Ștefan) M., Horhocea D., Marin-Ștefan G., **Chelmea L.**, Badea M., Oxidative stress benefits on human health, JMB, Nr. 1 (2022), General articles section, https://doi.org/10.31926/jmb.2022.1.2.
- Zahiu I. R., **Chelmea L.,** Ștefan M., Badea M., The importance of correlation between laboratory parameters in diabetic patients- case study, JMB, Nr. 2 (2021), Clinical cases section, 2022-02-09.
- Zahiu I. R, Ștefan M., **Chelmea L.,** Badea M., Changes in lipidic metabolism in diabetic patients-pilot study, JMB, Nr. 2 (2021), Original studies section, 2022-02-09.
- **Chelmea L.**, Adochite C.S., Modugno F. Di, Floroian L., Restani P., Badea M., New electrochemical detection strategies for iodinated compounds, Rev. Chim., Year 2019, Volume 70, Issue 3,919-924, https://doi.org/10.37358/RC.19.3.7031;
- Badea M., Florescu M., Veregut V., **Chelmea L.,** Corcan O., Floroian L., Restani P., Marty J.L., Moga M., Optimization of Electrochemical Detection of L-Ascorbic Acid from Plant Food Supplements Using Screen Printed Transducers, Advances in Analytical Chemistry 2015, 5 (4): 69-73, DOI:10.5923/j.aac.20150504.01; http://article.sapub.org/10.5923.j.aac.20150504.01.html,
- Badea M., Floroian F., **Chelmea L.**, Faraian C., Moga M., Rogozea L., Marty JL, Restani P., Experimental studies using enzymatic biosensors for the electrochemical detection of heavy metals, JMB, 2(2013) 22-26; ISBN – 18410782; BDI PROQUEST indexed.

AP5. From roots to genes: Unraveling the genetic diversity of Cuban mahogany through PCR and DNA analysis

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The genus Swietenia includes the three most important mahogany species Swietenia Humilis (Zucc), Swietenia macrophylla (King.) and Swietenia mahagoni (L.) Jacq. There are reports of hybrids between S. mahagoni and S. macrophylla that has been located in some Caribbean islands. These mahogany species are highly sought after to produce various high-quality products, such as musical instruments, boats, high-end cabinets, etc.
This study examined the genetic diversity and differentiation of two mahogany species (Cuban and Honduran mahogany) in Cuba using chloroplast microsatellite markers (cpSSRs). Five populations were analyzed, revealing that Haplotype 3 was the most common across all populations, while H1 and H2 were exclusive to Honduran mahogany. The Emigdio population showed the greatest haplotype variation with seven haplotypes. Genetic diversity, measured by expected heterozygosity (HE), was 0.543. AMOVA indicated that 94% of genetic variance was within populations, and the genetic differentiation (FST) was 0.195. These results underscore the complex genetic structure and high intra-population diversity, emphasizing the need for effective conservation and management of these species.

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- Bachelor's degree in Agricultural Engineering, Faculty of Agricultural Sciences, University of Sancti Spiritus, Cuba, 2018.
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Research areas of interest

- Genetic studies (nuclear and chloroplast)
- Biotic and abiotic stresses
- Plant growth-promoting bacteria