GUC
German University in Cairo
الجامعة الألمانية بالقاهرة

UNTERSTÜTZT VON / SUPPORTED BY
Alexander von
HUMBOLDT
STIFTUNG

CONFERENCE BOOKLET

Humboldt Kolleg
German University in Cairo
2-4 June 2025

WOMEN IN EXPERIMENTAL SCIENCES, LEADERSHIP & SUSTAINABILITY

Table of Content

Agenda

Sunday 01-06

Evening — Arrival of foreign guests toresidence in Cairo

Monday 02-06

9-10 AM — Arrival and Registration ofParticipants (C1.0)

10-10:10 AM — Performance by **GUC Music Ensemble**

10:10-10:50 AM

Opening and Welcome words

Prof. Ashraf Mansour, AvH alumnus, Chairman of BoT of GUC

Prof. Yasser Hegazy, President of GUC

Dr. Wiebke Bachmann, Director of DAAD

Prof. Gina Elfeky, President of ASRT, Egypt

10:50-11:10 AM

Keynote Speech

"Women in Experimental Sciences, Leadership, and Sustainability"

Prof. Rasha Hanafi, GUC, AvH alumna, Conference Chair

11:10-11:40 AM

Plenary Lecture

"Genotyping the Ancient Royal Egyptians"

Prof. Yehia Gad, National Research Center, Egypt

11:40-12:10 PM

Coffee Break and Networking

12:10-2:00 PM

Keynote speeches

Prof. Gina Elfeky, President of ASRT, Egypt

"Insights into female role in the progress of the Egyptian academy of Science, research and technology"

Prof. Mohamed Farag, AvH alumnus, Cairo

"How do tiny titans shape our lives? Metabolomics to Decode for Food Gut Interactions"

Prof. Odeku Oluwatoyin, AvH Ambassador Scientist, University of Ibadan, Nigeria

Empowering Women in STEM: Driving Innovation and Sustainability in Life Sciences"

2:00-3:00 PM

Lunch and Networking

3:00-5:00 PM

Seminar and Panel Discussion

"An insight into methods of evaluation of scientific research and productivity" in collaboration with the Egyptian Association for Evaluation (C1.0).

Prof. Mohamed Elfouly, NRC Head of the Association of Egyptian AvH

Prof. Mohamed M. Hashem, Former President of the National Research Centre.

Prof. Mahmoud M. Sakr, Former President of ASRT

Prof. Adel El Beltagy, Former Minister of Agriculture

Prof. Ashraf El Araby, President of Institute of National Planning

Dr. Nehal Ramadan, National research center

Dr. Radwa Elakkad, National research center

Parallel Session: Training for all junior researchers on implementation of metabolomic studies starting from data collection and ending to pathway generation

The training will use 2 case studies:

Metabolomic tools for natural products' profiling
Multi-omics in archaeology and archaeobotanical remains
(location: H8)

5:10-7:00 PM

Keynote speeches
By Women AvH alumni and researchers in technical themes of the Conference

Prof. Heba Handoussa, GUC, AvH fellow

"Insights on the Transformation of Conventional Foods into Health Promoters/Disease Preventers"

Prof. Reham Abdelkader, GUC

"From Powerhouse to Therapeutic Target: Mitochondria in Breast Cancer and the Future of Women' s Health"

Prof. Samar Azab, AvH alumna, Ain Shams University, Egypt

"Pharmacological Implementation of Monoclonal Antibodies in Preclinical Models"

7:00-9:00 PM

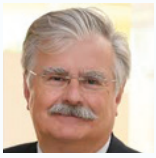
Dinner (by invitation)
Hanging Posters (C1.0)

Tuesday 03-06

9:00-11:00 AM

Session 1: Progress in Drug Discovery

By Women AvH alumni and researchers in technical themes of the Conference



Prof. Stefan Laufer, University of Tübingen, Germany

"Academic Drug Discovery: Fiction, Facts or Fantasy? - The Tübingen Center for Academic Drug Discovery"

Prof. Mohamed Gad, GUC

"25 years journey with gasotransmitters"

Prof. Ashraf Abadi AvH alumnus, GUC

"Expanding the Therapeutic Landscape of Phosphodiesterase 5 Inhibitors Beyond Erectile Dysfunction"

Prof. Maria Parr, Freie Universität Berlin, Germany

"Signs of Doping or of Having Eaten Steak? Evidence of use of the muscle-building drug clenbuterol in athletes" **(online)**

11:00-11:30 PM

Coffee Break and Networking

11:30-1:30 PM

Session 2: Progress in Omic Studies

Prof. Alessandra Sussulini, AvH alumna, Universida de Estadual de Campinas, Brazil

"Deciphering the biochemistry of neuropsychiatric disorders and natural psychedelics through metabolomics"

Prof. Sameh Magdeldin, 57357 Children Cancer Hospital, Egypt

"Unlocking Cancer' s Blueprint using state of art mass spectrometry"

Prof. Michael Lämmerhofer, University of Tübingen, Germany

"Lipidomics in support of drug discovery and clinical profiling"

Prof. Nabila Hamdi, GUC

"Precision Genomics in ALS: toward personalized Neuromuscular Medicine"

1:30-3:30 PM

Session 3: Biotechnology and Sustainability in focus (C1.0)

Prof. Mahmoud Bahgat, AvH alumnus, ASRT

"Efforts of the National Program for Biotechnology and Genetic Engineering to Contribute to Egypt' s Development"

Prof. Abdelfattah Badr, AvH alumnus, Helwan University, Egypt

"Conservation of Medicinal Plants in Arid Environment for Sustainable Use in Production of Pharmaceutically Bioactive Substances"

Prof. Moemen Sayed Hanafy, AvH alumnus, National Research Center, Egypt

"Biotechnology-Driven Enhancement of Bioactive Compounds in Plants"

Prof. Mohamed Barakat, AvH alumnus, Tanta University, Egypt, Illinois Institute of Technology, USA

"Metal Sulfides Nanoparticles Wrapped by Reduced Graphene Oxide Sheets for Green Hydrogen Production in Alkaline Electrolyte" (online)

Dr. Manar Mansour, GUC

"The role of biotechnology in modern diagnostics, a case study"

Parallel Session: Training to Junior Researchers by Elsevier (H12):

Leveraging AI in Research
The evolution of technology in research
Elsevier principles for safeguarding AI users
Research discovery using Elsevier AI tools
Online Demo
Q&A

3:30-4:30 PM

Lunch and networking

4:30-5:15 PM

Session 2: Progress in Omic Studies
Women in Experimental Sciences, Leadership and Sustainability: Challenges and Opportunities for women researchers in North Africa, South Africa, Germany, and Latin America and Shining Stars of Female GUC Alumni

Prof. Amira Abdel Motaal, President of DAAD Verein, Egypt

Prof. Alessandra Sussulini, AvH alumna, Brazil

Prof. Odeku Oluwatoyin, AvH lumna, Nigeria

Prof. Heba Handoussa, GUC, AvH fellow

Prof. Rasha Hanafi, GUC, AvH alumna, Conference Chair

Prof. Nadia Elgamel, AvH alumna, Egypt

Dr. Amira Metwally, GUC alumna, Egypt

Dr. Sara Hegy, GUC alumna, Egypt

Dr. Floriane Faragallah, GUC alumna, Egypt

5:15-6:30 PM

Poster session
For Junior Researchers in 1 of the themes of the 5 sessions. Best poster award will be given during the closing ceremony based on evaluation of senior professors to the posters

6:30-8:30 PM

Dinner (by invitation)

Wednesday 04-06

9:00 AM-12:00 PM

Oral presentations
For Junior Researchers (15 min) in 1 of the themes of the 5 sessions. An award for best oral presentation will be announced in the closing ceremony based on feedback of senior researchers.

12:00-12:30 PM

Coffee Break and Networking

12:30-2:30 PM

Session 4: Bioanalysis and Cheminformatics in focus

"Microscale thermophoresis as a sustainable tool to study bimolecular interactions"

Prof. Sami Eldeeb, University of Braunschweig, Germany, AvH alumnus

"Cheminformatics Applications in Drug Design"

Prof. Tamer Ibrahim, AvH alumnus, University of Kafr Elsheikh, Egypt

"Computational Revolution in Drug Discovery: Bioinformatics & Chemoinformatics Perspectives"

Dr. Mohamed Hamed, GUC

2:30- 3:30 PM

Lunch and networking

3:30- 5:30 PM

Session 5: Funding opportunities

Funding and Sponsorship opportunities at the Alexander von Humboldt foundation

Assoc. Prof. Ebaa Elhossary, AvH Ambassador Scientist

Prof. Moemen Sayed Hanafy, National Resaerch Center

Overview of the Egyptian Association of Alumni to the Alexander von Humboldt foundation

Mrs. Irene El-Khorazaty, Head, Cairo Liaison, Philipps-Universität Marburg

Funding and Programs at Philipps-Universität Marburg, Germany

Mrs. Hoda El Mahgoub, Head, Cairo Liaison , Freie Universität Berlin

Funding and Programs at Freie Universität Berlin, Germany

Dr. Rana Refaey, ASRT

Funding opportunities at Academy of Scientific Research and Technology

5:30-6:30 PM	**Wrap up, Recommendations, Best poster/ Best Oral Presentation Awards for junior Researchers**
6:30-9:00 PM	**Gala Dinner and GUC Music Ensemble** *Location: D-Fountain, GUC*

Thursday 05-06

Morning	**Check out and departure of foreign guests**

Welcome Message

From Queen Hatshepsut, one of the earliest female leaders in history (c. 1507–1458 BC), to the countless women today leading, researching, and driving change across laboratories, boardrooms, and communities, the story of women in science is one of remarkable resilience, intellect, and unyielding determination. Egyptian women have long been at the forefront of scientific discovery, pushing boundaries and challenging norms since the era of Ancient Egypt, proving that knowledge has no gender and that leadership can thrive in any field.

Today, as we come together in Cairo at the **Humboldt Kolleg Meeting 2025 in the German University in Cairo,** we unite under shared purposes: to honor the remarkable contributions of **Women in Experimental Sciences, Leadership, and Sustainability;** to meet as a community of Humboldtians from 4 different continents and sustain our interactions both as scientists and humans; to support our junior team members by giving them the chance to mesh with eminent scientists from various robust institutions. This Kolleg Meeting is not only an event but also a call for more investment in women education and elevation of skills in all fields, a proof that science diplomacy is still powerful in a conflicting world more than ever.

We gather today at the German University in Cairo, an institution at the forefront of higher education and innovation in Egypt since its establishment in 2003. GUC fosters an ideal environment for innovative research, collaboration, and interdisciplinary, championing diversity and welcoming individuals from all backgrounds. As we reflect on this, we recall the profound wisdom in the words of **Prof. Dr. Ashraf Mansour, Chairman of the Board of Trustees of the GUC: "Diversity is enrichment"** . This Kolleg stands as a testament to this principle, uniting individuals from diverse disciplines, generations, and cultures in the shared pursuit of knowledge, meaningful impact, and a better world.

Over the coming days [2-4 June 2025], I invite you to explore groundbreaking research in 5 thematic sessions of experimental science and sustainability, engage in thought-enriching discussions in 2 panels of distinguished leaders, and connect with inspiring women alumna to the Alexander von Humboldt foundation and a rich repertoire of leaders in academia, research, and innovation. In addition, we have a spectrum of activities for the junior researchers, including trainings, poster sessions, oral presentations and the chance of direct interaction with eminent figures in all fields during breaks and activities.

Finally yet importantly, I express my heartfelt gratitude to the sponsor: the Alexander von Humboldt (AvH) Foundation, whose unwavering support has made this Kolleg Meeting possible via their funding and continuous advice. Their commitment to fostering international collaboration and empowering women in research and leadership has been instrumental in shaping this Kolleg Meeting.

Prof. Rasha S. Hanafi
Chair of the Humboldt Kolleg Meeting, Cairo, June 2025
Alexander von Humboldt Alumna, Professor of Pharmaceutical Analysis, German University in Cairo

Organizing committee

- **Chair:** Prof. Rasha Hanafi, Professor of Pharmaceutical Analysis, alumna to the Alexander von Humboldt foundation
- **Registration:** Yasmin Elshoura (MSc.) and students: Patrick Adel, Sara Elnawwam.
- **Design:** Dr. Magy Maged and student: Jana Walaa
- **Supply and Material:** Students Ahmed Ganzoury, Aya Mohamed and Patrick Adel
- **Reservations:** Dr. Donia Eyad, and Ms. Hagar Khaled
- **Front desk:** MSc. Students: Hams Elhefnawy, Alaa Masoud and Nada Ahmed. Students: Sarah Eid
- **e-Conference book:** Dr. Dina Aboushady, Msc. Student Nada Ahmed. Students: Ahmed Ganzoury, Alaa Mohamed, Aya Mohamed, Hager Adel, Mahmoud Marzouk, Sara Elnawwam, Patrick Adel, Reem Almarsafy, Rimas Gamal
- **Media:** Dr. Liza Samir. Msc student: Abdelgawad Muhammad.
- **Keynote talks:** Students: Reem Almarsafy, Rimas Gamal
- **Transportation:** Msc. Students: Abdelgawad Muhammad and George Malak
- **Ushers:** Students: Martina Ashraf, Rowan Mohammed, Noor Bassam, Hams Hassanin, Rimas Gamal, Sarah Eid, and Alaa Mohamed

The Egyptian Association of Alumni to the Alexander von Humboldt (AvH) Foundation

The Egyptian Association of Alumni to the Alexander von Humboldt Foundation was established on June 24, 1990 by 16 pioneering Egyptian scientists' alumni to the Alexander von Humboldt Foundation. The association currently includes more than 300 members who made significant contributions to developing, enriching and managing scientific research in Egypt and have helped foster partnerships between Egypt and Germany. Many AvH alumni are recipients of national and international awards such as the Nobel Prize in Chemistry in 1999 to the AvH alumnus Prof. Ahmed Zewail (February 26, 1946 – August 2, 2016).

The role of the association includes:
Supporting and fostering scientific and cultural relations between Egypt and Germany.
Organizing conferences and seminars.
Assisting German researchers in obtaining grants for joint research projects with Egyptian researchers.
Encouraging and supporting Egyptian researchers in obtaining grants from the Alexander von Humboldt Foundation.
The managing board involves:
Prof. Mohamed El-Fouly, National Research Center, President
Prof. Abdel-Fattah Badr, Helwan University, Vice President
Prof. Moemen Hanafy, National Research Center, Treasurer
Assoc. Prof. Ebaa Al-Hussary, Egyptian Atomic Energy Authority, General Secretary and Ambassador Scientist.
Prof. Saad Zagloul, Vice President of Suez Canal University, Member
Prof. Mohamed Abdel-Hamid Shalaby, Faculty of Veterinary Medicine, Cairo University, Member
Prof. Rasha Hanafi, Faculty of Pharmacy and Biotechnology, German University in Cairo, Member.

Female Alumni to the Alexander von Humboldt Foundation: Nobel Prize Winners

Prof. Emmanuelle Charpentier

Year: 2020
Field of interest: Chemistry
"We all need to ask ourselves what kind of world we want to live in"
Prof. Charpentier won the prize jointly with Jennifer Doudna for their work in developing the CRISPR-Cas9 genome editing tool

Prof. Elinor Ostrom

Year: 2009
Field of interest: Economic Sciences
"Scientific knowledge is as much an understanding of the diversity of situations for which a theory or its models are relevant as an understanding of its limits."
Prof. Ostrom employed research methods that differed from those commonly used by economists. While most economists begin with a hypothesis—an assumed reality to be tested—Ostrom started with

Female GUC STARS- WALL of FAME

Nadine Ayman
(2023 graduate)

Featured on the Forbes 30 Under 30 list for the Middle East (2024)

Amira Metwally
(2008 graduate)

Received a Pre-graduate Award from the A*STAR institute in Singapore

Rania Morsi
(2009 graduate)

Awarded for the Best Doctoral Thesis in Germany by the German Scientific Foundation VDE (2021)

Sarah Hegy
(2012 graduate)

Winner of the Richtzenhain German Doctoral Prize awarded by the German Center for Cancer Research and Heidelberg University, Germany (2021)

Floriana Eshak
(2018 graduate)

First Egyptian to win the Solemn Thesis Award from the Chancellerie des Universités de Paris, honoring the best PhD thesis in pharmacy in the Paris region (2024)

Sarah Khaled
(2009 graduate)

Gold Award for EMC Excellence for developing a technical drawing tool (2015) & Platinum Award from the EMEA Vice President for Presales at Dell Technologies (2020)

Hayat Mohamed
(2014 graduate)

Winner of the "Young Talent Award Game Music" composition competition in Hamburg, Germany (2016)

Noha Bassiouny
(2010 graduate)

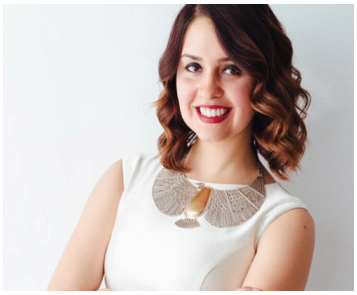
Her startup "ORDERA" was recognized as one of the top 10 promising startups in the Middle East by the MIT Enterprise Forum (MITEF) (2019)

Youmna Abdelrahman
(2010 graduate)

Received a best paper award at MUM2015 and an honorable mention at CHI2017 and MUM2018. Awarded the Ubicomp Student Award as one of the top five Ph.D. students in her field.

Imane Helmy
(2010 graduate)

First place winner of the World Bank and the Economic Research Forum Youth Essay Competition (2017), received the People' s Choice Award.



Al Shymaa Kamal Aboulkheir
(2008 graduate)

Honored by His Excellency, the President of Egypt, Mr. Abdelfattah El Sisi, at the Youth Conference in Alexandria, Egypt, for her continuous efforts in reviving Ancient Egyptian heritage across all design disciplines. (2017)

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Rasha S. Hanafi

Biography:

Prof. Rasha Hanafi is a distinguished academic and expert in Pharmaceutical Analysis, currently serving as Professor and Vice Dean of Student Affairs at the Faculty of Pharmacy and Biotechnology, German University in Cairo (GUC). She is an alumna to both the Alexander von Humboldt Foundation and the German Academic Exchange Service (DAAD), and a research alumna of the Institute of Pharmaceutical Sciences – Pharmaceutical (Bio-) Analysis at Eberhard Karls University of Tübingen. She is also an active member of the University of Tübingen' s Research Alumni Network, and Board Member of the Egyptian Association of Humboldt Alumni. She is recognized for her contributions to Analytical Quality by Design (AQbD), chiral separations, metabolomics, and bioanalysis. Her work bridges academia and industry, where she serves as a scientific consultant and freelance trainer, supporting advanced analytical method development and quality systems. She has supervised over 40 M.Sc. and Ph.D. students from diverse international backgrounds and has authored more than 50 peer-reviewed journal articles along with 50+ conference abstracts and presentations. She is also a reviewer and editorial board member for several Scopus-indexed journals in pharmaceutical analysis. As a Principal Investigator, she has led nationally and internationally funded research projects with a cumulative budget exceeding 7 million EGP. Her research collaborations span top-tier institutions in Germany, including the University of Tübingen, Freie Universität Berlin, TU Braunschweig, and the University of Mainz. In addition to her scientific work, She is fluent in Arabic, English, French, and Spanish, with working knowledge of German and is deeply committed to fostering global academic partnerships.

Abstract:

I explore the intersection of gender equity, leadership, and sustainability through the lens of my experience in the life sciences. Despite growing awareness and significant educational progress, women still account for only 30% of researchers worldwide. The challenges go beyond capability—they stem from structural barriers such as gender bias, caregiving responsibilities, and inflexible work environments. These factors contribute to the persistent "leaky pipeline" in academia and research. I reflect on how flexible policies, support networks, and a redefined view of success—focused on impact, innovation, and mentorship—can help women thrive. I also discuss how empathetic and collaborative leadership styles, often exemplified by women, can foster more inclusive and creative scientific environments. Drawing on the inspiring example of Prof. Charpentier, I highlight the importance of visibility and mentorship in shaping future leaders. I also examine how women scientists are driving sustainable innovation—from climate-resilient agriculture to ethical biotechnology—and why their perspectives are crucial in achieving the UN Sustainable Development Goals. I share how institutions like the Alexander von Humboldt Foundation and the German University in Cairo are leading efforts to promote inclusive excellence and global scientific collaboration. These organizations offer powerful examples of how we can support women researchers and strengthen the global research landscape. I call for reflection on approaches to empower junior promising calibers of women in science to shape an innovative and sustainable world.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Mohamed A. Farag

Biography:

Mohamed A. Farag completed his PhD at Texas Tech University, USA, in 2003, specializing in metabolomics, natural products chemistry, and plant biochemistry. In 2005, after spending time as a postdoctoral fellow at The Samuel Noble Foundation, USA, and the James Graham Brown Cancer Center, USA, he became an assistant professor in 2005 at the Faculty of Pharmacy, Cairo University, Egypt. Since 2009, Dr. Farag has been working as a part-time visiting professor at the Technical University of Munich, Germany, to participate in teaching plant metabolomics and chemometrics modeling for master' s students, and in 2009–2010, he held the Alexander von Humboldt fellowship at the Leibniz Institute for Plant Biochemistry, Germany. Dr Farag now works full-time as a professor at the Pharmacognosy Department within the Faculty of Pharmacy, Cairo University, where his research work focuses primarily on applying innovative biochemical technologies (metabolomics) to help answer complex biological questions in medicine, herbal drug analysis, and agriculture. Dr. Farag has been recognized with several awards, including the UNESCO Award in Life Sciences 2023, the Egypt Higher State Merit Award (2023), the Abd el Hameed Shoman Award (2016), and the Egypt Higher State Incentive Award (2012). For his highly cited publications with close to 20,000 in phytochemistry, Dr. Farag was selected as a top researcher in the field of plant biology in Africa by the American Society of Plant Biology, USA. [https://www.researchgate.net/profile/Mohamed_Farag6]

Abstract:

In symbiotic associations, there is a constant molecular complexity that allows for the establishment and maintenance of such ecological relationships. Metabolomic profiles have enabled us to explain symbiotic associations in terms of their underlying molecules and interactions between the symbiotic partners. Here, we de□ne metabolomics as ' 'a systematic analysis of metabolite structures, concentrations, pathways, and □uxes, and molecular interactions within and among organisms as a function of the environment.' ' This talk provides an overview of metabolomics and discusses its complementary role within the system biology of the symbiotic relationships in human gut microbiota. A scenario as to how gut microbiota interact with different dietary foods using in vitro culture and the outcome on human health is presented for the first time using metabolomics.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Oluwatoyin A. Odeku

Biography:

Oluwatoyin A. Odeku is a distinguished professor of pharmaceutics, former head of the Office of International Programs, and former dean of the Faculty of Pharmacy at the University of Ibadan, Nigeria. She had her postdoctoral training at the Hebrew University of Jerusalem and has served as a visiting scientist at various institutions, including the Universities of Bonn, Wuerzburg, and Potsdam (Germany); the University of Manchester (UK); and Kwame Nkrumah University of Science and Technology (Ghana), among others. Her numerous grants and awards include the UNESCO/Israel Co-Sponsored Fellowship, Alexander von Humboldt Foundation Fellowship, DAAD Visiting Fellowship, and the 2021 Humboldt Alumni Award. She runs a mentoring academy for women in academia with over 250 members across over 60 universities in Nigeria. She was a recipient of the 2024 May and Baker Professional Service Award in Pharmacy and the 2024 Nature Award for Mentoring in Science (Mid-life Achievement). With over 150 publications, her research focuses on biopharmacy, herbal drug delivery, cosmetics, and gender studies. She is a Fellow of multiple prestigious academies, including the Nigerian Academy of Science, the African Academy of Science, the Nigerian Academy of Pharmacy, and the West African Postgraduate College of Pharmacists. She is a member of the Humboldt International Advisory Board. As the Alexander von Humboldt Foundation' s Ambassador Scientist in Nigeria, she continues to champion mentorship and innovation in academia.

Abstract:

Women in STEM are faced with many challenges, including achieving work-life balance, handling hostile environments, gender discrimination, limited professional development opportunities, lack of confidence, and lack of role models and mentors. Despite growing awareness, gender disparities persist, limiting the sector' s full potential for groundbreaking discovery and global impact. Women can play a transformative role in driving scientific breakthroughs, promoting inclusive research practices, and championing sustainability initiatives. Leadership models and institutional strategies that support women' s participation and leadership are critical for fostering innovation, advancing sustainability, and addressing complex global challenges, particularly in the life sciences. Strategies such as targeted mentorship programs, equitable funding opportunities, and policy reforms are essential for creating an environment where women can thrive. Mentorship is important for developing confidence, resilience, and increasing networks, all of which contribute to women' s advancement into leadership roles. Therefore, mentoring can act as a potent catalyst for personal and professional development. This presentation explores how increasing gender diversity can enhance creativity, accelerate scientific advancement, and lead to more sustainable solutions and equitable outcomes.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Heba Handoussa

Biography:

Prof. Dr. Heba Handoussa is a distinguished Professor of Pharmaceutical Biology at the Faculty of Pharmacy and Biotechnology, German University in Cairo. Renowned for their Pioneering work in nutraceutical interventions, Professor Handoussa' s research significantly advances the comprehension of how phytoconstituents interact with biological systems. Professor Handoussa earned her B.Sc. in Pharmacy from Cairo University and a master' s degree and then completed a Ph.D. in Pharmaceutical Biology at German University in Cairo, where her doctoral research focused on the potential anti-inflammatory and cytotoxic impacts of common edible nutraceuticals. With a career spanning over 25 years, Professor Handoussa has held key academic positions, including the current position as Head of the Pharmaceutical Biology Department, GUC. Her current research endeavors are centered on identifying novel anti-obesity potential from edible plants in addition to other pharmacological applications of phytopharmaceuticals. Her effort led to her being chosen as an Alexander von Humboldt fellow in 2025. Professor Handoussa' s dedication to the field extends to significant service and leadership roles. She has coauthored many publications, books, and short communications targeting documenting the vital importance of natural products. Furthermore, she serves as a member of the editorial board for several journals in the field of natural sciences.

Abstract:

Obesity is considered an increasingly widespread disease in the world population, regardless of age and gender. It is characterized by excessive body fat accumulation and is associated with a wide array of comorbidities. Nutrition and physical exercise play an important role, especially in non-genetic obesity. Although there are several conventional medications on the market, nutraceuticals and complementary approaches still have a special growing interest and scientific community focus. Nutraceuticals tackle multifaceted mechanisms to combat obesity, targeting various molecular pathways. These include modulating appetite and satiety signals (e.g., via GLP-1, leptin, and ghrelin pathways), enhancing thermogenesis and fat oxidation (e.g., through AMPK activation and UCP upregulation), inhibiting adipogenesis and promoting lipolysis (e.g., by influencing PPAR-γ, C/EBP-α expression), and mitigating inflammation and oxidative stress associated with obesity. Upon modulation of these factors, nutraceuticals represent a promising strategy for obesity prevention and treatment.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Ashraf H. Abadi

Biography:

Ashraf H. Abadi is a distinguished professor of pharmaceutical chemistry at the German University in Cairo (GUC), where he also serves as head of the Department of Pharmaceutical Chemistry. He previously served as Dean of the Faculty of Pharmacy and Biotechnology from 2011 to 2016. Prof. Abadi earned his bachelor's, master's, and doctoral degrees in pharmacy from Cairo University and the University of Florida, USA. He was a professor of pharmacy at Cairo University from 2006 to 2016. He has held visiting professorships at institutions including King Saud University and several German universities. Prof. Abadi is a recipient of the Egyptian State Excellence Award in Medical Sciences (2022) and was recognized among the world's top 2% of scientists in medicinal chemistry, pharmacy, and pharmacology by Stanford University (2021–2024). His research focuses on drug design, phosphodiesterase inhibitors, Alzheimer's treatment, antiviral agents (HCV and Ebola), personalized medicine through structural modifications, and cancer therapeutics. He has over 130 publications and 12 international patent entries. He has supervised more than 130 postgraduate theses and is affiliated with the American Chemical Society and the Arab Pharmacists Union. He is an Alexander von Humboldt (AvH) and DAAD alumnus and served as an Ambassador Scientist for the Humboldt Foundation in Egypt (2010–2015). Additionally, he serves on the editorial boards of several international scientific journals. [https://www.researchgate.net/profile/Ashraf-Abadi]

Abstract:

Phosphodiesterase 5 (PDE5) inhibitors, originally developed for erectile dysfunction (ED), have broadened their therapeutic scope due to their ability to enhance cyclic guanosine monophosphate (cGMP)-mediated smooth muscle relaxation. Beyond ED, FDA-approved uses include pulmonary arterial hypertension (PAH), where agents like sildenafil and tadalafil reduce pulmonary vascular resistance, and benign prostatic hyperplasia (BPH), improving urinary symptoms. Emerging evidence supports their benefits in peripheral arterial disease by enhancing endothelial function and exercise tolerance, as well as in diabetic nephropathy through reductions in albuminuria and insulin resistance. Investigational applications extend to oncology, where PDE5 inhibitors exhibit antiproliferative effects in cancers such as prostate and breast. Neuroprotective potential is under study, including roles in post-stroke recovery and Alzheimer's disease via cGMP pathways. Additional promising areas include Raynaud's phenomenon, systemic sclerosis-related digital ulcers, and Duchenne muscular dystrophy. PDE5 inhibitors demonstrate versatile pharmacological effects across multiple organ systems. Ongoing research into their molecular mechanisms may unlock new indications, shifting their role from primarily urological treatments to broader systemic therapies addressing chronic inflammatory, metabolic, and neurodegenerative diseases.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Samar Azab

Biography:

I am Samar Azab, Professor of Pharmacology & Toxicology, and I previously served as the Acting Head of the Pharmacology & Toxicology Department, Faculty of Pharmacy, Ain Shams University. Through several professional experiences in my faculty as well as conducting my M.Sc. at the Cairo National Cancer Institute and later my Ph.D. project at the University of Texas Medical Branch, I had the chance to gain strong knowledge and experience in molecular pharmacology. I further pursued my research interests in the field of cancer chemotherapy as a postdoc in the Tumor Biology Center, Freiburg, Germany. I am a DAAD, Alexander von Humboldt (AvH), and Arab German Young Academy (AGYA) alumni member. My research experience was further expanded by accomplishing several projects and supervising several M.Sc. & Ph.D. theses. My career also includes an academic part, where I teach several undergraduate and postgraduate courses. I have co-authored over 40 publications in the fields of molecular, clinical, and neuropharmacology and environmental toxicology, besides 4 book chapters. I also participated with several presentations in both national and international conferences. I am a professional trainer certified by The American University in Cairo and have moderated several training programs addressing nanobiotechnology and research ethics. [ORCID: https://orcid.org/0000-0002-0253-8280]

Abstract:

Since 1975, the technology of monoclonal antibody (MAbs) production has gained worldwide interest in several therapeutic fields. This novel targeted therapy technology has changed the lives of patients with diseases that had limited medical treatment options prior to MAbs development. From the first MAb (Orthoclone®) that was FDA-approved in 1986 to manage organ transplantation rejection until 2025, hundreds of MAbs and MAb derivatives, either FDA-approved or candidates in clinical trials, are available for a variety of indications, e.g., inflammatory, neurological, and immune-based diseases. This presentation highlights some preclinical models that implemented MAbs for management options, besides the current challenges facing this medical technology.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Alessandra Sussulini

Biography:

Alessandra Sussulini is an associate professor at the Institute of Chemistry of the University of Campinas (UNICAMP), Brazil, and the head of the Laboratory of Bioanalytics and Integrated Omics (LaBIOmics). She holds a PhD in Natural Sciences from UNICAMP, with a sandwich period at the Max Planck Institute for Experimental Medicine (Germany). She completed postdoctoral research at the Butantan Institute and the Research Center Jülich (Germany). Her current research areas include the integration of omics sciences based on mass spectrometry for the study of neuropsychiatric diseases, molecular mechanisms of natural psychedelics, and the characterization of agroecological foods. She is the author of more than 60 peer-reviewed scientific articles, 9 book chapters, and editor of a book on metabolomics published by Springer Nature in 2017. She is a member of the editorial board of the journal Frontiers in Psychiatry and a reviewer for 33 journals and 11 national and international funding agencies/programs. Among the awards she has received is the Academic Recognition Award in Human Rights from UNICAMP and the Vladimir Herzog Institute in 2023. She has supervised 10 doctoral theses, 9 master' s theses, 3 postdoctoral projects, and 13 scientific initiation projects. [https://www.researchgate.net/profile/Alessandra_Sussulini]

Abstract:

Neuropsychiatric disorders are complex conditions with multifactorial etiologies, posing significant challenges for diagnosis and treatment. Current diagnostic approaches rely exclusively on clinical observations, while therapies are empirically tailored to individual patients based on symptomatic responses. A deeper understanding of the molecular mechanisms driving these disorders, as well as the biological effects of treatments, is critical for advancing personalized medicine. Omics strategies, particularly metabolomics, offer powerful tools to uncover metabolic alterations associated with disease states and therapeutic interventions, potentially leading to the discovery of novel biomarkers for diagnosis, prognosis, and treatment monitoring. In this presentation, we will explore mass spectrometry-based metabolomic studies investigating the molecular signatures of bipolar disorder, alongside research into the therapeutic potential of natural psychedelics, specifically ayahuasca and cannabis, for depression and Alzheimer' s disease. By analyzing the metabolic pathways affected by these compounds, we aim to elucidate their modes of action and assess their efficacy as alternative treatments. These insights may guide the development of targeted and mechanism-based therapies, offering new possibilities for patients with currently limited treatment options.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Mahmoud Mohamed Bahgat

Biography:

Mahmoud Bahgat was born on 23/7/1969 in Cairo. He received his B.Sc. and M.Sc. in biochemistry from Ain Shams University in 1990 and 1996, respectively. In 1997 he received a DAAD fellowship that brought him to the School of Medicine, Heidelberg University, where he was awarded his doctoral degree in 2001 in molecular and immunological infection research. He has been two times to the Department of Molecular Pathology at the University of California, San Francisco, as a visiting young scientist and as a visiting senior scientist in 1995 and 2005, respectively. In 2008 he received an Alexander von Humboldt fellowship that is awarded to world-class, internationally recognized, highly experienced researchers, which brought him to the Helmholtz Center for Infection Research (HZI) in 2009 for a year and a half. Later he was appointed at the HZI until 2015. During this period he succeeded in receiving two successive research grants from the German Ministry of Education and Research (BMBF). At the National Research Centre (NRC) of Egypt, Mahmoud Bahgat was appointed in 1991 as a research associate, in 1997 as an associate researcher, in 2002 as a researcher, in 2006 as an associate professor, and in 2011 as a full professor until the present. There, he established in 2005 the Research Group Immunology and Infectious Diseases that evolved in 2015 to the Research Group Immune- and Bio-markers for Infection at the Center of Excellence for Advanced Sciences. Since September 2018, he has been holding the position of the Supervisor General of the Central Laboratories Network and the Centers of Excellence at the NRC. In 2003 he received the NRC award for the best applied research paper, in 2006 the State Encouragement Prize in Biosciences, and in 2015 the NRC Prize for Outstanding Research Serving Medical Sciences. Prof. Mahmoud Bahgat authored more than 75 peer-reviewed international publications; his h-index is 21, and his total citation is 1422. Since 2016, Prof. Mahmoud Bahgat has been honored to be a member of the Permanent Executive Committee of the National Strategic Programs for Biotechnology and Genetic Engineering. Since 2019, he has also been honored to hold the position of the Academic Supervisor of the Science and Technology Cooperation Center at the Egyptian Academy of Scientific Research and Technology.

Abstract:

Biotechnology applications are diverse and have been extended to cover veterinary, ecological, environmental, health and drug research. Since 28 years, the Egyptian Ministry of Scientific Research has established an Executive Committee for the National Strategy of Biotechnology and Genetic Engineering which is administered by, and running under the Umbrella of, the Egyptian Academy of Scientific Research and Technologies. The National Strategy for Genetic Engineering and Biotechnology has always taken in consideration to orient its annual calls to demand-oriented applied research aiming at reaching a stage where the outcomes of the funded projects become more appealing to industry. Among the prerequisites the committee has put to consider applications for funding are having strong bench evidence on the applicability of the submitted proposals, and more important having an industrial partner end-user as a co-applicant. In the recent calls the program started to encourage emerging and frontier biotechnology applications. One of the very ambitious projects funded by the program is the Egyptian National Network for Preserving Microbial Culture Collections which is mainly concerned with characterizing and preserving the microbial resources of Egypt. In my presentation I will summarize the activities of the National Executive Committee for Biotechnology and Genetic Engineering and focus on some of the ongoing as well as future activities of the Egyptian National Network for Preserving Microbial Culture Collections.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Abdelfattah Badr

Biography:

The use of medicinal plants for human disease treatment is as old as human civilization. Approximately two- thirds of the estimated 50,000 medicinal plant species in use are collected from the wild. Up to 10,000 medicinal species might now be endangered. In Egypt and other arid and semi-arid countries, traditional medicine is widespread, and most of the medicinal plants are harvested from the wild. Threats to wild medicinal plants in arid regions are many, but the major constraint on medicinal plants in arid environments is drought because of water shortage. Under drought, the underground water resources are not sufficient to support economically and environmentally viable populations of medicinal plants. In addition, man-made threats to wild medicinal plants in Egypt are now prevailing and include a. increased demand from an increasing human population, b. uncontrolled collection—commercial overharvesting, c. uncontrolled tourism activities, d. overgrazing and overexploitation, e. mining, quarrying, and urbanization, and f. introduction of exotic/invasive species. Overharvesting medicinal plants is causing loss of genetic diversity and habitat destruction and diminishing fragile populations and local species extinctions. Conservation strategies for medicinal plants may be made by ex situ and in situ approaches. The ex situ conservation is a comprehensive survey, inventory, and collection program to document the distribution and status of medicinal plant genetic resources along with indigenous traditional knowledge and is of a high priority. In-situ conservation is focused on ecosystem conservation, and its strategy is to identify ecosystems with diverse medicinal plant species, which emphasizes the ecosystem with a substantial community size of a given medicinal plant. The actions of conservation also include a. promotion of public awareness on the value of medicinal plants as a sustainable source of drugs. b. Protection of areas with diverse medicinal plant species from encroachment as part of the general in-situ conservation program. c. Establishment of institutional and national databases. The procedures for conserving medicinal plants may be outlined as follows: a. Genetic authentication of threatened populations using DNA barcoding, b. Estimating the genetic diversity between and within populations, c. Phytochemical determination of the amounts and types of pharmaceutical compounds of interest in medicinal plants, d. In vitro cultivation of selected genotypes using plant cell and tissue culture techniques, and e. Production of pharmaceutical compounds in engineered species in plant cell suspension cultures and root cultures. We present a survey of selected threatened medicinal plants and report on the genetic and phytochemical diversity of Achillea fragrantissima and Artemisia judaica as examples of medicinal plants growing in the arid regions of Egypt.

Abstract:

Professor Dr. Abdelfattah Badr is Professor of Genetics and Plant Biodiversity in the Department of Botany and Microbiology, Faculty of Science, Helwan University, Egypt. He finished a B.Sc.honor degree in Botany from Assiut University, Egypt in 19972with grade Distinction andobtained a Ph.D. in Plant Cytogenetics from Sheffield University, England in 1977. Professor Badr earned Professorship at Tanta University in 1986 where he served as a Faculty from 1977 to 2012 and was Head of Botany Department from 1996 to 2002. He has been consultant to several committees in the Ministries of Education, Higher Education and Scientific Research as well as to the Academy of Scientific Research and Technology, City for Scientific Research and Technology Applications. He has been also reviewer of projects for the Science and Technology Development Fund (STDF) and the Research Development and Innovation Program (RDI)in Egypt and other funding agents in Egypt and abroad. Professor Badr has earned several sabbaticals in England, Germany, and the USA funded by the British Council, The Alexander von Humboldt Foundation and the Fulbright Foundation. He also worked in Saudi Arabia for 10 years. Professor Badr earned two significant prices, the State Prize for Excelling in Scientific Research in Biological Sciences in 1996 and the Tanta University Prize for Merit in Basic Sciences in 2008.

Abstracts and Biographies of Humboldtian Speakers

Prof. Moemen S. Hanafy

Biography:

Prof. Moemen Hanafy currently serves as the International Union of Biological Sciences (IUBS) treasurer. He earned his Ph.D. as a DAAD scholar at Hannover University, Germany. He pursued his early research career through prestigious fellowships from the Japan Society for the Promotion of Science (JSPS) and the Alexander von Humboldt Foundation (AvH). He also served as Associate Professor of Plant Biotechnology at the Faculty of Science and Humanities, Salman bin Abdul-Aziz University, Kingdom of Saudi Arabia. With over 30 years of experience in plant biotechnology research, Prof. Hanafy has made significant contributions to the field. Over the past two decades, he has published 40 research articles in peer-reviewed international journals, authored five book chapters, and delivered approximately 30 invited presentations at national and international conferences. He is a member of several professional societies and serves on the editorial boards of three scientific journals. Throughout his career, Prof. Hanafy has received several notable honors, including the Prize of the President of the National Research Centre for Best Applied Research and the NRC Prize for Scientific Encouragement in agricultural sciences. His strong ties to the European scientific community led to his appointment as Ambassador Scientist of the Alexander von Humboldt Foundation in Egypt from January 2016 to December 2021. In 2018, he was elected chairman of the Egyptian National Committee of Biological Sciences, a position he held until 2022. In 2019, he was elected to the Executive Committee of the International Union of Biological Sciences (IUBS) for the 2019–2023 term. In 2023, he was elected treasurer of the IUBS till June 2026. [https://scholar.google.com.eg/citations?user=Z07PMEYAAAAJ&hl=ar]

Abstract:

Plants are prolific producers of bioactive compounds, also known as secondary metabolites, whichplay essential roles in plant defense and offer vast therapeutic and industrial potential. However, conventional methods for enhancing these compounds often face limitations such as low yield, environmental dependency, and slow production rates. Biotechnology offers innovative solutions to overcome these challenges by enabling precise and efficient manipulation of plant metabolic pathways. This presentation explores biotechnological strategies for enhancing the production of bioactive compounds in plants, including metabolic engineering, genetic transformation, elicitor treatments, and tissue culture techniques. Special attention is given to manipulating amino acid biosynthesis pathways to enhance the accumulation of essential and commercially valuable amino acids. Moreover, case studies highlighting enhanced production of bioactive compounds such as alkaloids, flavonoids, terpenoids, and phenolics through these approaches will be presented. Biotechnology presents a powerful toolkit for the sustainable and large-scale production of plant-derived bioactive compounds with applications in medicine, agriculture, and biotechnology industries.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Mohamed Barakat Zakaria

Biography:

Mohamed Barakat Zakaria, an Associate Professor of Physical Chemistry at Tanta University, earned his PhD in Engineering from Waseda University of Japan in 2016 under the supervision of Prof. Yusuke Yamauchi. He then did his postdoctoral research at the National Institute for Materials Science (NIMS) in Tsukuba/Japan, the University of Queensland, Australia; and Ruhr University of Bochum (RUB)/Germany. In 2024, he joined Illinois Institute of Technology (IIT) as a senior research associate for one year. Mohamed is a recipient of many prestigious awards such as JSPS Fellowship-16F16371/Japan (2016), postdoctoral exchange program-2019M652339/China (2018), IAAM Young Scientist Prestigious Medal/Stockholm (2018), Humboldt Research Fellowship-1211515/Germany (2020), the Irish Postdoctoral Fellowship Award/Ireland (GOIPD/2020/283) etc. He has authored 66 original articles, 4 review papers, 4 patents, and 1 book with an h-Index of 26 and delivered 35 presentations at international conferences. His research mainly focuses on heterogeneous catalysis and functional/porous materials engineering and chemistry for alkaline water electrolysis, ORR, CO□RR, N2RR, and supercapacitors. Additionally, he is interested in the rational Design of 2D and 3D porous coordination polymers in the nanoscale and investigating their potential for nanostructured inorganic materials for electrocatalysis. [https://www.researchgate.net/profile/Mohamed-Barakat-16]

Abstract:

There is a lot of interest in using water electrolysis to produce hydrogen as a clean fuel for a carbon-neutral civilization. Water electrolysis needs a lot of energy to continue producing hydrogen efficiently and sustainably because it is a time-consuming and energetic reaction. Catalytic electrodes can lower manufacturing costs and the amount of energy used. In this context, herein reduced graphene oxide (rGO) sheets wrapped earth-abundant metallic sulfides nanoparticles (Fe3Co3Ni3S8) in a layered structure (rGO/Fe3Co3Ni3S8) were realized through self-assembly of GO sheets and rGO/Fe3Co3Ni3S8 nanoparticles, followed by annealing in nitrogen at 800 oC for 2h. The optimized composition (rGO/Fe3Co3Ni3S8-3) was obtained through using different amounts of rGO and Fe3Co3Ni3S8. We further investigated the effect of Sustainion® XA-9 alkaline ionomer 5% in ethanol and Nafion (5wt%) perfluorinated resin solution binders on the electrocatalytic hydrogen evolution reaction (HER) performance of rGO/Fe3Co3Ni3S8-3 composite in 1.0 M KOH. By employing Sustainion® XA-9 alkaline ionomer 5% in ethanol, the rGO/Fe3Co3Ni3S8-3 composite achieved -100 mA cm-2 at 371 mV and 199 mV dec-1 significantly outperforming the rGO and Fe3Co3Ni3S8 single phases and the rGO/Fe3Co3Ni3S8-3 supported Nafion (5wt%) perfluorinated resin (561 mV and 591 mV. dec-1). The rGO/Fe3Co3Ni3S8-3 supported Sustainion binder roughly compares to the benchmark Pt/C40% catalyst (223 mV and 99.6 mV dec-1) at identical conditions. Through a long-term stability test at -100 mA cm-2, the catalyst demonstrated persistent performance with additional activation in the first two hours, achieving -0.57V vs. RHE.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Sami Eldeeb

Biography:

Prof. Dr. Sami Eldeeb is a German professor of pharmaceutical and medicinal chemistry, specializing in pharmaceutical analysis and sustainable analytical chemistry. He currently holds a professorship at the Technical University of Braunschweig and serves as an external consultant for Merck Darmstadt. He has recently held several prestigious visiting positions, including an Alexander von Humboldt Guest Professorship at the Free University of Berlin and a full professorship at the University of Nizwa in Oman, where he directed the Analytical Unit at the Natural and Medical Sciences Research Center. He also served as a guest professor at Ajman University in the United Arab Emirates, where he taught pharmacy and dentistry students. Prof. Eldeeb' s expertise spans a broad range of advanced instrumental techniques, including UHPLC, LC-MS, ICP-AES, HR-CS AAS, capillary electrophoresis, microscale thermophoresis, and biosensor development. As a strong advocate of green and white analytical chemistry, he is a pioneer in developing sustainable chromatographic methods using eco-friendly solvents. His research interests also include metabolomics, biomolecular interaction analysis, enantioselective separation, phytochemical profiling, and bioanalytical method development. He is an active alumnus of the Alexander von Humboldt Foundation, where he currently serves as an application reviewer, and a DAAD alumnus, having served for several years on the DAAD scholarship selection committee. Prof. Eldeeb has supervised numerous Ph.D. and postdoctoral researchers and is widely recognized for his innovative and student-centered teaching approach, consistently earning excellent evaluations across several international academic institutions. In addition to his academic and research accomplishments, he has significantly contributed to the advancement of higher education through curriculum development, academic program accreditation, and the supervision of graduate theses. He is a member of several scientific societies and actively participates in international research collaborations and conferences.

Abstract:

Understanding biomolecular interactions is central to modern biomedical research, with critical applications in drug discovery, disease etiology, and biosensor development. This presentation introduces microscale thermophoresis (MST) as a powerful and sustainable analytical technique for characterizing noncovalent interactions between biological molecules. MST enables the precise determination of binding affinities, kinetics, and thermodynamic parameters using minimal sample volumes and environmentally friendly procedures. The talk compares MST with other methods such as affinity capillary electrophoresis (ACE), highlighting its advantages in sensitivity and eco-compatibility. Practical case studies, including protein-metal interactions and ligand binding to targets such as lactoferrin and copeptin, are presented to demonstrate the versatility of MST. The integration of MST into green analytical workflows exemplifies its potential for sustainable research practices. Overall, the method' s adaptability to various molecular systems and its compatibility with modern drug development and diagnostic applications make it a promising tool for the next generation of pharmaceutical and analytical sciences.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr.Tamer Ibrahim Abdelrehim

Biography:

Tamer M. Ibrahim graduated from the Faculty of Pharmacy, Alexandria University. He worked at the German University in Cairo (GUC), where he received his master' s degree. He received his Ph.D. from the Eberhard Karls University of Tuebingen (Germany), with a focus in Computer-Aided Drug Design (CADD), Cheminformatics, and Structural Bioinformatics. In addition, during his postdoctoral studies in Germany, he worked at the boundary of experiment and theory for drug discovery projects. Dr. Tamer is an Associate Professor of Pharmaceutical Chemistry in the Faculty of Pharmacy at Kafrelsheikh University. Recently, Dr. Tamer was awarded a research sponsorship from the Alexander von Humboldt Foundation to execute collaborative projects with Prof. Stefan Günther, as a guest professor in the Pharmaceutical Bioinformatics Department at the Albert-Ludwigs-Universität of Freiburg. Dr. Tamer was awarded (in 2023) the State Encouragement Award (Egypt - □□□□□ □□□□□□ □□□□□□□□) for modern technological sciences that serve the medical fields. Dr. Tamer is appointed as an Associate Editor in Chief for the journal Drug Design, Development and Therapy and an Academic Editor in the PLOS ONE journal.

Abstract:

Cheminformatics has become an indispensable tool in modern drug design, integrating computational methods with chemical data to accelerate discovery and optimization processes. By leveraging molecular descriptors, predictive modeling, and virtual screening techniques, researchers efficiently identify drug candidates with optimal efficacy and safety profiles. The integration of artificial intelligence and machine learning further enhances cheminformatics capabilities, enabling rapid analysis of complex datasets and improving success rates in preclinical evaluations. In my lecture, a couple of examples of modern cheminformatics applications in drug design will be elaborated. In my lecture, I will delve into a couple of compelling case studies that illustrate the cutting-edge applications of modern cheminformatics in drug design.

Abstracts and Biographies of Humboldtian Speakers

Assoc. Prof. Ebaa El-Hossary

Biography:

Assoc. Prof. Ebaa El-Hossary is an Associate Professor of Pharmaceutical Chemistry at the National Centre for Radiation Research and Technology (NCRRT)—Egyptian Atomic Energy Authority. He studied pharmacy at Misr University of Science and Technology and graduated in 2003. In 2004, he was recruited for a position as a research pharmacist at the NCRRT, where he completed his master' s thesis and subsequently his PhD work. He received his PhD in pharmaceutical chemistry from Cairo University in 2010. In 2012, he was selected for a Humboldt Postdoctoral Fellowship and began implementing his collaborative research project at the Institute of Pharmacy and Food Chemistry—University of Würzburg. In 2024, he was awarded a renewed Humboldt research fellowship to conduct further studies at the Helmholtz-Zentrum Dresden-Rossendorf. Since January 2022, he has been appointed by the Alexander von Humboldt Foundation as its Ambassador Scientist in Egypt. In 2023, he was also elected as the Secretary General of the Humboldt Alumni Association in Egypt. [https://www.researchgate.net/profile/Ebaa-El-Hossary]

Abstract:

The Alexander von Humboldt Foundation, as it is known today, was established in 1953 by the Federal Republic of Germany. The foundation enables highly qualified postdoctoral scientists and experienced researchers from abroad to carry out research projects of their own choice in Germany. There are no quotas for individual countries or disciplines. The foundation allows the researchers to choose their host institutions themselves and to conduct independent research without any stipulations. Applicants are responsible for choosing their own research project and host in Germany. "Once a Humboldtian—always a Humboldtian" is the hallmark of the Alexander von Humboldt Foundation. Humboldt sponsorship is enduring: the foundation is a lifetime partner, maintaining the connections on a long-term basis through its alumni sponsorship programs. As a result, an active knowledge network of more than 30,000 Humboldtians has been laid across the whole academic world—embracing over 140 states. The presentation provides comprehensive information about the Humboldt Foundation and its sponsorship programs.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Nadia E. A. El-Gamel

Biography:

Nadia E.A. El-Gamel is a Professor of Inorganic Chemistry at Cairo University, Faculty of Science. She is an Alexander von Humboldt alumna. She was awarded Alexander von Humboldt Foundation in 2005 and joined the Institute of Inorganic Chemistry at Konstanz University and TU Bergakademie Freiberg, Germany. She was a Guest Professor at the University of Cologne (2010) and at Ruhr- University, Bochum (2012). Since 2014, she has been a full professor of Inorganic Chemistry at the Faculty of Science at Cairo University. Her research interests focus on inorganic chemistry and include various topics on inorganic material chemistry.

Research Interests:

a) Synthesis of hybrid inorganic-organic materials and the widespread use of their biological applications in healthcare and medicine.

b) Synthesis of metal-organic frameworks (MOFs) and investigating the function of defects in porous coordinating polymers to create materials with a tunable number of modulated functional sites and optimized properties for gas storage, gas separation, and other catalytic applications.

c) Surface functionalization of nanomaterials and their multipurpose uses in the biological sciences.

d) Surface functionalization of nanomaterials (nanoparticles / nanocomposites....) with adjustable compositions and topologies for various industrial, environmental, and catalytic applications.

Abstracts and Biographies of Humboldtian Speakers

Prof. Dr. Mohamed Moustafa El-Fouly

Biography:

Dr. Mohamed Moustafa El-Fouly : Professor of Plant Physiology and Nutrition. Born 1039 – Bachelor of Agriculture, Alexandria Univ. 1959. Dr. Agr. TU Munich 1963. Studied Philosophy and Psychology (4 semesters) and Natural Recourses if Africa. Cairo Univ. (4 semesters 1973-1975). Researcher at Saar Univ., and the research station Limburger of BASF, Germany. 1963-1966). Researcher at the National Research Centre (NRC) (10/66), Professor (5/1977). Chairman of the Department of Botany (1955) and head of the Agricultural and Biological Research Division and member of the board of directors (1997). Part time expert (1974-1975), ALECSO League of Arab States. Attended about thirty training courses in technical, managerial and development subjects. Over 250 original research and 24 Reviews & state of the Art publications. Scientific of proceedings of 23 international and local conference. He supervised 22 M.Sc. and 29 Ph.D. thesis. One patent. Established at the NRC a Centre of Excellence in Research on micronutrients in soil and plants, industrial unit for the development of foliar micronutrients fertilizers, and a station for large scale – outdoor production of micro algae. Received numerous scientific awards and appreciation certificates and mentioned in several encyclopaedias. Holds the State Scientific Appreciation Award in Agricultural (2006). Prof. El-Fouly received numerous grants and fellowships including A. von Humboldt Foundation. Participated in over 100 conferences abroad and Egypt. Reviewer in local and international journals. Member of the Editorial Boards of scientific journals. Principal investigator of different projects funded by international and local organizations. Was in charge of the more than fifty studies and researches financed by the beneficiaries. Member of international, regional and local scientific committees. Supervisor of the training centre and capacity development (NRC-6/2010). Helped to resolve national problems, in the areas of micronutrients decencies in soil and plant, use of foliar fertilizers. Gave many public lectures and cultural TV program and author of popular science articles. Member of several international, regional and local associations. Chair person of the Egyptian Association for Evaluation.

Abstracts and Biographies of Speakers

Prof. Dr. Ashraf El-Araby

Biography:

Professor Ashraf El-Araby is the President of the Institute of National Planning (INP) in Cairo. He previously served as Minister of Planning and International Cooperation, and later as Minister of Planning, Monitoring, and Administrative Reform in Egypt (2012–2017). During his tenure, he also represented Egypt as Governor to several international and regional financial institutions, including the World Bank, the European Bank for Reconstruction and Development, the Arab Fund for Economic and Social Development, and the African Development Bank. Prof. El-Araby served as an Advisor to the Arab Planning Institute in Kuwait (2017 – 2022), and as a Board Member of the Central Bank of Egypt (2019- 2023). Currently, Prof. El-Araby is a Board Member of the Egyptian Financial Regulatory Authority, a Member of the Coordinating Council for Monetary and Fiscal Policies, Secretary-General of the Arab Society for Economic Research, and a Member of the Boards of Trustees of both King Salman International University and the Arab Planning Institute in Kuwait. He is also a Member of the Egyptian Academy of Scientific Research and Technology and Egypt' s Scientific Institute, and currently serves as Chairman of the Advisory Council of the National Media Authority (Maspero) in Cairo. El-Araby earned his Ph.D. in Economics from Kansas State University (USA) in 2004, and is widely recognized both nationally and internationally for his contributions to the fields of planning and development, macroeconomic policy, education economics, and labor market dynamics. He has lectured at several Egyptian and international universities and has authored numerous academic publications, policy briefs, and background papers for both national and international reports. His academic excellence has been acknowledged through several awards, including the "Best Graduate Instructor Award" from the Department of Economics, Faculty of Economics and Political Science - Cairo University (2006), and the "Emerson Memorial Scholarship for "Best Graduate Student" from the Department of Economics at Kansas State University, USA, (2003)

Abstracts and Biographies of Speakers

Prof. Dr. Mohammed Mahmoud Hashem

Biography:

Prof. Dr. Mohammed Mahmoud Hashem, is a Professor of Applied Organic Chemistry in the Textile Division, at National Research Centre. He was awarded his B.Sc from Faculty of Science Zagazig University in 1986. He was appointed in National Research Centre in 1989. He awarded his M.Sc in 1992 and Ph.D degree in 1996 in Applied Organic Chemistry from Cairo University and Duisburg University in Germany. He was appointed as head of Preparation and Finishing of Cellulosic Fabrics department in 2011. In 2014 , he was appointed as head of Textile Division. In 2014 he was appointed as Vice-President of National Research Centre for Research Affairs and International Relations. In October 2018 He appointed as President of the National Research Centre. His main Research was in the field of chemistry, engineering and technology of textile fiber and fabric, pretreatment and finishing of cellulosic-based textile polymer and carbohydrates chemistry. He has also an experience in chemistry and technology of carbohydrate polymers, cellulosic fiber and fabrics and textile warp sizing as well as pretreatment and finishing of different types of textile and fabrics. He was also technically engaged in chemical analysis and quality control for cellulosic textiles, industrial auditing in textile wet processing for small and medium enterprises as well as trouble shooting in textile wet processing. He has more than 70 international scientific papers and has three patents. He participated in more than 35 national and international scientific research projects and supervised more than 20 M.Sc and Ph.D theses. Moreover; he was an external examiner for many M.Sc and Ph.D theses submitted to several Egyptian faculties. He is a part time lecturer in many Egyptian universities and a reviewer to the 15 International Scientific Journals. Moreover; He was awarded 6 prizes including State Prize of Scientific Excellence in Advanced Technological Science in 2013 and his name was included in "Who is Who in the Science and Engineering" in 2006 and "Who is Who in the World" in 2007.Last but not least, he had scientific visits in more than 15 different universities and institutes in Germany, USA, Poland, Italy, China and others 1992 through 2016. He was particularly engaged in different scientific missions with the Textile College in North Carolina State University, USA in 2001 through 2006.

Abstracts and Biographies of Speakers

Prof. Dr. Mahmoud M. Sakr

Biography:

Mahmoud M. Sakr is an emeritus Professor of plant biotechnology at the National Research Center, Egypt, with more than two decades of cumulative experience in Egypt' s high-level science, technology, and innovation policies and management. He got his PhD from Tanta University, Egypt, in 1995 (with experimental work carried out at Pavia University, Italy, through fellowships from the Italian Ministry of Foreign Affairs and ICGEB). He obtained a professorship in plant biotechnology in 2006. He received the State Encouragement Award in Agricultural Biotechnology, the National Research Center Award for Scientific Encouragement and Excellence in Biotechnology, and the award of the International Council for Small Businesses (ICSB). Internationally, he served as the Vice President of SESAME (Jordan), NAM (India), and Egypt' s Plenipotentiary in the Joint Institute of Nuclear Research (JINR), Russia. Sakr has over 140 scientific publications to his name in the biotechnology field, has authored and co-authored 5 books and two encyclopedias (Egyptian Medicinal Plants and Egyptian Traditional Foods), and has supervised 35 Master' s and PhD students from Egypt, Sudan, and Algeria. He has published over 10 international publications and reports on STI policies, management, funding mechanisms, brain drains, brain circulation, climate change, green innovation, empowering youth and women, STEM, science diplomacy, foresight studies, entrepreneurship, and technology transfer and commercialization.

Abstracts and Biographies of Speakers

Prof. Dr. Yehia Gad

Biography:

Yehia Z. Gad graduated from the Faculty of Medicine, Cairo University, in 1979. He got M.Sc. and M.D. degrees in pediatrics from the same faculty in 1983 and 1992, respectively. He started his research career as a fellow in the Human Genetics Dept., National Research Centre (NRC) in 1981, then was promoted over the years up to the post of Professor of Molecular Genetics in 2003. He is a fellow of Johns Hopkins University and Albert Einstein College of Medicine, USA. He published 39 articles in national and international journals in the fields of molecular genetics, genomics, endocrinology, and paleobiology. He is a PI of several national and international projects. He is currently an emeritus professor in the NRC and the scientific supervisor of the ancient DNA lab at the National Museum of Egyptian Civilization. [https://www.researchgate.net/profile/Yehia-Gad]

Abstract:

The ancient DNA (aDNA) research field has been commingled with the study of ancient Egyptian artifacts since the first publication on an ancient human subject [an Egyptian mummy] by Paabo in 1985. Afterwards, the field of aDNA analysis has faced many technical challenges that slowed down its rapid progress. Only within the last 15 years has there been significant progress in the aDNA analytical methods and tools, thanks to tremendous technological advances that enabled researchers to generate big datasets from minute samples of biological remains. This unprecedented opportunity to draw clearer images of ancient civilizations has become a cornerstone for the new wave of evidence-based archaeology. In Cairo, two dedicated aDNA labs were established in 2007 to launch the field of molecular Egyptology in Egypt. Within the following years, the research focused on the study of some royal mummies using mainly targeted molecular analysis to answer a number of questions related to kinship and human disease. On the other hand, within the last two years, the lab research teams have stepped up their methodological approach through the utilization of next-generation sequencing (NGS) technology, which has become the standard analytical platform in the field. The NGS comprehensive analytical capabilities enable the labs to currently investigate in depth a number of royal mummies and other human remains. In the current presentation, the presenter will share with the floor highlights on previous and current activities of the Egyptian labs within the domain of investigating the identity and kinship of some ancient Royal Egyptians.

Abstracts and Biographies of Speakers

Dr. Nehal Sameh Ramadan

Biography:

With over sixteen years of professional experience in pharmaceutical research and public service, I specialize in pharmacognosy, food chemistry, natural products chemistry, and plant biochemistry. I earned my PhD in 2020 through an Egyptian-Japanese exchange program between Cairo University and Kyushu University, Japan. In 2021, I joined the Chemical Industries Research Institute at Egypt' s National Research Centre as a researcher. My work centers on applying advanced biochemical tools—especially metabolomics—to explore complex biological questions in food, medicine, herbal drug analysis, and agriculture. I am also experienced in the isolation and structural elucidation of chemical compounds using chromatographic methods, 1D & 2D NMR, and high-resolution mass spectrometry. I am currently involved in preserving Egypt' s cultural and natural heritage through two national projects. I serve as co-principal investigator of "Encyclopedia of Egyptian Traditional Foods: Documentation of Egyptian Traditional Food Heritage," as well as co-principal investigator of "Investigation of Ancient Egyptian Crops and Dietary Habits through a Multidisciplinary Study of Archaeobotanical and Archaeological Remains: An Insight for More Sustainable Crops." In addition, I am proud to be part of the team at the International Relations office at the National Research Centre, working to foster global scientific collaboration. [https://www.researchgate.net/profile/Nehal-Ramadan-2]

Abstract:

Contemporary progress in multi-omics methodologies—encompassing genomics, proteomics, metabolomics, and lipidomics—enables the high-throughput acquisition of comprehensive datasets, which are increasingly vital in biomolecular archaeology. This interdisciplinary field plays a pivotal role in elucidating historical enigmas through the analysis of ancient biomolecules, such as nucleic acids, proteins, and stable isotopic signatures, thereby addressing fundamental inquiries concerning human history and evolutionary trajectories. Complementary to this, archaeobotanical and archaeological data constitute essential resources for reconstructing past societies, yielding information regarding their socio-cultural organization and paleoenvironmental conditions, where material culture, including seeds, plant fibers, and ceramic artifacts, furnishes critical evidence pertaining to agricultural practices and quotidian existence.

Abstracts and Biographies of Speakers

Dr. Radwa H. El-Akad

Biography:

Researcher at the Pharmacognosy Department, National Research Centre, Egypt. She earned her M.Sc. and Ph.D. in pharmacognosy from the Faculty of Pharmacy, Cairo University. With 10 years of experience, Dr. El-Akad has specialized in the metabolomic profiling of natural resources, applying advanced analytical tools such as UPLC/MS and GC/MS, which contributes to understanding the chemical diversity and therapeutic potential of natural resources.
She has authored over 15 peer-reviewed publications in reputable indexed journals, with an h-index of 6, and her contributions extend to participating in international collaborations. She presented several workshops and hands-on training sessions focusing on practical approaches in metabolomics for researchers and postgraduate students. She continues to play a pivotal role in advancing metabolomics applications in natural product research.

Abstract:

The training session aims to build foundational skills for exploring complex metabolomes. Junior researchers will be introduced to key metabolomic tools used in natural products profiling, focusing on mass spectrometry-based metabolomics for compound identification and data interpretation strategies. Case studies from marine- and plant-derived metabolites will be highlighted. Participants will gain practical insights into spectral data analysis and the application of metabolomics in natural product discovery.

Abstracts and Biographies of Speakers

Prof. Dr. Reham Mahmoud Abdel-Kader

Biography:

Prof. Reham Mahmoud Abdel-Kader is a Professor of Pharmacology and Toxicology at the German University in Cairo (GUC), where she also serves as Head of Department. A dedicated educator and researcher, she leads a multidisciplinary research group focused on mitochondrial dysfunction in disease, with particular emphasis on Alzheimer's disease and, more recently, cancer. Her current work investigates mitochondria not only as cellular powerhouses but as central therapeutic targets—an approach that frames her conference talk titled "From Powerhouse to Therapeutic Target: Mitochondria in Cancer and the Future of Women's Health." Dr. Abdel-Kader earned her Ph.D. in Pharmacology from Johann Wolfgang Goethe University in Frankfurt, Germany. She has led multiple nationally and internationally funded projects, including grants from Egypt's Science, Technology, and Development Fund (STDF), the Swiss National Science Foundation (SNF), and DAAD-BMBF. She has supervised over 30 postgraduate theses and plays a key role in shaping academic strategy, curriculum development, and quality assurance at GUC. An active member of ESMO and ISTAART, Dr. Abdel-Kader also serves as a peer reviewer for leading journals and funding agencies, including ASRT and the Czech Science Foundation. She is driven by a deep passion for translational research that connects scientific discovery with meaningful health impact. [https://www.researchgate.net/profile/Reham-Abdel-Kader]

Abstract:

Mitochondria, long recognized as cellular powerhouses, are now accepted as key regulators in carcinogenesis. In triple-negative breast cancer (TNBC), mitochondrial dysfunction has been highly implicated, including altered bioenergetics, apoptosis suppression, and disruption of redox homeostasis— all key contributors to tumor aggressiveness. Recent studies have highlighted the roles of mitochondrial dynamics, biogenesis, and oxidative phosphorylation in tumor progression and therapy resistance.

Among emerging regulators, hydrogen sulfide (H□S)-producing enzymes—cystathionine β-synthase (CBS), cystathionine γ-lyase (CSE), and 3-mercaptopyruvate sulfurtransferase (3-MST)—modulate mitochondrial function and redox signaling, offering promising therapeutic targets. This talk integrates current insights in the field with our research findings in TNBC, showing that disruption of H□S-related mitochondrial pathways impairs tumor viability by affecting redox regulation and mitochondrial biogenesis. Analysis of breast cancer tissues from patients demonstrates that mitochondrial dysregulation is a consistent characteristic, marked by altered expression of both mitochondrial genes and H□S-producing enzymes. This changing paradigm presents new prospects for precision oncology as mitochondria-targeted treatments progress through preclinical and clinical stages, especially for malignancies that are resistant to therapy. By redefining mitochondria as therapeutic targets, we explore their ability to enhance outcomes in treatment-resistant cancers such as TNBC.

Abstracts and Biographies of Speakers

Prof. Dr. Stefan Laufer

Biography:

Stefan Laufer is Professor and Chairman for Pharmaceutical/Medicinal Chemistry at Tuebingen University. He received his degrees from Regensburg University. After 10 years in the pharmaceutical industry, he joined Tuebingen University in 1999 as chairman of Pharm./Med. Chemistry. His research interests are anti-inflammatory and cancer drug discovery with various eicosanoid (COX-1,2,3, LOXs, mPGES1, cPLA2) and protein kinase targets (e.g. p38s, JAKs, JNKs, CK1s, mtEGRFs, BTK, ATM, ATR, AurKa). Prof. Laufer is co-founder of the ICEPHA (Interfaculty Center for Pharmacogenomics and Drug Research), TüCADD, Tuebingen Center for Academic Drug Discovery and is co-founder of two start-up companies. He served the community in various positions (e.g. President German Pharmaceutical Society 2016-2019, Boardmember MedChem Division, German Chemical Society 2012-2023). Prof. Laufer is associate editor of the ACS Journal of Medicinal Chemistry, authored more than 700 publications, 17 books/bookchapters and is inventor in 51 patent families with 402 national applications. 5 compounds from his lab made it to first into human studies. [https://www.researchgate.net/profile/Stefan-Laufer]

Abstract:

Our research in RNAi- and Crispr/Cas9-based functional genomics especially focuses on the identification of new cancer genes and therapeutic targets in therapy-resistant solid tumors. For such studies, clinically relevant mouse tumor models, which closely resemble the human disease, are available. Specifically, we are combining so-called mosaic mouse models with stable RNAi technology to dissect tumor suppressor networks in gastrointestinal tumors and to identify and validate new therapeutic target genes. Together with a limited number of other laboratories worldwide, we have the expertise to conduct RNAi screens for new cancer genes directly in orthotopic and immunocompetent cancer mouse models in vivo. To best translate data from our unique RNAi platform into new cancer therapies, we recently systematically connected our RNAi expertise with the research areas virtual screening/modelling and medicinal chemistry to build an academic drug discovery unit, designated TüCAD2 (Tübingen Centre for Academic Drug Discovery. Our unit was recently approved as a member of the worldwide acting Academic Drug Discovery Consortium (ADDC). TüCAD2 represents an interfaculty and interdisciplinary endeavor and was founded by the Dept. of Pharmaceutical/Medicinal Chemistry (Stefan Laufer) and the Dept. of Internal Medicine VIII (Lars Zender). In our talk we will discuss the pivotal role of academic drug discovery infrastructures for rapidly translating validated therapeutic target structures into clinical applications. TüCAD2 successfully transferred 4 new compounds first into human. Case studies for pure academic funding and VentureCapital based spin-offs will be presented.

Abstracts and Biographies of Speakers

Prof. Dr. Mohamed Zakaria Gad

Biography:

Prof. Dr. Mohamed Zakaria Gad is Professor of Biochemistry and Vice-Dean for Postgraduate Studies and Scientific Research at the German University in Cairo (GUC). He previously served as dean of the Faculty of Pharmacy and Biotechnology at GUC. A graduate of Cairo University (Pharmacy, 1983, ranked 1st among 500 students), he obtained his M.Sc. in Biochemistry in 1987 and his Ph.D. from the Medical College of Pennsylvania, USA, in 1991. Prof. Gad has held senior academic positions at Cairo University, GUC, October 6 University, Ain Shams University, and Helwan University. He coordinated a major TEMPUS curriculum development project and received prestigious awards, including the American Heart Association Fellowship, the National Promotional Prize in Biomedical Sciences (2002), and the State Appreciation Award in Advanced Technological Sciences (2023). He is a board member of the Egyptian National Committee of Biochemistry and Molecular Biology, the Egyptian Drug Authority (EDA), and Medical Union Pharmaceutical Co., and chairs the Institutional Review Boards of MARC and 57357 Children' s Cancer Hospital. Prof. Gad has supervised over 60 postgraduate theses, published 115 international papers, authored 8 books and chapters, and contributed 131 conference abstracts and presentations. Recognized among the world' s top 2% of scientists by Stanford University, he has a SCOPUS H-index of 30. [https://www.researchgate.net/profile/Mohamed-Gad-33]

Abstract:

This presentation narrates a 25-year scientific journey from our laboratory, dedicated to unraveling the pivotal roles of gasotransmitters, with a special focus on nitric oxide (NO) and hydrogen sulfide (H□S), in health and disease. The story begins with the discovery of NO as the first gaseous biological messenger, a molecule with unconventional chemical properties that revolutionized cardiovascular physiology and earned a Nobel Prize in 1998. Building on this breakthrough, our research revealed NO' s protective roles in inflammation, gastric integrity, and atherosclerosis. Driven by curiosity and clinical need, we expanded our focus to H□S—another endogenous gas with profound biological functions. Our lab pioneered the development of a novel portable device for point-of-care H□S measurement, advancing early diagnosis of myocardial infarction. We further explored the intersection of gasotransmitters and oncology, uncovering significant dysregulation of H□S- and NO-producing enzymes in breast cancer, particularly triple-negative subtypes. Through innovative microRNA-based strategies, we demonstrated the potential to therapeutically target these pathways. Over this journey, our research has bridged basic science and clinical translation, offering new biomarkers and therapeutic avenues for cardiovascular and oncological diseases. This presentation will highlight not only the scientific advances but also the key milestones and publications that have shaped the legacy of our group over the past quarter-century.

Abstracts and Biographies of Speakers

Prof. Dr. Maria Kristina Parr

Biography:

Prof. Maria Kristina Parr is working as professor for Pharmaceutical Analysis at Freie Universität Berlin, Germany, since 2012. The main research focus of her group is mass spectrometric analysis hyphenated to different chromatographic separation techniques with main focus of analyzing biological samples for drugs and their metabolites. With Maria Parr' s long history in anti-doping research, primary focus of the group is on steroids and other performance enhancing drugs. Investigations in drug metabolism, determination of endogenous and xenobiotic compounds by GC-, LC- and SFC-MS(/MS) and drug-drug interactions play an important role in her research activities.
Additionally, the analysis of active ingredients in drugs, dietary supplements and counterfeit or black-market products, protein and antibody characterization, quality management, analytical quality by design and sustainability in pharmaceutical analytical chemistry are important fields of her research.

Abstract:

The sympathomimetic drug Clenbuterol is proven to be abused in animal husbandry and sports for growth promoting purposes due to its anabolic (side-) effects. Since several adverse analytical findings for Clenbuterol in doping control samples of athletes were claimed to be due to the ingestion of contaminated meat. To trace back the route of ingestion of Clenbuterol (drug or contaminated food) in a doping control sample the enantiomeric composition of Clenbuterol residues in urine samples was proposed as research perspective. In 2000, Smith already reported that after application of racemic Clenbuterol to chicken and swine, S-Clenbuterol is enriched (respectively R-Clenbuterol is depleted) in concerning animal tissues. In contrast pharmaceutical preparations contain racemic Clenbuterol. Ingestion of those different enantiomeric compositions may also lead to different enantiomeric compositions of Clenbuterol in athletes urines and therefor allow for a distinction between the consumption of contaminated meat and the illegal administration of drugs. Herein we report the analysis of several drug preparations that were all confirmed to consist of a racemic mixture of clenbuterol. After treatment with the approved veterinary drug Ventipulmin for 14 days calves were slaughtered and the enantiomeric composition of Clenbuterol was determined. A controlled administration trial in men was performed with clenbuterol administered from different sources, namely drug and contaminated meat. Analysis of the enantiomeric composition was performed using a chiral separation by LC-MS/MS and SFC-MS/MS and enantioselective elimination kinetics is reported. Alterations in the enantiomer' s proportion in urine may be used to support or oppose athlete' s statements.

Abstracts and Biographies of Speakers

Prof. Dr. Sameh Magdeldin

Biography:

Sameh Magdeldin Mohamed is a professor of physiology at the Faculty of Veterinary Medicine at Suez Canal University, and he is currently heading the proteomics and metabolomics research program at Children' s Cancer Hospital 57357. He obtained a master' s degree in physiology in 2002. His first Ph.D. was accomplished in 2007 (physiology). He received a second doctorate in biomedical and medical sciences from Niigata University, Japan, in 2013 and completed his MBA in 2021. With a sold record of professional post-doctoral internships at Max Planck, Germany; Scripps Institute, California; and Fred Hutchinson Cancer Research Center in Seattle. He published over 70 peer-reviewed research articles and more than 5 books. Dr. Sameh has received several international awards. Among them are the international HUPO award, National Encouraging Award, and others. In 2019, he established the proteomics and metabolomics research program at children' s cancer hospital 57357. One of his main interests is empowering bioinformatics disciplines in Egypt. Dr. Sameh and his bioinformatics team have successfully published more than 15 freely available software programs that support the proteomics and metabolomics fields. [WWW.57357.org/proteomics-unit]

Abstract:

Mass spectrometry (MS) has emerged as a transformative tool in biomarker discovery and the elucidation of disease pathophysiology, offering unparalleled precision in identifying and quantifying biomolecules. Its high sensitivity, specificity, and multiplexing capabilities enable the detection of low-abundance proteins, metabolites, and other molecular signatures that reflect disease states. MS techniques like liquid chromatography-MS (LC-MS) have been instrumental in uncovering dysregulated pathways in cancers and metabolic diseases, providing insights into mechanisms such as protein post-translational modifications and metabolic reprogramming. This talk presents the principles of MS approaches with application in the cancer field and personalized medicine, offering novel diagnostic, prognostic, and therapeutic targets for cancer.

Abstracts and Biographies of Speakers

Prof. Dr. Michael Lämmerhofer

Biography:

Michael Lämmerhofer is a full professor for pharmaceutical (bio-)analysis at the University of Tübingen, Germany (since 2011). He graduated in pharmaceutical sciences in 1992 and earned his PhD in pharmaceutical chemistry in 1996 at the University of Graz, Austria (supervisor Prof. Wolfgang Lindner). Between 1997 and 2002, he was assistant professor, and from 2002 to 2011, associate professor at the University of Vienna, Institute of Analytical Chemistry. Between 1999 and 2000, he spent a year as a postdoctoral researcher at the Department of Chemistry of the University of California, Berkeley (Prof. Frantisek Svec/Prof. Jean M. Frechet). Since 2007, he has been associate editor of the Journal of Separation Science, and since 2024, editor-in-chief. His research interests include bioanalysis (metabolomics and lipidomics), pharmaceutical analysis (impurity profiling, enantioselective analytics), multidimensional separations and biopharmaceutical analysis (peptides, oligonucleotides, proteins, plasmids), and the development of functionalized separation materials (chiral stationary phases, mixed-mode phases, chemo- & bioaffinity materials, nanoparticles, monoliths). [https://orcid.org/0000-0002-1318-0974]

Abstract:

Lipidomics approaches are nowadays widely adopted to have a comprehensive view of lipid profiles in biological samples. Alterations in lipid profiles may provide a panel of biomarkers for diagnostic and prognostic purposes for various diseases. Untargeted lipidomics workflows may generate new hypothesis for supporting biological interpretations or complementing other omics data, but they also have great utility to support the discovery of new drug actions (pharmacolipidomics). Targeted lipidomics approaches are often utilized to validate biomarkers found in a discovery phase or measure particular lipids associated with a certain disease or present in low abundance (e.g. lipid mediators in inflammation). Considering the importance of many lipids in signaling pathways and membrane integrity, lipidomics has gained wide interest not only amongst analytical chemists, but it has also raised broad attention in the clinical research community. In this presentation, workflows established in our group for clinical lipidomics will be outlined and critical parameters discussed. Using lipid species separation by reversed-phase liquid chromatography and quadrupole-time-of-flight mass spectrometric detection by data-independent acquisition with SWATH, typically 300 to 700 lipids can be detected and identified using an in silico mass spectral library in plasma and cells. While routine clinical diagnostics is roughly based on a half dozen lipid markers (total cholesterol, total triglycerides, LDL cholesterol, HDL cholesterol, etc.), clinical lipidomics profiling provides a way more differentiated picture and provides patient stratification and risk assessment based on lipidomics profiles. Its utility will be demonstrated in profiling the platelet lipidome of CAD patients as well as for the research on the antiplatelet effects of a platelet ACKR3/CXCR7 agonist.

Abstracts and Biographies of Speakers

Prof. Dr. Nabila Hamdi

Biography:

Nabila Hamdi is Professor of Molecular Medicine and Pathology at the German University in Cairo, where she leads translational research at the intersection of genomics, neurodegeneration, and experimental pathology. After earning her medical degree in Tunisia and completing clinical training in Germany, she obtained her Ph.D. in Molecular Genetics Pathology in 2009. A committed advocate for international scientific collaboration, Dr. Hamdi has driven pioneering research on hepatitis C and, since 2012, on neurodegenerative diseases. Since 2017, she has focused on complex neuromuscular disorders—most notably amyotrophic lateral sclerosis— by integrating genomics, epigenetics, multi-omics approaches, bioinformatics, and AI-powered analysis to uncover population-specific disease mechanisms in Egypt. She has established a national neuromuscular research cluster and is leading the development of Egypt' s first ALS network, laying the foundation for sustainable, data-driven research and modern genetic therapies. Her strong international collaborations—particularly with Ulm University—have been supported by several DAAD and BMBF funds. In recognition of her contributions to academic exchange and scientific leadership, Dr. Hamdi was awarded the prestigious Hans Kupczyk Guest Professorship Award of Ulm University in 2024. She actively promotes capacity-building through regional training programs and conferences, with a strong focus on empowering women in biomedical research. [https://www.researchgate.net/profile/

Abstract:

Amyotrophic Lateral Sclerosis (ALS) is a complex neurodegenerative disorder characterized by significant clinical and genetic heterogeneity, highlighting the urgent need for precision approaches to diagnosis and management. This presentation will explore how genomic investigations are revealing population-specific variants in ALS, with a particular focus on Egyptian cohorts. By analyzing both familial and sporadic cases, our research has identified unique genetic patterns that contribute to regional disease burden and offer critical insights into ALS pathogenesis. In parallel, our studies on microRNA expression have uncovered inter-population regulatory differences, further elucidating mechanisms of disease and supporting the development of novel biomarkers. We propose a multi-omics framework—integrating genomics, epigenomics, and metabolomics—powered by artificial intelligence to better understand the complex landscape of ALS. This approach aims to support therapy readiness by identifying genetically stratified subgroups of patients who may benefit from targeted treatments. Our work is embedded in a growing transnational research network, particularly with Ain Shams University and Ulm University, and emphasizes the importance of sustainable, collaborative infrastructures. The German University in Cairo (GUC) serves as a key hub for this initiative, facilitating genomic research, capacity building, and innovation in neuromuscular medicine. Together, we are advancing toward more equitable, locally informed, and globally relevant precision care for ALS patients.

Abstracts and Biographies of Speakers

Dr. Manar Mansour

Biography:

Manar Mansour, PhD, is an Assistant Professor and Research Group Leader in the Pharmaceutical Biology and Microbiology Department, Faculty of Pharmacy and Biotechnology, at The German University in Cairo. During her journey as a researcher, Dr. Mansour characterized a novel gene that functions as a cytoplasmic biosensor of light and oxygen in the bacterium Rhodospirillum rubrum. In addition to her research on bacterial signalling pathways, Dr. Mansour has also investigated the potential of using Salmonella bacteria as a delivery vector for anti-tumor proteins and peptides in cancer gene therapy approaches. Currently, her research predominantly focuses on the field of diagnostic and prognostic biomarkers in cancer, with a particular emphasis on mesothelioma, a rare and aggressive form of cancer. [https://www.researchgate.net/profile/Manar-Mansour-3]

Abstract:

Biotechnology plays a crucial role in modern diagnostics by enabling the identification and analysis of long non-coding RNAs (lncRNAs), which serve as important biomarkers for various diseases. The ability to detect lncRNAs not only enhances disease diagnostics but also aids in understanding disease mechanisms and developing targeted therapies. The identification of reliable diagnostic and prognostic biomarkers is crucial for improving early detection and guiding personalized treatment of cancer. Mesothelioma, an aggressive cancer with a poor prognosis. While current approaches to mesothelioma diagnosis and monitoring are limited, recent research has highlighted the potential of long noncoding RNAs (lncRNAs) as a novel class of blood-based biomarkers that could revolutionize mesothelioma management. LncRNAs have emerged as promising biomarkers due to their unique expression patterns in various cancer types. We will explore the significance and clinical utility of plasma-derived lncRNA biomarkers for mesothelioma. An overview of the latest scientific evidence will highlight the promise of plasma lncRNA biomarkers to transform early detection and treatment monitoring for mesothelioma patients. Identifying these innovative clinical tools could lead to improved outcomes and quality of life for those affected by this devastating disease.

Abstracts and Biographies of Speakers

Dr. Mohamed Hamed

Biography:

Dr. Hamed is an Associate Professor of Biomedical Informatics and Computational Biology at the German University in Cairo (GUC). He also leads the Integrative OMICs Analysis Group at the Rostock University Medical Center in Germany and previously directed computational biology initiatives in cancer immunology and immune modulation within one of Europe' s leading pharmaceutical companies. He serves as the director of the German-Egyptian university partnership projects EG-CompBio and GED-PerMedAI, both of which aim to strengthen bioinformatics and computational biology capacity in the MENA region. Additionally, Dr. Hamed coordinates the German-Arab Research Network for Computational Life Science (GARN-CLS), fostering collaborative research between German and Arab institutions. Dr. Hamed brings a multidisciplinary background that spans biomedical informatics, molecular biology, computer science, and high-throughput data analysis. His research focuses on biomedical data science, biological data integration, and the development of integrative bioinformatics methods for precision medicine. Key areas of interest include systems biology, computational immunology, drug combination prediction, radiogenomics, and AI-driven analysis of multi-omics data. Dr. Hamed is an active member of the International Society for Computational Biology (ISCB) and has been recognized with several academic fellowships, including awards from the German Academic Exchange Service (DAAD), as well as securing multiple research and mobility

Abstract:

The integration of computational methods into drug discovery has revolutionized the field, enabling faster and more precise development of novel therapeutics. This talk presents a focused overview of how bioinformatics and chemoinformatics are driving innovation across in the area of discovery research. From a bioinformatics perspective, the availability of large-scale omics data, such as genetics, transcriptomics, and proteomics, combined with systems biology tools has advanced our ability to identify and validate novel drug targets. Computational approaches are now central to biomarker discovery, patient stratification, and drug repurposing, especially through the use of AI and machine learning models that can uncover hidden patterns in complex biological data. In parallel, chemoinformatics offers powerful tools for the design and optimization of small molecules. Techniques such as molecular docking, QSAR modeling, and virtual screening significantly reduce the time and cost of hit identification and lead optimization. Recent developments in generative deep learning models have further enhanced the ability to design novel compounds with desired properties, including improved bioactivity and reduced toxicity. The talk will illustrate how these two domains converge to accelerate drug development through interdisciplinary computational methods as well as AI-driven approaches. Case studies and recent applications will also be presented, along with the growing importance of model interpretability, multi-modal data integration, and deep learning-based fusion approaches in translating computational predictions into clinical outcomes.

Abstracts and Biographies of Speakers

Dr. Sara Hegy

Biography:

Dr. Sara Hegy is the founder and Managing Director of GenX Leadership Academy, a Berlin-based coaching and leadership development company. An award-winning scientist turned leadership expert, she has published in the world' s top scientific journal: Nature and led the development of her project that secured a $2.7 million USD grant from the NIH. Originally from Egypt, Dr. Hegy brings a powerful story of resilience and growth as an expat in Germany—using coaching, mindset work, and education to overcome challenges and enable leaders worldwide to create extraordinary results in management, innovation, and STEM industries. Her work has earned her multiple awards in both science and leadership.

Abstracts and Biographies of Speakers

Prof. Dr. Amira Abdel Motaal

Biography:

Prof. Dr. Amira Abdel Motaal earned her PhD from the Faculty of Chemistry and Pharmacy, Eberhard Karls University, Tübingen, Germany in January 2006. She is currently the Dean of the Faculty of Pharmacy, Galala University, and member of the Pharmaceutical Sector Committee in the Supreme Council of Universities, Egypt. She is the current President of the DAAD Alumni Association in Egypt (DAV) located at DAAD, Cairo office, Zamalek.

Dr. Abdel Motaal was the chairman of the Pharmacognosy Department, at Cairo University, King Khalid University, KSA, and the Pharmaceutical Biology Department at the German University in Cairo (GUC). She participated in grounding the Faculty of Pharmacy and Drug Technology, Heliopolis University in 2012, where she acted as a vice dean and head of the Pharmacognosy Department. She was the head of the Research and Development Department at Atos Pharma, SEKEM, for eight years.

She participated in establishing the Egyptian Guidelines for the Registration of Herbal Medicine at the Egyptian Drug Authority (EDA).
https://www.edaegypt.gov.eg/media/mxznpnos/egyptian-guidelines-for-registration-of-herbal-medicines.pdf

She was a member of the Scientific Committee for Dietary Supplements Registration, Ministry of Health and Population for almost10 years. She is a member of the international Society of Medicinal Plant and Natural Product Research (Gesellschaft fuer Arzneipflanzen- und Naturstoff- Forschung) since 2012.

Abstracts and Biographies of Speakers

Dr. Amira Metwaly

Biography:

Dr. Amira Metwaly is an accomplished microbiologist with a decade of expertise in gut microbiota, inflammatory bowel disease (IBD), and translational research. She has a proven track record of high-impact publications in Nature Gastroenterology & Hepatology, Nature Communications, Cell Host & Microbe, and The Lancet. Her work bridges disciplines and borders, fostering collaborations across Germany, Egypt, and beyond.

Currently a postdoctoral scientist at the Technical University of Munich (TUM), Dr. Metwaly leads the DAAD-funded GEM-CAP project, focused on building microbiome research capacity between Egypt and Germany. She has been recognized with prestigious awards including from UEG, DAAD, and the Singapore A*STAR Pre-graduate Program.

Dr. Metwaly is also an advocate for inclusive science and global knowledge exchange. She actively contributes to public engagement through initiatives such as Frontiers for Young Minds, Fondazione Prada, and Pint of Science, making complex science accessible to diverse audiences.

Deeply committed to empowering future leaders, especially women in STEM, Dr. Metwaly plays an active role in training and mentoring programs that support the next generation of researchers across the Global North and South.

Abstracts and Biographies of Speakers

Dr. Floriane Eshak

Biography:

Floriane Eshak graduated from the German University in Cairo (GUC) with a degree in Pharmacy. She then pursued her master' s in in silico Drug Design, earning her degree from Université de Caen Normandie and the University of Paris Diderot. In 2023, she obtained her PhD from Université Paris Cité with a thesis entitled "Nanobodies Targeting mGlu Receptors for Innovative Treatment of Schizophrenia," under the supervision of Dr. Francine Acher and Dr. Anne Goupil.

During her PhD, Floriane presented her work at more than 20 international conferences across Europe, winning several oral communication and poster prizes. Following her PhD, she worked as a postdoctoral researcher at Dassault Systèmes in Boston, where she evaluated the accuracy of recent AI-based predictive algorithms, such as the Nobel Prize-winning AlphaFold.

In December 2024, Dr. Eshak was awarded a prestigious prize from la Chancellerie des Universités de Paris for the excellence of her PhD thesis in Pharmacy, becoming the first Egyptian to receive this award.

Abstracts of Posters and Oral Presentations by Junior Researchers

Prof. Ahmed Abdelaziz

German University in Cairo, 11835 New Cairo, Egypt
German international University, New Administrative Capital, Egypt

Ahmed Abd El Aziz, Ahmed Wahby, Anke Klingner, Meryem Tolba, Khaled Tolba, Ahmed Karsoun

Abstract:

3D printing of agricultural residues: Materials development and innovation

3D printing is a general term for different processes that share the same principle of making three dimensional objects from a digital file by laying down material in layers under computer control. Liquid Deposition Modeling (LDM) is one of these processes that is based on the extrusion of paste materials.The study encompasses the comprehensive modeling and validation of liquid deposition 3D printing parameters, with a particular emphasis on material properties, printing parameters, and environmental impact. The research aims to address the pressing need for eco-friendly alternatives in additive manufacturing by repurposing agricultural waste materials into functional, cost-effective, and sustainable printing substrates. The study involves paste preparation, printing process, extruder design and evaluation the for 3D printed objects physically and mechanically. The study results should create a foundation for a subsequent commercial use of this innovative additive manufacturing process for producing eco-friendly consumer goods. Several agriculture residues have been used, rice, wheat, date palms, bagasse, where as paste has been prepared and printed. The mechanical stability and shrinkage are dependent on the type of agricultural residues and the grain size of the powder.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Abeer Desouky

Plant Biotechnology Department, Biotechnology Institute, National Research Center (NRC).

Abstract:

Nanoparticle-Induced Modulation of Indole Alkaloid Pathways and Gene Expression in Catharanthus roseus Hairy Roots and Tissue Cultures

Catharanthus roseus (L.) G. Don, a member of the family Apocynaceae, is an important medicinal plant rich in alkaloids, several of which exhibit pharmacological properties. This study aimed to achieve a stepwise enhancement of terpenoid indole alkaloid (TIA) production-specifically catharanthine (cath.), vincristine (vinc.), and vinblastine vinbl.)—in C. roseus through sequential stages including callus culture and hairy root induction (HR) using Agrobacterium Rhizogenus, followed by treatment with various concentrations of ZnO and chitosan (CH) nanoparticles (NP) in two types of culture systems; solid and liquid media as a potential source for the synthesis of natural compounds. Moreover, the expression profile of some related regulatory genes was investigated. Stem-derived callus and two hairy roots lines (L1 induced by strain K599/p35SGFPGUS+ and L2 induced by disarmed K599) were stimulated by 50 and 100 mg/l of ZnO-NPs and CH-NPs. The study showed no significant effect of NPs on the fresh weight (FW) of callus compared with control, except with the treatment with CH-NPs at the concentration of 100mg/l which had negative impact on the growth of the callus growing on solid medium. The fresh weight (FW) of the suspension culture showed a positive response only to the treatment with 50 mg/L ZnO-NPs. In contrast, treatments with CH-NPs resulted in decreased FW. The data of the dry weight (DW) was constant with the data of FW. The obtained data from hairy roots showed that the highest FW and DW of the hairy roots were observed with the treatment with Zn-O NP at concentration of 100 mg/l after 4 weeks of culture on either solid or liquid culture. HPLC analysis revealed that field-grown plant leaves had the lowest alkaloid levels of vinc and vinbL compared with L1 hairy roots grown on solid medium. However, cath. and vinc were significantly higher in the stem-derived callus grown in solid medium. The elicitation of the hairy roots grown in liquid medium resulted in vary results. Cath. was significantly enhanced by elicitation with 100 mg/l CH-NPs. Vic. was enhanced by the elicitation of 100 mg/l ZnO-NPs. On the other site vinbl was enhanced by CH-NPs at a concentration of 50 mg/l. However, on the HRs grown on solid media only the elicitation with CH-NPs at concentration of 100 mg/l elevated the Cath. with no elevation with vinc and vinbl. With regard to the elicitation of callus grown on solid medium resulted in enhancement of vinc was achieved with all type and concentration of the NPs especially with ZnO-NPs at 50 mg/l. cath. and vinbla were enhanced with 100 mg/l ZnO NPs. With regard to the callus suspension culture, vinc. was enhanced by the elicitation with ZnO NPs and 50 mg/l CH-NPs. The highest elicitation was obtained with the treatment with CH-NPs at 50-mg/l. Cath. was enhanced only with CH-NPs at 50 mg/l. On the other site, no enhancement with vinbl was obtained. Gene expression analysis confirmed that the elicitation treatments modulated the expression of STR, DAT, PRX1, and SLS, aligning with the observed biochemical outcomes. Overall, the findings suggest that ZnO and chitosan nanoparticles may exhibit synergistic or complementary effects, serving as effective elicitors for enhancing TIA biosynthesis in C. roseus hairy root and callus culture systems. These results underscore the potential of nanoparticle-based strategies for improving the in vitro production of medicinal alkaloids.

Abstracts of Posters and Oral Presentations by Junior Researchers

Mr. Ahmed R. Elaraby [PhD Student]

Pharmaceutical Chemistry Department, Faculty of Pharmacy, Sinai University, Kantara Branch, Ismailia, Egypt. Pharmaceutical Chemistry Department, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt

Abstract:

Enhancing the success rate of structure-based virtual screening against KRAS G12D. A benchmarking study using DEKOIS2.0

The KRAS G12D mutation is a critical oncogenic driver in pancreatic cancer, presenting a challenging yet promising target for drug discovery. This study aims to enhance the effectiveness of structure-based virtual screening against KRAS G12D by benchmarking three widely used molecular docking tools—FRED, PLANTS, and AutoDock Vina—using a rigorous DEKOIS 2.0 decoy set. Active compounds were collected from BindingDB and drug patents, while decoys were generated following DEKOIS 2.0 guidelines. The performance of each docking tool was evaluated using pROC-AUC and Enrichment Factor (EF1%) metrics. Results demonstrate that all three tools surpassed random performance, with FRED emerging as the most effective, achieving a pROC-AUC of 2.04 and an EF1% of 30.28. These findings underscore the importance of thorough benchmarking in virtual screening workflows and support the use of FRED as a superior docking tool for identifying potent KRAS G12D inhibitors. Ongoing validation efforts aim to further confirm the robustness of these conclusions.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Ayatollah Samir El-Zayat

Dept. of Microbiology, Faculty of Agriculture, Cairo Univ., Giza 12613, Egypt

Abstract:

The Power of Omics: From Microbial Diversity to Evolution-Proof Antimicrobials

The word omics derives from the suffix "-ome," rooted in the Greek word meaning "whole" or "all parts." It refers to fields of biological study that end in "-omics," such as genomics, transcriptomics, proteomics, and metabolomics. Omics technologies have become deeply integrated across biological disciplines, spanning human, animal, plant, environmental, and microbial disciplines. These multi-omics approaches provide powerful insights into the genomic composition, metabolic potential, and functional activity of complex microbial communities. In microbial ecology, the advent of high-throughput sequencing has uncovered an astounding level of microbial diversity and ubiquity in environmental samples. not only identifying who is there and what they do, but also enabling the realization that a major limitation exists: only a small fraction of microorganisms identified through sequencing can be cultured using traditional methods. This gap between observable and cultivable microbes has driven the emergence of culturomics, a high-throughput, innovation-driven approach to grow and study previously unculturable microbes. In light of the escalating threat posed by the evolution of antimicrobial resistance (AMR), the development of new evolution-proof antimicrobials has become an urgent priority. Antibiotics are increasingly classified as "emerging contaminants" due to their widespread presence in both aquatic and terrestrial environments, where they exert sublethal yet ecologically significant effects. These pharmaceuticals, originating from human and veterinary applications, infiltrate ecosystems through multiple pathways, subtly altering the composition and structure of the plant-soil microbiota. To comprehensively understand the mechanisms driving the emergence of the antibiotic resistome, evolutionary pressures in microbial communities, and how microbes acquire and transfer resistances, integrative omics approaches should be applied to investigate the AMR-evolved bacterial populations. These cutting-edge technologies provided comprehensive insights into the transcriptomic and genomic alterations associated with antibiotic resistance evolution. By bridging microbial diversity, evolutionary insight, and therapeutic innovation, the integration of omics and culturomics holds a promise for shaping a more sustainable and resilient future in healthcare and biotechnology.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Dina Hady Aboushady

Pharmaceutical Chemistry Department, Faculty of Pharmacy and Biotechnology at the German University in Cairo (GUC)

Abstract:

Implementing Quality by Design (QbD) for Enhancing Quality Assurance in Pharmaceutical Analysis

Quality by design (QbD) is a proactive approach to ensure product quality by identifying, explaining, and managing sources of variability throughout the product development and manufacturing lifecycle. The study employed a Quality-by-Design (QbD) approach to develop and optimize an enantioseparation method using chiral mobile phase additives (CMPAs) in reversed-phase ultra-high-performance liquid chromatography (UHPLC). A systematic Design of Experiments (DoE) strategy was applied; a Plackett–Burman screening design was used to evaluate six key chromatographic parameters. The responses measured were selectivity factor (α) and retention time (tRLast). Multivariate regression modeling and response surface analysis were subsequently used to define optimal conditions that achieved high enantioselectivity with minimal retention time. Among the CMPAs, Hydroxypropyl-β-cyclodextrin (HP-β-CD) showed the most effective separation performance for the analyte of interest. However, the method exhibited limited robustness when switching between different CMPAs, highlighting the need for sufficient column conditioning—and flushing the column with at least 16 column volumes of achiral mobile phase. Moreover, computational molecular modeling was implemented to support the experimental findings and revealed the mechanism of chiral recognition. The study demonstrated the effectiveness of QbD tools in improving method reliability and understanding, offering a cost-efficient and flexible alternative to chiral stationary phases for enantioseparation in pharmaceutical quality control.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Eman Ahmed Hafez

Pharmaceutical Chemistry Department, Faculty of Pharmacy and Biotechnology at the German University in Cairo (GUC)

Abstract:

Synthesis and Application of Molecularly Imprinted Polymers for Extraction of Ethinyl Estradiol from Water Samples

Endocrine disrupting chemicals are a class of compounds that can act directly on the endocrine system, being able to block or imitate the natural hormones' action. They have received great attention in recent years due to the increase in the domestic, commercial, and industrial use of these chemicals, increasing their levels in water resources. Many negative environmental and health effects of these chemicals have recently emerged. Ethinyl estradiol is one of the synthetic estrogenic steroids that was reported to be found in the environment as one of the endocrine disruptors. It is more resistant to biodegradation compared to the natural beta estradiol, and its accumulation in the environment is easier. Although the reported concentrations of ethinyl estradiol in global waters are low (ng L-1), it can have serious effects on human health if allowed to accumulate in the environment above the safe thresholds and enter the food chain. The Nile River is the world' s most steroid-polluted river due to the population growth and the inefficient wastewater treatment processes currently adopted. This work aimed at synthesizing molecularly imprinted polymers for the selective removal of ethinyl estradiol from water samples. Eight polymers were synthesized by the precipitation polymerization method using methacrylic acid and 4-vinylpyridine as functional monomers and ethinyl estradiol as the template molecule in different ratios. MIP IV with a template to monomer (Methacrylic acid) to crosslinker ratio of 1:4:20 showed the highest binding performance and a high imprinting factor of 2.2. Molecularly imprinted solid-phase extraction using MIP IV as a sorbent was then applied for the removal of ethinyl estradiol from water samples, including river Nile water samples. High recovery of 89.75%–94.56% was achieved for different spiked water samples. The UPLC-MS/MS method was optimized, validated, and used for the quantification of ethinyl estradiol. The method has revealed linearity in the range of 0.004-2.3 µg/ml with low LOD (0.004 µg/ml) and low LOQ (0.008 µg/ml). Prior to analysis, ethinyl estradiol in sample and standard solutions was first derivatized using dansyl chloride as a derivatizing agent. The ethinyl estradiol dansyl derivatives were readily ionizable under positive electrospray ionization with high-intensity peaks in low concentration ranges compared to ethinyl estradiol peaks without derivatization.

Abstracts of Posters and Oral Presentations by Junior Researchers

Ms. Mai Mostafa [PhD Student]

Technische Universität Braunschweig, German University in Cairo

Abstract:

Novel GC MS/MS method for Bioanalysis of PQQ

Phenolic compounds have a neuroprotective effect in diseases of cognitive impairment. Pyrroloquinoline quinone (PQQ), an aromatic water-soluble quinone enhances cognitive function in vivo, as previously demonstrated by our research group. In an attempt to comprehend the mechanism of action, development of a bioanalytical method for PQQ in brain matrix was essential to investigate blood-brain barrier (BBB) permeability for the drug and/or its metabolites. This study documents a novel fast GCMS/MS method for bioanalysis of PQQ in mice brains following a novel derivatization reaction of this drug. A simple extraction methodology using a single solvent highlights the sustainability and greenness of our sample preparation protocol. Method validation and quantitative analysis of PQQ as an intact molecule in mice brain homogenates were done using novel qualifier and quantifier ions of the silylated drug for the first time. We report BBB permeation to PQQ in an induced neuroinflammation mouse model in addition to its sulfate metabolite following intraperitoneal injection. Interestingly, PQQ was detected in the brains of control mice on a standard diet containing soybeans. In silico prediction suggests the involvement of P-gp in active transport of PQQ across the BBBwhere the drug appears to be an excellent substrate and inhibitor. Pharmacokinetic analysis in the brain revealed tmax as 2 h. Our optimized extraction method, as well as the GC–MS/MS method, can be used to quantify levels of PQQ in various matrices, opening the door to many other studies on this polyphenol. Moreover, we recommend the use of PQQ as a co-treatment in cognitive impairment diseases.

Abstracts of Posters and Oral Presentations by Junior Researchers

Ms. Mariam soliman [PhD Student]

Faculty of Pharmaceutical Engineering and Technology, The German International University in Cairo, Egypt

Abstract:

Computational Tools for Sustainable Bioanalysis

The COVID-19 pandemic exposed critical limitations in traditional laboratory diagnostics. driving the urgent need for portable, accurate, and scalable bioanalytical tools. To address this, the WHO' s ASSURED guidelines serve as a gold standard for point-of-care (POC) diagnostics, yet many existing technologies fall short, particularly in affordability and stability. In this work, we present a paper-based microfluidic platform that utilizes molecularly imprinted polymers (MIPs) to immobilize glucose oxidase (GOx) for glucose detection. The microfluidic device is fabricated using cost-effective cellulose paper, which naturally wicks fluids via capillary action, eliminating the need for external pumps or power sources. Laser printing enables rapid and precise patterning of hydrophobic barriers to define fluidic channels, allowing controlled sample and reagent flow within a compact, disposable setting. To enhance MIP development, computational methods were utilized to evaluate various monomers for optimal selectivity and sensitivity prior to experimental validation. Subsequently, the synthesized MIPs with immobilized enzyme were integrated onto the paper substrate to detect glucose, creating enzyme-friendly binding sites that Significantly improve enzyme stability by protecting GOx from denaturation and leaching during assays. This immobilization not only preserves enzymatic activity over extended storage periods but also enhances reproducibility compared to free enzymes in solution. Colorimetric detection is achieved through an enzymatic reaction producing a colored product, which is quantified by analyzing scanned images for gray value intensity, directly correlating with glucose concentration in the tested sample. This integrated approach offers a low-cost, user-friendly, and robust platform aligned with ASSURED criteria, advancing accessible diagnostics for decentralized healthcare settings.

Abstracts of Posters and Oral Presentations by Junior Researchers

Ms. Mayada Mahdy kelany Ibrahim

Helwan University

Abstract:

GWAS identifies novel loci linked to seedling growth traits in highly diverse barley population under drought stress

Climate changes refer to long-term shifts in temperature and weather patterns that may cause drought, one of the major stresses hindering seed germination, plant growth, and crop productivity. Barley (Hordeum vulgare L.) is considered one of the most drought-stress-tolerant cereals and may be used for elucidating genes for drought tolerance at seed germination and seedling stages that would pave the way toward improving the performance of all cereals. The current study was performed at IPK-Gatersleben (Germany) in 2023. Our aim was to explore the genetic basis of germination and seedling traits under drought stress (20% PEG6000 treatment) in a 198 global spring barley collection genotyped with 38,632 SNPs via Genotyping by Sequencing (GBS). The drought treatment significantly reduced the seed germination parameters and seedling traits in the genotypes of a global barley collection. Drought tolerance indices (DTI) for the measured germination and seedling traits indicate delayed and lower germination speed under drought stress than the control. The shoot fresh weight was the most affected trait, with a DTI of 37.4, followed by the seedling fresh weight SDLFW (DTI = 46.3) and root fresh weight (DTI = 47). In contrast, the root length DTI was the least affected trait by drought (78.2), followed by RDW DTI (72.8). GWAS was conducted using single-locus (CMLM) and multi-locus models (MLMM, Farm-CPU, BLINK), with significant marker-trait associations determined at -log10 (1.29E-06) ≥ 5.88. In our present study, we identified 79 highly significant SNPs distributed across the seven barley chromosomes related to the germination and seedling growth parameters under both control and drought conditions. Gene annotation of these highly significant SNPs revealed that 35 SNPs were in the exonic regions of genes that play roles in important plant biological and physiological processes. Further analysis exhibited 35 high-confidence candidate genes influencing barley germination and seedling growth under control and drought conditions. These genes represent promising targets for breeding and genetic enhancement efforts to improve drought tolerance in barley, potentially extending these benefits to other cereal crops.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Nadia M. Sharaf

Department of Pharmacology & Toxicology, Faculty of Pharmacy & Biotechnology, German University in Cairo, Cairo, Egypt

Abstract:

Harnessing Green Pharmacology: Epigallocatechin Gallate for Epigenetics Reversal of Cardiac Hypertrophy in Diabetic Cardiomyopathy

Cardiac hypertrophy, a primary structural abnormality in Diabetic Cardiomyopathy (DCM), is linked to phosphorylated extracellular signal-regulated (p-ERK1/2) activation. Dual specificity phosphatase 5 (DUSP5) inactivates p-ERK1/2, while histone deacetylases (HDACs) regulate gene expression. Epigallocatechin-3-gallate (EGCG), a prominent catechin in green tea, has cardioprotective properties, but its role as an epigenetic modifier in DCM-related cardiac hypertrophy is unknown.
To investigate EGCG' s epigenetic effects as an HDAC3 inhibitor in attenuating cardiac hypertrophy by targeting the DUSP5-ERK1/2 signaling pathway. Additionally, we evaluated its prophylactic and therapeutic efficacy on structural and functional cardiac dysfunction in an induced DCM rat model.
A Type 2 Diabetes Mellitus (T2DM) rat model was established in Wistar rats (n=60) with streptozotocin (STZ) and a high-fat diet. Rats were divided into control, diabetic, and EGCG/VPA pre-treated or treated groups. Cardiac function (echocardiography), metabolic profiles, oxidative stress, cardiac injury markers, histopathology, CD44 (marker of cardiac hypertrophy), and gene/protein expression (HDAC3, DUSP5, Brain natriuretic peptide (BNP), nuclear p-ERK1/2) were assessed.
Both EGCG pre-treatment and treatment significantly attenuated cardiac hypertrophy. This was associated with downregulation of HDAC3 gene and protein expression and upregulation of DUSP5 gene and protein expression, leading to decreased activation of nuclear ERK1/2. Reductions in heart weight to body weight (HW/BW) ratio, CD44 immunoexpression, and BNP gene expression supported these findings. EGCG also improved metabolic abnormalities, reduced myocardial oxidative stress and injury, and preserved cardiac function and architecture.
EGCG demonstrates potential as an epigenetic modifier of cardiac hypertrophy in this DCM rat model, likely by modulating the DUSP5-ERK1/2 signaling pathway. These findings suggest EGCG could be a valuable complementary supplement for diabetic patients for both the prophylaxis and treatment of DCM, with prophylactic intervention exhibiting more pronounced effects in reversing cardiac remodeling.

Abstracts of Posters and Oral Presentations by Junior Researchers

Ms. Noha Sherif [PhD Student][M.Sc.]

Department of Pharmaceutical Biology, Faculty of Pharmacy and Biotechnology, German

Abstract:

Modulatory impact of wheat metabolome on Wnt/β-catenin signaling pathway in an obesity-induced rat model

Wheat ranks among the most important cereal grains worldwide. This study investigated how lipophilic extracts (200 mg/kg/day) from six different wheat growth stages influence the Wnt/β-catenin signaling pathway in an obesity-induced rat model through evaluation of key biomarkers, including Wnt 3a, CCAAT/enhancer Binding Protein-α, and fatty acid synthase via RT-qPCR, as well as β-catenin and glycogen synthase kinase 3β through western blotting. The inflammatory marker leukotriene B4 was measured via ELISA, alongside evaluation of liver and lipid profiles. Metabolomic profiling of extracts was conducted using gas chromatography-tandem mass spectrometry, which led to 122 compounds being annotated. Unsupervised statistical analysis techniques, including principal component analysis and hierarchical cluster analysis, revealed three distinct clusters: one consisting of germ, bran, and grain; a second comprising aerial parts from stages 1 and 3; and a third representing the aerial part from stage 2. Phytochemicals were correlated with β-catenin activation, a central component of the Wnt/β-catenin pathway, through supervised analysis using partial least squares discriminant analysis, leading to VIPs annotation. All extract-treated groups exhibited a significant improvement in biomarker levels compared to the high-fat diet control group, indicating the anti-obesity effects, with wheat germ and bran being the most effective. This study is the first to report the potential of lipophilic extracts from different wheat growth stages to activate the Wnt/β-catenin pathway while also providing a metabolomic signature of these extracts.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Ragwa Mansour Abdelghany Hamed

Department of Pharmacology and Toxicology, Faculty of Pharmacy and Biotechnology, German University in Cairo, Egypt

Abstract:

Integrating Pharmacovigilance into the Drug Discovery Pipeline Advancing Safety from Discovery to Delivery,

Pharmacovigilance (PV) is a vital scientific discipline that supports the detection, assessment, understanding, and prevention of adverse drug reactions and other drug-related problems. While historically regarded as a post-marketing activity, PV is now recognized as an essential component throughout the entire drug development lifecycle. Its integration from early discovery through clinical trials to post-approval monitoring is critical for optimizing patient safety, public health, and therapeutic outcomes. Traditional drug development has emphasized efficacy and pharmacologic performance in early stages, often delaying comprehensive safety assessments. However, the increasing complexity of modern therapeutics, including biologics, gene therapies, and accelerated development programs, necessitates proactive and continuous PV strategies. Early identification of unknown or rare safety issues, quantification of risk, and recognition of contributing factors are fundamental to mitigating harm and maximizing clinical benefit. Effective PV systems also inform decision-making for healthcare providers and pharmaceutical stakeholders, reduce the likelihood of regulatory setbacks, and help prevent costly market withdrawals. Furthermore, as clinical research becomes increasingly globalized, harmonized PV standards are essential to ensure consistent and accurate safety reporting across regions. This presentation outlines a comprehensive framework for embedding PV practices across all stages of drug development, thereby enhancing regulatory compliance, patient safety, and confidence in therapeutic innovation.

Abstracts of Posters and Oral Presentations by Junior Researchers

Ms. Farida Hatem ElGamal [PhD Student]

Department of Pharmaceutical Chemistry, Faculty of Pharmacy and Biotechnology, German

Abstract:

Exploring novel and safer estrogenic options for postmenopausal women

This research project presents the design and synthesis of novel estrogenic compounds for topical use aimed at alleviating symptoms in postmenopausal women. With the goal of providing a safer alternative to traditional hormone replacement therapy (HRT), these compounds focus on improving skin health, particularly in the context of wound healing and anti-aging. The research explores the development of TAM analogs with potent estrogenic activity, leveraging computational in-silico modeling and studies to predict pharmacokinetics, permeation, release profiles, and stability. The project includes the synthesis of novel molecules through structural modifications of triphenylethylenes, targeting improvements in physicochemical properties and metabolic stability, specifically reducing rapid metabolism by CYP2D6. The design includes both in-vitro and ex-vivo formulation tests to assess skin permeability and stability. A topical dosage form, such as a skin-patch, will be developed to promote wound closure and skin regeneration. Ultimately, this project aims to deliver a safer and more effective topical estrogenic solution for postmenopausal women, enhancing their skin wellness and addressing the challenges of current hormone therapies.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Marwa S Khattab

Department of Pathology, Faculty of Veterinary Medicine, Cairo University,Giza,

Abstract:

Diacerein ameliorates amiodarone-induced pulmonary fibrosis via targeting the TGFβ1/α-SMA/Smad3 pathway

This study aimed at investigating the possible protective effect of diacerein (DIA) against AMD-induced pulmonary fibrosis in rats. Rats were classified into 4 groups: a normal group that received distilled water, a control group that received AMD (100 mg/kg, p.o.) for 21 days to induce pulmonary fibrosis, and 2 treatment groups that received diacerein in 2 dose levels (50 and 100 mg/kg, p.o., respectively) in addition to AMD (100 mg/kg, p.o.) for 21 days. Lung function was tested using a spirometer; serum and tissue were collected. Biochemical, real-time PCR, histopathological, and immunohistopathological analyses were carried out. AMD reduced tidal volume (TV), peripheral expiratory rate (PER), forced vital capacity (FVC), serum reduced glutathione (GSH) levels, Beclin, and LCII, while it elevated transforming growth factor (TGF-β1) gene expression, serum malondialdehyde (MDA) level, alpha-smooth muscle actin (α-SMA), Smad3, phosphorylated signal transducer and activator of transcription (p-STAT3), and p62 lung content. Also, AMD elevated tumor necrosis factor-alpha (TNF-α) and caspase-3 protein expression. DIA elevated TV, PER, FVC, serum GSH level, Beclin, and LCII, while it reduced TGF-β1 gene expression, serum MDA level, α-SMA, Smad3, p-STAT-3, and p62 lung content. Moreover, DIA reduced TNF-α and caspase-3 protein expression. DIA attenuated AMD-induced pulmonary fibrosis via alleviating the TGF1/α-SMA/Smad3 pathway, reducing STAT-3 activation, and combating oxidative stress and inflammation in addition to promoting autophagy and abrogating apoptosis.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr Mayar Waleed Aly

Affiliation: Department of Clinical Pharmacy, Faculty of Pharmacy and Biotechnology, German University in Cairo, Egypt

Abstract:

AI is significantly transforming how healthcare professionals deliver patient care and manage medications by introducing advanced tools that enhance accuracy, safety, and efficiency. A key application of this technology is in Clinical Decision Support Systems (CDSS), particularly in therapeutic drug monitoring (TDM). These AI-driven systems are designed to manage and optimize drug therapy, especially for medications with narrow therapeutic windows, such as lithium, vancomycin, and certain anticoagulants. By integrating patient-specific data—such as age, weight, renal and liver function, genetic profile, and potential drug interactions—AI algorithms can recommend precise and individualized dosage adjustments. This minimizes the risk of underdosing or overdosing, thereby reducing adverse drug reactions and improving therapeutic outcomes. Furthermore, AI-enhanced CDSS continuously update based on the latest clinical guidelines and real-world data, supporting clinicians in making informed, evidence-based decisions. Ultimately, AI in medication management not only prioritizes patient safety but also improves overall healthcare quality and promotes better long-term health outcomes.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr Salma Mokbel

Salma A. Mokbel1,2, Mohammad Abdel-Halim1, Mehmet Dinc3, Boris Mizaikoff3,4 and Nesrine A. El Gohary1.

Abstract:

Dexamethasone (DEX), a widely used anti-inflammatory drug, is also recognized as an endocrine disruptor capable of exerting toxicological effects at trace levels. This study is the first to report the detection of DEX in the River Nile. To address this environmental concern, we developed the first Magnetic Molecularly Imprinted Polymer (MMIP) tailored for DEX extraction, using biocompatible reagents and a green synthesis method aligned with green chemistry principles. Magnetite served as the core, and three monomers—aminopropyl triethoxysilane (APTES), dopamine, and 3-aminophenylboronic acid (APBA)—were evaluated. Comprehensive characterization was performed using Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Brunauer–Emmett–Teller (BET) and Barrett–Joyner–Halenda (BJH) methods, Energy-Dispersive X-ray spectroscopy (EDX), and X-ray Photoelectron Spectroscopy (XPS). Among the polymers, APBA-based MMIP demonstrated superior performance, achieving a recovery of 90.08% ± 7.25% for DEX in Nile River water. Additionally, a sensitive and accurate Ultra Performance Liquid Chromatography–Tandem Mass Spectrometry (UPLC–MS/MS) method was developed and validated according to International Council for Harmonisation (ICH) guidelines. The method exhibited excellent linearity (R^2 = 0.9997), low Limit of Detection (1.11 × 10□⁷ M), and Limit of Quantification (3.72 × 10□⁷ M). Recovery ranged from 93.39% to 111.68%, with relative standard deviations between 0.02% and 3.43%. The integration of green-synthesized MMIPs with UPLC–MS/MS provides a robust, efficient, and environmentally friendly strategy for monitoring pharmaceutical contaminants in aquatic ecosystems.

Abstracts of Posters and Oral Presentations by Junior Researchers

Aya Ismail Abdelaziz

Researcher in Research and Development Department, 'Faculty of Pharmacy, Heliopolis University

Genetic Polymorphisms and Expression Profiles of IL28B and FOXP3 Predict Response to Direct-Acting Antivirals in Chronic Hepatitis C Patients

Aya I. Abdelaziza [a] , Eman Abdelsameeab [b], Mohamed Abdel-Samieeb [b], Samar E. Ghanem[c], Sara A. Wahdand [d], Doaa Elsherbinyd [d], Zeinab Zakariaa [a] and Samar S. Azabd [d]

a Research and Development Center, Faculty of Pharmacy, Heliopolis University for Sustainable Development, Cairo, Egypt
b Department of Hepatology and Gastroenterology, National Liver Institute, Menoufia University, Shebin El-Kom, Egypt
c Department of Clinical Biochemistry and Molecular Diagnostics, National Liver Institute, Menoufia University, Shebin El-Kom, Egypt
d Department of Pharmacology and Toxicology, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt.

Abstract:

Despite the success of direct-acting antivirals (DAAs) in treating chronic Hepatitis C virus (HCV) infection, the impact of host immunogenetic factors on treatment outcomes remains an active area of research. While polymorphisms near the interleukin-28B (IL28B) gene have been linked to DAA responsiveness, the influence of forkhead box P3 (FOXP3) gene variants has not been thoroughly investigated. This study aimed to assess the effect of single nucleotide polymorphisms (SNPs) in the promoter regions of IL28B and FOXP3 genes on treatment outcomes in Egyptian HCV patients. A total of 162 HCV-infected individuals treated with DAAs were included, consisting of 99 patients who achieved sustained virologic response at 12 weeks (SVR12) and 63 non-responders. IL28B rs12979860 was genotyped using real-time PCR, while IL28B rs8099917, FOXP3 rs3761548, and rs2232365 were analyzed via RFLP-PCR. Serum levels of IL28B and FOXP3 were measured in representative patient subsets. The IL28B rs12979860 T>C and FOXP3 rs2232365 A>G polymorphisms were significantl associated with an increased risk of treatment failure. Responders showed higher IL28B, and lower FOXP3 serum levels compared to non-responders. Regression analysis confirmed that these genetic variants independently predicted treatment outcomes regardless of age or gender. A predictive model was developed with 76.2% sensitivity and 91.9% specificity for estimating DAA response in HCV patients. These findings emphasize the potential of IL28B and FOXP3 polymorphisms as predictive biomarkers for DAA therapy, offering opportunities for personalized treatment approaches in chronic HCV management.

Abstracts of Posters and Oral Presentations by Junior Researchers

Abdelgawad Mohamed (MSc/ PhD)

Reference Lab Analyst at Egyptian Drug Authority, Agouza, Giza 12654, Egypt

Abstract:

Stability-Indicating Comparative Study of Amoxicillin, Clarithromycin, and Vonoprazan Under Stress Conditions Using LC-MS/MS

The combination of Amoxicillin, Clarithromycin, and Vonoprazan is widely used for the eradication of Helicobacter pylori infections and treatment of related gastric disorders. Stability-indicating methods are essential for evaluating pharmaceutical compounds under stress conditions and for distinguishing active ingredients from their degradation products. This comparative study assessed the stability of these three drugs under five ICH-recommended stress conditions: acidic, basic, oxidative, thermal, and photolytic. Each drug was analyzed using LC-MS/MS to detect and characterization of degradation products with high sensitivity and specificity.Results showed that Amoxicillin and Clarithromycin were extensively degraded under most stress conditions. In contrast, Vonoprazan exhibited degradation only under thermal and basic stress, demonstrating superior stability in acidic, oxidative, and photolytic environments. These findings provide insights into the degradation behavior and relative stabilities of the tested drugs. Further work is ongoing to develop robust stability-indicating separation methods for each compound to support future formulation and quality control strategies.

Abstracts of Posters and Oral Presentations by Junior Researchers

Anke Klinger

Miniature robotic snake
Mohand Mohamed Galal Abdelrahman Mohamed, Mohamed Elwi, Anke Klingner

Abstract:

This work presents the development of a modular robotic snake, designed to replicate serpentine locomotion through a biologically inspired approach. The project explores the use of a sine wave-based actuation system, implemented in both a software simulation and hardware prototype, to achieve smooth, lifelike motion across multiple segments. The initial phase involved in-depth research on snake biomechanics, control strategies, and relevant mechatronic systems. A 2D schematic was developed to visualize the role of the Seeeduino XIAO ESP32S3 microcontroller in driving multiple servos, each responsible for articulated motion across alternating planes. This was followed by the creation of a physics-based 3D simulation using Webots and Python to test the locomotion algorithm in a controlled virtual environment. The simulation currently utilizes 13 motors and serves as a reference for real-world implementation. The robotic snake' s movement is governed by a sinusoidal function that incorporates phase offsets and amplitude modulation to replicate natural locomotion. While real-world testing is ongoing, the simulation results indicate smooth and continuous movement patterns. One of the key design challenges has been component miniaturization, particularly in sourcing a battery with a high enough discharge index in a sufficiently compact form. After extensive research, an appropriate battery was sourced, enabling the continuation of hardware development without compromising the project' s scale constraints. The work provides a foundational framework for future exploration into remote-controlled and autonomous snake robots. Applications may include search and rescue operations, pipe inspection, or terrain exploration where traditional wheeled robots are ineffective.

Abstracts of Posters and Oral Presentations by Junior Researchers

Dr. Liza Samir Samy Botros

Pharmaceutical Chemistry Department, Faculty of Pharmacy and Biotechnology, German University in Cairo

Abstract:

UHPLC Enantiomer Resolution for the α/β-Adrenoceptor Antagonist R/S-Carvedilol and Its Major Active Metabolites on Chiralpak IB N-5

Carvedilol (CAR), a racemic lipophilic aryloxy propanolamine, acts as a selective α-adrenoreceptor antagonist and a nonselective β-adrenoreceptor antagonist. CAR metabolism mainly produces three active metabolites: desmethyl carvedilol (DMC), 4′-hydroxy carvedilol (4′OHC) and 5′-hydroxy carvedilol (5′OHC). The oxidative S-(-)-metabolites contribute to the β-antagonistic effect, yet not to the α-antagonistic effect to be observed after drug dosage. Therefore, the three β-adrenoceptor blocking metabolites, which are structurally closely related to the parent CAR, are included into the development of a bioanalytical quantitative method for all major active species relevant with respect to adrenoceptor-blockade. Because of the given pharmacological profile, resolution of the enantiomers of carvedilol, of 4′- and 5′-hydroxy carvedilol as well as of DMC, is mandatory. The current study aims to determine the response surface for the enantiomer separation of the parent CAR as well as the major metabolites on a suitable chiral stationary phase.

Design of experiment approach (DoE) was utilized in an initial screening phase followed by central-composite design for delimitation of the response surface for resolution of the four enantiomeric pairs in least run time. The impact of chromatographic variables (composition and percentage of organic modifier(s), buffer type, buffer pH, flow rate) on critical peaks resolution and adjusted retention time was evaluated, in order to select the most significant critical quality attributes. On this basis, a robust UHPLC-UV method was developed and optimized for the simultaneous, enantioselective determination of CAR along with its major active metabolites (4′OHC, 5′OHC, and DMC) on Chiralpak IBN-5. The optimized UHPLC-UV method (which includes metoprolol as the internal standard) was validated according to the ICH M10 guidelines for bioanalytical methods and proven to be linear, precise, accurate, and robust. The validated assay was applied to plasma samples from cardiovascular patients treated with rac-CAR (blood randomly drawn at different times after oral CAR intake). In order to provide more insight into the mechanism of the enantiomer separation of CAR and its metabolites on the CSP, docking experiments were performed.

Molecular simulation studies suggest the chiral recognition to be mainly due to different binding poses of enantiomers of the same compound.

List of Participants

Humboldtian Speakers

Abdel-Fattah Badr	Helwan University
Alessandra Sussulini	Universidade Estadual de Campinas
Ashraf Abadi	German University in Cairo
Ashraf Mansour	Chairman of the Board of Trustees, German University in Cairo
Ebaa El-Hossary	Egyptian Atomic Energy Authority
Heba Handouusa	German University in Cairo
Mahmoud Mohamed Bahgat	Academy of Scientific Research & Technology
Moemen Sayed Hanafy	National Research Center
Mohamed Barakat	Tanta University
Mohamed Farag	Cairo University
Mohamed M. El-Fouly	National Research Center
Nadia Emam Ali El-Gamel	Cairo University
Odeku Oluwatoyin	University of Ibadan
Rasha Hanafi	German University in Cairo
Samar Azab	Ain Shams University
Sami Eldeeb	University of Braunschweig

Humboldtians

Abbas Yehia	National Research Center
Ahmed Fathy Darweesh Ramadan	Cairo University
Ahmed H. M. Elwahy	Cairo University
Ahmed Hamza Ali	Assiut University
Ahmed I. Khodair	Kafrelsheikh University
Ahmed Ihab	Newgiza University
Ashraf Farag El-Baz Hawas	University of Sadat City
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