



# Electrochemical biosensors — driving personalized medicine

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Personalization is everything nowadays; we can customize consumer products (T-shirts, phone cases, gifts, etc.) and get personalized recommendations on streaming services for movies, music, and so on. It is therefore not surprising that medicine and nutrition are fully taking root in this domain. We are privileged witnesses that the clinical management of patients is drastically changing from an approach based on general clinicopathological profiles to a personalized one that considers molecular alterations at the individual level, which is known as personalized medicine (PM). In addition to being a right for patients, PM can make a decisive contribution to making our lives longer and better and can play a key role in engaging us in our self-care. For society, it means a more rational use of resources and significant savings in healthcare costs and unnecessary effort and suffering.

PM is becoming increasingly important in multiple diseases, such as oncological and neurodegenerative diseases, the most important example of which is Alzheimer's disease, which involve many genetic disorders and unique molecular profiles.

Although PM is having a growing impact on research and healthcare, mainly in oncology patients, where it is contributing to higher survival rates, its implementation in egalitarian healthcare has a long road ahead. This path will be conditioned, among other things, by the development

and application of new technologies that allow the identification, validation, and determination of new biomarkers at multiplexed and/or multiomics levels in a decentralized, affordable and sustainable manner, a field in which electrochemical biosensing technology has much to say and offer.

Having first-hand knowledge of what cutting-edge electrochemical biosensing can offer in PM, we approached the preparation of this topical collection with tremendous enthusiasm. Our aim was to put even more focus on this subject of the highest and most timely relevance, through unique contributions from renowned researchers who share our concerns in this area. All of them lead research groups responsible for pioneering contributions, and from the moment we contacted them, they were compelled to participate in this project by providing unique contributions.

This is how this topical collection was born, which takes advantage of the opportunity and diffusion channels provided by the journal *Analytical & Bioanalytical Chemistry*, making visible some representative breakthroughs of the last few years in the field of electrochemical biosensing research to meet the needs in personalized healthcare. The collection comprises five review articles and three research articles (2 selected by the Editorial team of this journal as Paper in Forefront). These outstanding contributions focus on state-of-the-art bio-devices that have demonstrated pioneering and decisive capabilities for the determination of clinical biomarkers of different nature (proteins, point mutations, exosomes, metal ions, and antimicrobial compounds). They are applied to personalized medicine of both known diseases (cancerous, neurological, inflammatory, infectious, etc.) and those, like COVID-19, which may arise unexpectedly, turning our lives upside down. Designs implemented using nanomaterials, different bioreceptors, less conventional electrode substrates (paper, flexible, wearable), and electrochemical techniques (photoelectrochemistry) are included.

The versatility, rapid adaptation, and the groundbreaking advances that electrochemical biosensing approaches are constantly demonstrating to drive personalized medicine make us think that this topical collection is just a foretaste of the wonderful contributions we will witness in the near

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future. Much remains to be done on this subject, which, due to its relevance both at a scientific and social level, does not stop feeding back and is more awake than ever. We expect that the papers in this collection will serve as inspiration for further work to address new bioelectrochemical technologies that contribute to making personalized medicine a reality.

At this point, we must admit that we are flattered to be involved in this topical collection, and to belong to the Editorial Board of *Analytical & Bioanalytical Chemistry*. We are tremendously grateful to many people and for much. Firstly, to all the important scientists who have contributed (Dr. Jahir Orozco from Colombia, Dr. Mustafa Sezgintürk from Turkey, Dr. Cecilia Cristea from Romania; Dr. Martin Bartosik from the Czech Republic; Dr. Fabiana Arduini and Dr. Ilaria Palchetti from Italy, Dr. Damion K. Corrigan from the United Kingdom; and Dr. Alfredo de la Escosura-Muñiz from Spain); secondly to other great scientists who have participated in this TC judging these contributions as reviewers. Thirdly to the Editorial team of *Analytical & Bioanalytical Chemistry* and particularly to Maite Menes for her kind support with the management of this topical collection. Finally, to our dear María Cruz Moreno-Bondi, who proposed us as Guest Editors and to whom we would love to dedicate it.

We hope and trust that this topical collection will be to your liking and satisfy your expectations.

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