



AVVISO DI SEMINARIO

Il giorno 03/05/2024 alle ore 10.00

nell'aula Seminari

Il Prof. ***ALBERTO ESCARPA***

terrà un seminario dal titolo

“Micromotors in action: smart microsensors swimming in a concept or a futuristic reality?”

Proponente: Prof..ssa Fabiana Arduini

Micromotors in action: smart microsensors swimming in a concept or a futuristic reality?

Alberto Escarpa^{*1,2}

¹ Department of Analytical Chemistry, Physical Chemistry, and Chemical Engineering, Universidad de Alcalá, Alcalá de Henares, E-28871 Madrid, Spain.

² Chemical Research Institute “Andres M. del Rio”, Universidad de Alcalá, E-28807, Madrid, Spain.

* alberto.escarpa@uah.es

Abstract

Micromotors represent one of the most exciting horizons in micro and nanotechnologies. The utilization of self-propelled micromotors in (bio)chemical assays has led to a fundamentally new approach where their continuous movement around the sample and the mixing associated effect, all this as a collective behavior, greatly enhances the target-receptor interactions and hence the performance of the bioassay [1-3].

In our lab, we are focusing on the design and development of micromotors which are constituted by (nanostructured) layers (tubular-based shape) and particles (Janus-based shape) that confer them self-propulsion using (photo)-catalytic propulsion and magnetic guidance with compatibility in biological media due its tremendous significance, as it has been critically reviewed [4-6]. They also smartly incorporate nanomaterials and molecular recognition-based functionalization to obtain sensitivity and exquisite selectivity on board using electrochemical and fluorescence detection approaches. Also, we have explored the coupling of micromotors even with electrochemical microfluidics. In our experience, we humbly found that micromotor technology is an attractive alternative to performing fast, and reliable bioassays and diagnostic testing, especially when an extremely low volume of samples is available or when the analysis must be performed in a micro-size environment.

In this Lecture, selected micromotors-based bioassays with potential in diagnostics, and some future directions will be discussed. But ultimately, we try to answer the talk title's central and disturbing question.

ACKNOWLEDGMENT

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Biosketch

Dr. Alberto Escarpa is a Full Professor of Analytical Chemistry at the University of Alcalá. He has received several awards such as the NATO Fellowship to perform postdoctoral research at the New Mexico State University (USA) in 2001, the "Young Investigator Award" by the University of Alcalá in 2003, the International Dropsens Award "Best Research Work in applied electroanalytical chemistry" (finalist) in 2015 and the Excellence Award in Doctoral Thesis Direction of Sciences in 2021, and Spanish Royal Society of Chemistry Award for Research Excellence 2024. He served as a guest professor in international Universities and research centers such as the University of California San Diego (EEUU), the International Center for Young Scientists in National Institute for Materials Science (Tsukuba, Japón) or CIDETEQ (Querétaro, México). He has also been a Visiting Professor at Buenos Aires University and currently, he is a Visiting Professor at Universidad Nacional Agraria La Molina (Peru) and Prince of Songkhla University, Hat Yai, Songkhla (Thailand). Prof. Escarpa is also a member of the Collegium of the Ph.D. in Food Science at Teramo University (Italy).

He has led and founded the "Analytical Miniaturization and Nanotechnology" research group since 2003. His main research interests are analytical miniaturization and nanotechnologies, electrochemical microfluidics, lab-on-a-chip technology, bio-inspired nanomaterials and artificial micromotors for optical and electrochemical (bio)-sensing.

He has co-authored more than 200 peer-reviewed articles in leading international peer-reviewed journals, 6 international patents, and several book chapters, yielding an h-index 50. He has recently been included in the top 1% of most cited chemists worldwide (2020, 2021 lists by Sandford University). His works have been featured and highlighted on several occasions as cover in top journals (*Angew. Chem. Int. Ed.*, *Chem. Sci.*, *Chem. Eur. J.*, *Lab Chip*, *Anal. Chem.*, *Analyst* and *Anal. Sen.*) and social scientific media (*Chemical World* (RSC), *Separations Now* from Wiley and *C&EN news* from ACS, *Nanowerk*). He has also supervised 20 Ph.D. Doctoral Thesis (with 20 awards and honors) and several postdoctoral researchers granted highly competitive fellowships. He has edited and authored several books including *Miniaturization of Analytical Systems: principles, designs, and Applications* (Wiley, 2009), *Food Electroanalysis* (2015, Wiley), and *Carbon-based Nanomaterials in Analytical Chemistry* (RSC, 2019). He has given more than 50 invited lectures at the most prestigious conferences of micro and analytical nanotechnologies. He is a member of the Editorial Board of *Anal. Chem.*, *Anal & Sen.*, *Electrophoresis*, *Appl. Mat. Today*, *Sensors* and *J. of Nanobiotech*. He has been Associate Editor for *RSC Advances* (2015-2019) and Associate Editor for *Microchimica Acta* (2018-2019). He is currently Editor in Chief for *Microchimica Acta*.

