SIBPA
Società Italiana di Biofisica Pura e Applicata
fondata nel 1973

NEWSLETTER 2023, #4 –April

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[bySIBPA] WORKSHOP: Photons and Bugs

All'interno delle iniziative volte a celebrare il 50° anniversario dalla fondazione di SIBPA, si svolgerà a Parma un workshop della durata di mezza giornata.
E' ancora possibile inviare richieste di partecipazione fino al 30 aprile e proposte di contributi da parte di giovani ricercatori entro il 5 maggio.

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UNIVERSITÀ DI PARMA
DIPARTIMENTO DI SCIENZE MATEMATICHE, FISICHE E INFORMATICHE

50 years SIBPA Società Italiana di Biofisica Pura e Applicata 1973 - 2023

SIFB

ESP

FONDAZIONE DI PIACENZA E VIGEVANO

Photons & bugs

A workshop on photodynamic treatment of microorganisms

Thursday May 25, 2023

Centro congressi S. Elisabetta - Campus Universitario, Parma

The COVID19 pandemic has highlighted the need for innovative and effective treatments that can be rapidly deployed in the fight against emerging pathogens. The workshop proposes some methodological and technical advances on the use of the photodynamic effect as a tool to tackle microbial infections. For young researchers it is possible to propose short oral communications of 10 minutes. Among proposals received, 2 contributions will be selected and presented during the workshop.

Programme

14.00 **Registration**

Mechanistic insights on blue light bacterial photoinactivation
Santi Nonell
Istitut Quimic de Sarria, Universitat Ramon Llull, Barcelona, Spain

Photodynamic Inactivation as new tool to fight plant pathogens
Kristjan Plätzer
Paris Lodron Universität Salzburg, Salzburg, Austria

Innovative light sources for in vivo antimicrobial inactivation
Giovanni Romano
Università di Firenze, Firenze, Italy

Targeting SARS-CoV-2 with PDI
Pietro Delcanale
Università di Parma, Parma, Italy

Selected presentations

17.00 **Conclusions**

Participation in the workshop is free and no registration fee is required.

[CfPo] Research Fellow in Biological NMR/Biophysics, multidisciplinary Astbury Centre for Structural Molecular Biology/ School of Molecular and Cellular Biology

Are you looking to apply your skills to gain a new molecular understanding of the mechanism of amyloid formation and help to develop new routes to combat amyloid disease?

We are looking for an outstanding postdoctoral research fellow to join our interdisciplinary team that is investigating how proteins aggregate into amyloid fibrils, including the link between disease-relevant mutations, post-translational modifications and fibril structure. Funded by Wellcome, you will use biological NMR and other biochemical and biophysical methods, including mass spectrometry, single molecule FRET and other biophysical methods to map the early protein-protein interactions in amyloid formation and to discover new routes to prevent or control these interactions using small molecules, chaperones, or other approaches. You will have expertise in the analysis of protein structure and dynamics using modern biomolecular NMR approaches combined with computational analysis and/or other biophysical and biochemical methods to interrogate how ligands bind and affect protein assembly. The project will focus on a range of amyloid diseases, including type II diabetes, Parkinson's and systemic amyloidosis.

You will be based in the laboratory of Professor Sheena Radford and work closely with other members of our amyloid group that bring skills in cryoEM, biophysics, cell biology and peptide chemistry to the team (Radford lab). You should have a PhD (or be close to completing one) in Structural Biology, Chemical Biology, Biochemistry, Biophysics or a related discipline, and you should have extensive experience of using biological NMR and other biophysical methods to elucidate biological mechanisms.

To explore the post further or for any informal queries you may have, please contact: Professor Sheena Radford, Astbury Professor of Biophysics
Tel: +44 (0)113 343 3170 | Email: s.e.radford@leeds.ac.uk
and see https://jobs.leeds.ac.uk/vacancy.aspx?ref=FBSAS1060

[CfPo] Postgraduate / Postdoc position in Genoa, Italy, lab of Michael Pusch – Properties and physiological role of the putative neuronal glucose transporter SLC45A1

We are offering a We are offering two 18 months postgraduate / postdoc positions for our Telethon/Cariplo project on the putative neuronal glucose transporter SLC45A1. Brain metabolism is mostly fueled by glucose transported through the blood-brain barrier by GLUT1. The physiological role of another putative sugar transporter, namely SLC45A1, is incompletely understood. Mutations of SLC45A1 have been associated with intellectual disability (ID), epilepsy and variable neuropsychiatric features.

The project aims to investigate the functional properties of SLC45A1, its cellular distribution and its physiological and pathophysiological role. Specifically, we will use in vitro heterologous expression and sugar transport and electrophysiological assays to evaluate functional impact of SLC45A1 variants of unknown significance. In parallel exploiting a Slc45a1 knockout mouse model we will determine expression and localization of the protein in the different brain areas and neuronal cell types using qPCR and immunofluorescence. Finally, we will study the physiological and pathophysiological role of SLC45A1 in brain metabolism or metabolic sensing using neuronal cultures dissociated from different areas of the KO mice brain.

One position is focusing on the in vitro analysis, while the other position is concentrated on the analysis of neuronal cultures. The positions will start in September / October 2023.

Our lab is located at the Institute of Biophysics of CNR in Genoa, Italy between the Mediterranean Sea and beautiful mountains.

Further information: michael.pusch@ibf.cnr.it

Further reading:

Srour M, Shimokawa N, Hamdan FF, Nassif C, Poulin C, Al Gazali L, Rosenfeld JA, Koibuchi N, Rouleau GA, Al Shamsi A & Michaud JL. 2017. Dysfunction of the Cerebral Glucose Transporter SLC45A1 in Individuals with Intellectual Disability and Epilepsy. Am J Hum Genet 100:824-30

Mir A, Almudhry M, Alghamdi F, Albaradie R, Ibrahim M, Aldurayhim F, Alhedaithy A, Alamr M, Bawazir M, Mohammad S, Abdelhay S, Bashir S & Housawi Y. 2022. SLC gene mutations and pediatric neurological disorders: diverse clinical phenotypes in a Saudi Arabian population. Hum Genet 141:81-99

Vannucci SJ, Maher F & Simpson IA. 1997. Glucose transporter proteins in brain: delivery of glucose to neurons and glia. Glia 21:2-21

Koepsell H. 2020. Glucose transporters in brain in health and disease. Pflugers Arch 472:1299-343

Gras D, Roze E, Caillet S, Meneret A, Doummar D, Billette de Villemeur T, Vidailhet M & Mochel F. 2014. GLUT1 deficiency syndrome: an update. Rev Neurol (Paris) 170:91-9
Shimokawa N, Okada J, Haglund K, Dikic I, Koibuchi N & Miura M. 2002. Past-A, a novel proton-associated sugar transporter, regulates glucose homeostasis in the brain. J Neurosci 22:91

[CfPo] Postgraduate / Postdoc position in Genoa, Italy, lab of Michael Pusch – Role of potassium channels and volume-regulated anion channels in melanoma

We are offering a 1 year postgraduate / postdoc position for our AIRC project on the role of potassium and volume-regulated anion channels in melanoma. The techniques adopted in the research include patch-clamp, proliferation and migration assays, intracellular Ca2+ measurements and AAV-mediated short-hairpin interference in melanoma cell lines, macrophages and lymphocytes. Experience in at least some of the techniques is welcome but training will be provided. The work is carried out within a larger team of staff scientists and postdocs. The position will start in September / October 2023.
Our lab is located at the Institute of Biophysics of CNR in Genoa, between the Mediterranean Sea and beautiful mountains.

Further information: michael.pusch@ibf.cnr.it

Further reading:

Bertelli S, Remigante A, Zuccolini P, Barbieri R, Ferrera L, Picco C, Gavazzo P & Pusch M. 2021. Mechanisms of Activation of LRRC8 Volume Regulated Anion Channels. Cell Physiol Biochem 55:41-56, doi: 10.33594/000000329

Bertelli S, Zuccolini P, Gavazzo P, Pusch M. 2022. Molecular determinants underlying volume-regulated anion channel subunit-dependent oxidation sensitivity. J Physiol doi: 10.1113/JP283321

Ferrera L, Barbieri R, Picco C, Zuccolini P, Remigante A, Bertelli S, Fumagalli MR, Zifarelli G, La Porta CAM, Gavazzo P & Pusch M. 2021. TRPM2 oxidation activates

two distinct potassium channels in melanoma cells through Intracellular calcium Increase. Int J Mol Sci 22, doi: 10.3390/ijms22168359

Remigante A, Zuccolini P, Barbieri R, Ferrera L, Morabito R, Gavazzo P, Pusch M, Picco C. 2021. NS-11021 Modulates Cancer-Associated Processes Independently of BK Channels in Melanoma and Pancreatic Duct Adenocarcinoma Cell Lines. Cancers 13:6144, doi: 10.3390/cancers13236144

Zuccolini P, Ferrera L, Remigante A, Picco C, Barbieri R, Bertelli S, Moran O, Gavazzo P & Pusch M. 2022. The VRAC blocker DCPIB directly gates the BK channels and increases intracellular Ca(2+) in melanoma and pancreatic duct adenocarcinoma cell lines. Br J Pharmacol , doi: 10.1111/bph.15810

[CfPo] PhD position in Paris

Dear EBSA colleagues,
my collaborator Laurent Catoire and myself are looking for a motivated PhD candidate in the field of structural biology by NMR to probe lipid/protein interactions under high hydrostatic pressure for a start in fall 2023 or earlier. The PhD is funded by a French ANR PhD fellowship.
The PhD student will be involved in a highly interdisciplinary research project at the frontiers of Chemistry, Biology and Physics. The aim is to continue the development of high-pressure NMR techniques to understand how membrane proteins affect lipid dynamics and how lipids affect protein dynamics in lipid bilayers.
PhD context and objective: Lipids and proteins are the main components of cell membranes. Although their mutual interactions and dynamics govern many cellular functions, we are still far from having a complete description. In our two CNRS laboratories (ICSN/IBPC), we have started to explore a new and original way to probe lipid/protein interactions within lipid bilayers using high hydrostatic pressure [1]. We will aim to demonstrate the existence of coupling between lipid and protein dynamics by NMR at high pressures (1 to 3000 bar) at various temperatures. We already identified strong lines of evidence of coupled motions but we will characterize at much higher details (timescales, ...) the interactions by combining NMR relaxation data but also DLS, SAXS, fluorescence on different types of membrane proteins, including G protein-coupled receptors (GPCRs) and

lipid bilayers systems. Notably, we will deeply analyze the lipid dynamics and phase transitions in nanometric particles.
The PhD student will be trained during the PhD thesis in the production and purification of isotopically enriched membrane proteins in nanodiscs (at IBPC), as well as in state-of-the-art NMR spectroscopy (ICSN) in two laboratories that are world experts in their fields. He/she will have privileged access to ICSN's exceptional NMR equipment (ten spectrometers up to 950 MHz including the High-Pressure setup, https://icsn.cnrs.fr/en/platforms/ir-rmn). The two labs are closely located, with IBPC in Paris downtown (near Pantheon) and ICSN in the green area of Gif-sur-Yvette in Univ Paris-Saclay with a village spirit. Both labs are directly connected by the RER B train (~1h door to door), thus allowing to experience two radically different atmospheres. Complementary experiments will be collected at Soleil synchrotron (2km away from ICSN) in neighboring platforms at Paris-Saclay. In parallel, another PhD thesis will cover the molecular modelling aspect of the project under the supervision of J. Hénin/G. Stirnemann also at IBPC-Paris.
Required background: The candidate should ideally have a background in biochemistry, chemistry, physical-chemistry, biophysics, molecular biology and/or structural biology or a related discipline. A strong interest in structure-dynamics-interaction-function studies of proteins/lipids, in the physical-chemistry of biological systems and in collecting and analyzing data on biomolecular dynamics will be appreciated. Experience in protein expression and purification and/or NMR would be a plus.
Application: Interested and motivated candidates can apply by email to ewen.lescop@cnrs.fr and Laurent.catoire@ibpc.fr . Please provide:

- your CV
- a motivation letter
- Master (M1 and M2) marks and ranking

More information about our groups at https://icsn.cnrs.fr/en/research/cbsa/structural-biology-and-chemistry and http://umr7099.ibpc.fr/research-themes/molecular-signalisation-pathway-of-gpgrs/

Ewen LESCOP, PhD