Laboratory of Brain Exosomes and Pathology - ExoBrain

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Dr. Ioannis Sotiropoulos (PhD) is the Director of **the Laboratory of Brain exosomes and pathology- ExoBrain** and joined the Institute of Biosciences and Applications (IBA) of National Center for Scientific Research “Demokritos” (NCSR Demokritos) at 2021. He studied Biology at the Department of Biology of the University of Patras (Greece) and completed his PhD studies at the University of Heidelberg and the Max Plack Institute of Psychiatry (Germany). He has been previously trained and worked at different universities and research institutes such as University College London (UK), Max Planck Institute of Psychiatry (Germany), Columbia University (USA), RIKEN Brain Science Institute (Japan), and MRC Center for Synaptic Plasticity (UK) and Medical School, University of Minho (Portugal).

The research work of Dr. Sotiropoulos’ and his team focuses on understanding the role of risk factors (e.g., chronic psychological stress, sex, and prolong pain) in the development of Alzheimer's disease (AD), with a particular focus on the relationship between AD and depression, a disorder also associated with stress.

Combining studies in cells, animals and humans, Dr. Sotiropoulos' research aims to:

1) elucidate the etiopathological mechanisms of AD and depression with a particular focus on chronic stress and Tau protein as key regulators of neuroplasticity and neuropathology,

2) test novel therapeutic targets and substances such as antisense oligonucleotides (ASOs), cannabidiol and psychedelics,

3) monitor the role of brain exosomes as mediators and peripheral biomarkers of brain pathology in AD and depression.

Dr. Sotiropoulos’ research work has been published in high impact international scientific journals such as PNAS, Molecular Psychiatry, EMBO J, J Neuroscience, Cell Signal & Comm and several book chapters – see publications https://pubmed.ncbi.nlm.nih.gov/?term=Sotiropoulos+I&sort=date . He has received various prizes, awards & honors such as Hirnliga Alzheimer Award 2009, AD/PD Young Faculty 2014

Award, Jerome Lejeune 2017 Award, Janssen Innovation Award 2017, Alzheimer Association Award for Best Mentor in Neuroscience 2021. He is an active member of the Hellenic Initiative Against Alzheimer's Disease (HIAAD.gr), a network of basic and clinical scientists promoting translational and clinical research as well as Alzheimer's disease daycare centers in Greece. Dr. Sotiropoulos has edited a multidisciplinary book on Alzheimer's disease for the general audience entitled " *When logic chases memory: the multidimensional threat of Alzheimer's disease in the 21st century",* University Crete Press).

Dr Zafiroula (Iro) Georgoussi – Researcher A (retired)

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Dr Zafiroula (Iro) Georgoussi is a Research Director (Retired 2022) of IBA. She graduated from the Biology Department, University of Patras (Greece), obtained a Diploma from Queen Elizabeth College, UK (1981), undertook doctoral studies at the National Hellenic Research Foundation and the University of Ruhr, Germany (PhD 1986 awarded by the National and Kapodistrian University of Athens (Greece) and post-doctoral research at Vanderbilt University, USA (1986-1989), the NCSRD (1990-1994) and the University of Glasgow, UK (1994-1995). She has been an IBA member since 1995 and directed the Laboratory of “Cellular Signaling and Molecular Pharmacology” of IBA until her retirement.

Dr Georgoussi’s interests focus on the mechanisms of G protein-coupled receptor (GPCR) signaling, particularly those for the involvement of opioid receptors in pain perception, tolerance, drug dependence and neuronal differentiation. Her team identified proteins interacting with these receptors and modulating their activities; downstream targets causing alterations in neuronal cell differentiation; a novel signaling pathway involving κ-opioid receptor-dependent induction of the autophagic machinery in neuronal cells and consequent synaptic protein changes under stress conditions. Her team has developed cell-based screening assays for discovery of new therapeutic compounds and development of food supplements for pain and stress alleviation.

Dr. Georgoussi has published in high impact scientific journals (see Scopus) and is the holder of a patent. Her research activities have been supported by national research agencies, pharmaceutical companies, and the European Commission. For her research on new pain alleviating compounds, she received awards from the International Warsaw Invention Show; the International Federation of Inventors; the Polish Government; and the Hellenic Industrial

Property Organization. She has trained a large number of undergraduate, MSc and PhD students, is a member of the Inter-Institutional “Athens International Master's Program in Neurosciences" coordinating the course “Cellular and Molecular Neuroscience" and is also teaching in other postgraduate programs. Notably, she has also been a member of the Ethics Committee of the NCSRD.

Prof. Kostas Iatrou, PhD, Research director (Emeritus)

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Prof. Kostas Iatrou, PhD, is a Research director (Emeritus) of the Institute of Biosciences & Applications (IBA), NCSR "Demokritos" (NCSRD). Dr. Iatrou obtained a BSc in Natural Sciences from the Aristotle University of Thessaloniki, Greece (1970), carried out doctoral studies at the Universities of Sussex (UK; 1973-74) and Calgary (Canada; 1975-77) and undertook postdoctoral training at Harvard University (USA; 1977-81). He has been a Professor of Biochemistry and Molecular Biology, Faculty of Medicine, University of Calgary, Canada (1981-2001; Adjunct Professor 2001-to date), Director of the Institute of Biology (currently IBA), NCSRD (1998-2003), Director of the Laboratory of "Insect Molecular Genetics and Biotechnology" of the IB-A (1998-2013), Member of the Board of Directors of the NCSRD (1998-2003) and Vice-President and Acting President and Chair of the Board of Directors of the NCSRD (2002-2003).

Dr. Iatrou's studies on fish and insect molecular biology, genetics, physiology, pathology and evolution, have generated novel insights in the fundamental developmental process that control animal development and innovative tools with multiple applications in the biosciences. Dr. Iatrou has authored 118 peer-reviewed articles and book chapters in high impact scientific journals (publications at https://pubmed.ncbi.nlm.nih.gov/?term=iatrou+k) and is the holder of several relevant USA, international and Greek patents
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Besides contributing to the search for novel therapeutic agents to counteract undesirable aspects of opioid functions on the central nervous system, Dr. Iatrou is currently focusing attention on the discovery of volatile organic compounds (VOCs) of natural origin causing anosmia-like effects to mosquitoes and preventing them from finding suitable hosts and transmitting infectious agents to them while obtaining blood meals from them. The selected target for the VOC-mediated disruption of mosquito odorant receptor (OR) function is the obligatory odorant co-receptor ORco. Accordingly, these research activities focus on the discovery of natural VOCs acting as antagonists of ORco using an
ex vivo
receptor expression-activity detection platform. Large-scale expression of ORco is also carried out in order to deduce the structure of the ORco homomer and allow Artificial Intelligence-based discovery of new mosquito anosmia-causing molecules.