Maria Gaitanou

About

I am a researcher at the Laboratory of Cellular-Molecular Neurobiology and Stem Cells working in the fields of Neurodevelopment and Neurosignaling especially studying signaling pathways controlling cell cycle progression/exit and differentiation of neural stem cells. My work has focused on nervous system development, in order to clarify genes and mechanisms that control cell cycle progression/exit and neuronal differentiation of neural stem/precursor cells. Proliferation and differentiation of neural stem cells are opposing, but tightly linked developmental processes, which control the number of neurons produced and, ultimately, the proper wiring and function of the adult nervous system. Special emphasis of my work is the elucidation of the signaling pathways by which BM88/Cend1 and Mirk/Dyrk1B promote neurogenesis. My research interests also include gene and cell therapy approaches and the usage of small molecules as therapeutic tools for the treatment of neurodegenerative diseases.

Projects

- Neurodevelopment: Signaling Pathways Controlling Cell Cycle Progression/Exit and Differentiation Of Neural Stem Cells (read more)
- Mirk/Dyrk1B kinase is a novel cell cycle regulator of neuronal progenitors inducing neuronal differentiation *in vitro* and *in vivo* (read more)
- A human stem cell-based model of neurodevelopment for the identification of novel miRNAs controlling neurogenesis (read more)

Collaborative Projects
Collapsed and expandable

Implications of δ-opioid receptor activation and RGS4 in STAT5B activation in neural stem cells proliferation/ differentiation (collaboration with Z. Georgoussi, Cellular Signaling and Molecular Pharmacology Laboratory, Institute of Biology, NSCR Demokritos)

The Regulator of G protein Signaling 4 (RGS4) is a multitask protein that negatively modulates opioid receptor signaling. Previously the group of Dr Georgoussi, has showed that the δ-opioid receptor (δ-OR) forms a multiprotein signaling complex consisting of Gi/Go proteins and the Signal Transducer and Activator of Transcription 5B (STAT5B) that leads to neuronal differentiation and neurite outgrowth upon δ-OR activation. In this collaborative project we have investigated the role of RGS4 in signaling pathways regulating neurotropic events using primary neuronal and adult NSC cultures derived from RGS4 knock-out (KO) mice. It has been demonstrated that RGS4 interacts directly with STAT5B independently of δ-OR presence. An intruiging finding is that RGS4 implicated in neuronal sprouting and enhanced proliferation of NSCs, with concomitant increase in the mRNA levels of the anti-apoptotic STAT5B target genes bcl2 and bcl-xl. These observations suggest that RGS4 is

implicated in opioid dependent neuronal differentiation and neurite outgrowth via a "non-canonical" signaling pathway regulating STAT5B-directed responses.

Relevant publications

● Pallaki P., Georganta E., Serafimidis I., Papakonstantinou M., Papanikolaou V., Koutloglou S., Papadimitriou E., Agalou A., Tserga A., Simeonof A., Thomaidou D., Gaitanou M. and Georgoussi Z. (2017). A novel regulatory role of RGS4 in STAT5B activation, neurite outgrowth and neuronal differentiation Neuropharmacology (117):408-421.

● Georganta EM, Tsoutsi L, Gaitanou M and Georgoussi Z. (2013) "δ-opioid receptor activation leads to neurite outgrowth and neuronal differentiation via a STAT5B-Gαi/o pathway" J. Neurochem. 127(3):329-41.

Study of novel nucleus-penetrating monoclonal anti-DNA antibodies that induce apoptosis though nucleolysis (collaboration with P. Lymberi, Immunology Laboratory, Immunology Department, Hellenic Pasteur Institute) (read more)

Publications

Updated list of publications in PubMed