

Description of Funded Research Projects

1st Call for H.F.R.I. Research Projects
to support Post-Doctoral Researchers



H.F.R.I.
Hellenic Foundation for
Research & Innovation

Research Project Title:

**Microglia-driven pathology and
altered brain surveillance in
demyelination**

Principal Investigator:
Vasiliki Kyrargyri

Popular Title:

**The role of brain microglia in experimental
models of Multiple Sclerosis**

Scientific Field:

**Life Sciences,
Neuroscience/Neuroimmunology**

Host Institution:

Hellenic Pasteur Institute



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Neuroinflammation is a common feature of all neurodegenerative disorders, ranging from immune-mediated diseases such as multiple sclerosis (MS), to classical neurodegenerative diseases such as Alzheimer's disease, and is a promising target for therapeutic intervention. Microglia is the local immune system of the central nervous system (CNS) that mediates intrinsic neuroinflammation. Chronic activation promotes neuroinflammation and induces secondary damage to brain tissue. Recent research, however, has shown that microglia performs equally important regulatory functions in the healthy brain, and has a beneficial role in restoring local tissue alterations. This multiplicity of microglial function suggests that these cells react differently to similar stimuli, acquiring either a beneficial or a harmful role. The new data implies the need for a better understanding of microglial function before designing any therapeutic approach that will target them. In this study, we will investigate the hypothesis that activation of specific microglial molecules contributes to the progression of chronic neuroinflammation, while reducing its positive contribution to brain repair. In particular, we will use Multiple Sclerosis models, developed transgenic technologies, advanced bio-imaging methods and computational image analysis, and we expect to determine whether specific microglia molecules are candidate therapeutic targets for the treatment of CNS inflammatory disorders.

The success of this project is guaranteed by the research team, two young Greek researchers and two academic mentors, all of whom have significant experience in the field. It will allow the two young researchers to further develop their research careers and participate in an area of immediate translational value for the therapy of CNS inflammatory diseases. In addition, it will allow me to return to Greece from UCL in London and transfer to the host Institute expertise in highly sophisticated imaging and analysis techniques that are not yet available in Greece.

This project aims to investigate the role of microglia in the progression of neuroinflammation, which is a common pathological feature of all neurodegenerative disorders, including Multiple Sclerosis, Alzheimer's and Parkinson's diseases. The treatment of these chronic neurodegenerative disorders is of particular interest to the research world as existing immunotherapy strategies fail to provide overall suppression. Furthermore, Europe has the world's highest proportion of elderly people, with 16% of the population over 65 years old.

Given that there is a direct correlation between aging and neurodegenerative disorders, and that these diseases are usually followed by complications such as depression, obesity and dementia, the impact of this project is widening to a greater range of diseases. Finally, strategies to reverse microglial activation in the brain could also have a potential impact on the treatment of non-degenerative conditions that affect the young, such as autism and depression, both of which are associated with microglial activation.

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The funding of H.F.R.I. was an important incentive for me to return to Athens and the Hellenic Pasteur Institute, from UCL in London, where I was working as a postdoctoral researcher for the last 3 years. At the research level, it is an interesting challenge for me to be able to carry out a research project in which I will be the principal investigator for the first time in my career and be able to prove my scientific value to myself first and to the wider research community. I also believe that it is a dynamic element of my CV for future opportunities for professional advancement and scientific establishment. On a personal level, I am motivated to return to my homeland and my family and so I can contribute to the domestic scientific potential.

*The Principal Investigator,
Vasiliki Kyrargyri*

Funding

Amount: **180,000 €**

Duration: **36 months**

Foundation: **H.F.R.I.**





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