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:

Neuroprotective, Neurogenic Implants for CNS Injury Treatment

Principal Investigator:

Dimitrios Tzeranis

Popular Title:

Neuroimplants for central nervous system injuries

Scientific Field:

Life Sciences

Host Institution:

Foundation for Research and Technology Hellas
(IMBB-FORTH), Greece

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Traumatic central nervous system (CNS) injury is a devastating neurological disorder that affects the lives of thousands of individuals around the world. The spontaneous response to wound healing initiated by traumatic CNS injury leads to neurological deficit, disability, pain, and poor quality of life. Despite significant research efforts, traumatic CNS injury remains an untreatable condition, with significant societal and economic impact. There is vital need to uncover the complex mechanisms underlying CNS response to injury and exploit them to develop novel treatments that can promote neuronal survival and eventually axonal regeneration. The objective of "neuroimplants" project is to utilize a novel organ-on-chip in vitro platform and two established animal models to develop new treatments for traumatic CNS injury. The proposed treatments will combine three technologies: 1) porous collagen scaffolds, similar to FDA-approved biomaterials utilized clinically in peripheral nerve regeneration, 2) neural stem cells (NSC), and 3) microneurotrophins (MNT), small-molecule analogs of neurotrophins. Neuroimplants will consist of degradable porous scaffolds that deliver MNT and NSC at the CNS injury site in order to exploit MNT neuroprotective and neurogenic actions and enhance axon elongation, and NSC-mediated synthesis of new nerve tissue.

Traumatic central nervous system (CNS) injury is a devastating neurological disorder that affects the lives of thousands of individuals around the world. There is vital need to uncover the complex mechanisms underlying CNS response to injury, and exploit them to develop novel treatments that can promote neuronal survival and eventually axonal regeneration. The neuroimplant project will be the first effort to evaluate and exploit the neuroprotective activities of a new class of small molecules (MNTs) in traumatic CNS injury, seeking to exploit their neuroprotective and neurogenic effects reported in other in vitro and in vivo CNS models. Successful neuroimplant development could provide neurosurgeons a novel emergency tool to treat traumatic CNS injuries, or a long-term treatment for inducing regeneration after CNS injury.

To me, H.F.R.I. funding would mean...

“H.F.R.I. funding of “neuroimplants” project is a unique opportunity to transfer unique knowhow on regenerative medicine to Greece, and expand it further in order to solve an important clinical problem that affects thousands of patients worldwide. H.F.R.I. funding enables me to remain a member of IMBB-FORTH, one of the best research institutes of Greece and exploit its infrastructure and interdisciplinary know-how. Furthermore, it enables me to strengthen existing collaborations and establish novel collaborations with neuroscientists and engineers in Greece or abroad. Finally, it provides me with the necessary resources in order to develop new technology and seek further funding in order to translate it into clinical practice.

The Principal Investigator,
Dimitrios Tzeranis

Funding

Amount: **180,000 €**

Duration: **36 months**

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

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Hellenic Foundation for Research & Innovation

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