EuroSciCon

July 12-13, 2018
Paris, France

4th EuroSciCon Conference on
Neurology & Neurological Disorders

M Fratini et al., J Neurol Neurosci 2018, Volume: 9
DOI: 10.21767/2171-6625-C1-008

STUDY OF THE VASCULAR AND NEURONAL NETWORK IN THE SPINAL CORD FOR PRECLINICAL APPLICATION

M Fratini[1,2], P Miocchi[1], L Maugeri[1], A Sierra[3], I Bukreeva[2], F Mangini[1], A Nurmi[4], O Grohn[3], F Giove[5] and A Cedola[2]

[1]IRCCS Fondazione Santa Lucia, Roma, Italy
[2]Institute of Nanotechnology, Consiglio Nazionale delle Ricerche (CNR-NANO), Roma, Italy
[3]Biomedical Imaging Unit, A I Virtanen Institute for Molecular Sciences, University of Eastern Finland, Finland
[4]Charles River Discovery Services, Finland
[5]Centro Fermi, Italy

Anomalous developments or damages to the vascular network (VN) of the CNS, as well as an impaired partnership with neurons and glia are related to pathology. Several studies have found that the early detection of vascular diseases in the brain may lead to an increased ability to perform premorbid diagnosis of the Alzheimer Disease. On the other hand, traumatic spinal cord injuries induce microvascular changes that may contribute to secondary injuries and deficits observed in patients. In particular, the ischemia and the extravasation of the blood components resulting from such injuries contribute to a series of effects such as edema formation, neuronal cell death, and damage to white matter tracts. Studying the complexity of the VN and neuronal network in a large volume of tissue, with a resolution sufficient to access the smallest capillaries and the neuronal ultra-structure, appears then as a key point for a better understanding of the neuro-vascular coupling. Nevertheless, conventional 2D imaging yields incomplete spatial coverage, whereas conventional 3D imaging does not achieve sufficient resolution and contrast. X-ray phase-contrast µTomography (XrPCµT) has great potential for the investigation of the structures that generate poor contrast by absorption, since the XrPCµT sensitivity to light elements is about 1000 times higher than by X-ray absorption contrast methods. By X-ray high-resolution phase-contrast tomography, we performed a simultaneous 3D imaging of the VN and of the neurons of the mouse spinal cord. The cellular images show the 3D distribution of axons bundles, the neuronal soma and the synaptic junction. The study of CNS diseases and of traumatic spinal cord injuries are two of the most significant examples of applications that could take advantage of our approach, which is a crucial complementary tool for pre-clinical investigation and would allow for solving the entangled relationship between the VN and for the neuronal system.

Biography

M Fratini has completed her specialization school in Medical Physics from LA Sapienza University and PhD studies from Roma TRE University in physics. She is a Researcher at the CNR-Nanotec. She is PI at Santa Lucia Foundation in Young Research project of the Healthy Ministry. She has published more than 50 papers in reputed journals and has been serving as an Editorial Board Member of repute.

michela.fratini@gmail.com