

Tuesday, 21st February, 12.00pm

Seminar Room

Host: Prof. Maurizio Prato

Cell Therapy for Spinal Cord Injury Regeneration

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Spinal Cord Injury (SCI) is a severely debilitating condition that causes motor, sensory and autonomic dysfunctions. Currently, SCIs remains a worldwide problem with no efficient cure due to its complexity involving diverse biochemical and physiological processes.

Nowadays, Neural progenitor cell (NPC) transplantation has represented a promising treatment strategy for SCI, demonstrating potential to recovery complex neurological functions after the injury; however, the limited cell survival rates, poor host circuit integration and neuronal differentiation limits he extension of their capabilities. Either the therapeutic mechanisms as well as the underlying limitations remain incompletely understood, therefore we have interrogated whether the severe spinal cord injuries cause transcriptional dysregulation, in a rat model, how it persists from early subacute to chronic stages. Functional analysis of this dysregulated transcriptome in injured spinal cords reveals the significant downregulation of cAMP signalling components immediately after SCI and the ectopic transplantation of spinal cord-derived NPCs at acute or subacute stages of SCI rescued this signalling, including the expression of EPAC2, a substrate for cAMP. We next evaluated the impacts of EPAC2 in NPC mediated neural regeneration by the combination with a specific inhibitor. The overall results indicate that the NPC-associated mechanisms, in the context of SCI involve the cAMP pathway, where related to the reduces inflammation and providing a more neuropermissive environment; All in all, EPAC2-dependent mechanism emanates has a potential target for the neuronal repair strategies alone or in combination with NPC transplantation.