



Psychiatry and Neuroscience Seminar

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Pro-regenerative effect of glial cell exosomes and its modulation by transcriptional programs

Friday October 26th, 2018, 12 pm

Room R04-45, 102-108 rue de la santé - 75014 Paris

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Nervous system function relies in the coordinated action of neurons and glial cells. In recent years, the importance of glial cells for several aspects of nervous system function has been underscored. Phenomena like synaptic activity, conduction of action potentials, neuronal growth and regeneration, to name a few, are fine tuned by glial cells. We have proposed a model in which the axon has certain autonomy from the neuronal cell body, and its associated glial cell is a major regulator of local axonal programs, including a regenerative program of axonal extension, a destruction program activated by various stimuli and local protein synthesis in the axon. We have demonstrated vesicular mediated transfer of ribosomes from Schwann cells (SCs), the peripheral glial cell type, to axons in vivo after axonal damage as well as during axonal regeneration. Recently, we have found that exosomes secreted by SCs and selectively internalized by axons increase neurite growth substantially and greatly enhance axonal regeneration in vitro and in vivo. We have now used a combination of next-generation sequencing, proteomics and bioinformatic analysis to identify RNAs and proteins present in SC- exosomes, and to search for candidates mediating the functional effect of SC-exosomes over axonal regeneration. This mode of interaction provides a new dimension to the understanding of the intercellular regulation at large, and we foresee that a number of phenomena of the nervous system still poorly understood will be studied under this new light.