PROGRESS IN NEUROSCIENCE PINS

Seminar Series of the
Brain & Mind Research Institute
Weill Cornell Medical College (WCMC)
&
The Graduate Program in Neuroscience of
WCMC and Sloan Kettering Institute

Thursday, 10/9/14, 4 PM, coffee at 3:45 PM
Weill Auditorium

A 'White' Matter of Identity: Distinct Profiles of Myelin Distribution in the Neocortex

Giulio Srubek Tomassy, Ph.D.
Stem Cell & Regenerative Biology, Harvard University

Abstract:

A highly orchestrated process of cell-fate specification progressively generates the diversity of neuronal and glial cell types that populate the central nervous system (CNS). Over time, the identity of each population is composed through the combinatorial effects of intrinsic programs (often acting through ‘‘master’’ transcription factors), and extrinsic signals that pattern the niche where each population develops.

Among glial cells of the CNS, oligodendrocytes (OLs) are a particularly specialized cell type that provides fundamental support to neuronal activity by producing the myelin sheath.

In the cerebral cortex, myelin is not evenly distributed: while deep layer neurons are relatively homogeneous in their profile of longitudinal myelination, pyramidal neurons located in the superficial cortical layers display a highly diversified set of profiles, including a pattern in which myelinated segments are interspersed with long, unmyelinated axonal tracts. It is possible that different combinations of neuron-oligodendrocyte interactions may exist in the different layers of the cortex, generating these diverse profiles of myelination.

Recent relevant publications:

1) Armentano, M., Chou, S.-J., **Tomassy, G.S.**, Leingärtner, A., O'Leary, D. D. M., & Studer, M. (2007). COUP-TFI regulates the balance of cortical patterning between frontal/motor and sensory areas. *Nature Neuroscience*, *10*(10), 1277–1286. doi:10.1038/nn1958

2) **Tomassy, G. S.**, De Leonibus, E., Jabaudon, D., Lodato, S., Alfano, C., Mele, A., et al. (2010). Area-specific temporal control of corticospinal motor neuron differentiation by COUP-TFI. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(8), 3576–3581. doi:10.1073/pnas.0911792107

3) **Tomassy, G. S.**, Berger, D. R., Chen, H.-H., Kasthuri, N., Hayworth, K. J., Vercelli, A., et al. (2014). Distinct Profiles of Myelin Distribution Along Single Axons of Pyramidal Neurons in the Neocortex. *Science*, *344*(6181), 319–324.

4) **Tomassy, G.S.**, & Fossati, V. (2014). How big is the myelinating orchestra? Cellular diversity within the oligodendrocyte lineage: facts and hypotheses. *Frontiers in Cellular Neuroscience*, *8*. doi:10.3389/fncel.2014.00201

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