TEMS

Temasek External Monthly Seminar

TEMASEK LIFESCIENCES LABORATORY

ALL ARE WELCOME

26 August 2019 (Monday), 3pm
The Auditorium (Level 1)

Hosted by: Mr Bu Shufeng

Motor-based polarity sorting of microtubules in neurons

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Dr. Peter Baas is Professor of Neurobiology and Anatomy at Drexel University College of Medicine, where he is also Director of the Graduate Program in Neuroscience. His research focuses on the organization and regulation of microtubules during the development of the nervous system, and also during disease and injury

A longstanding question in cellular neuroscience is how microtubules in the axon become organized with their plus ends out, a pattern starkly different from the mixed orientation of microtubules in vertebrate dendrites. Recent attention has focused on a mechanism called polarity sorting, in which microtubules of opposite orientation are spatially separated by molecular motor proteins. Here we discuss this mechanism, and conclude that microtubules are polarity sorted in the axon by cytoplasmic dynein but that additional factors are also needed. In particular, computational modeling and experimental evidence suggest that static crosslinking proteins are required to appropriately restrict microtubule movements so that polarity sorting by cytoplasmic dynein can occur in a manner unimpeded by other motor proteins.

Recent Publications:

1. Rao, A.N., A. Patil, M.M. Black, E.M. Craig, K.A. Myers, H.T. Yeung, and **P.W. Baas**. 2017. Cytoplasmic dynein transports axonal microtubules in a polarity-sorting manner. Cell Reports 19: 2210-2219.
2. Qiang, L., X. Sun, T.O. Austin, H. Muralidharan, D. C. Jean, M. Liu, W. Yu, and **P.W. Baas**. 2018. Tau does not stabilize axonal microtubules but rather enables them to have long labile domains. Current Biology 28: 2181-2189.
3. Qiang L, Piermarini E, Muralidharan H, Yu W, Leo L, Hennessy LE, Fernandes S, Connors T, Yates PL, Swift M, Zholudeva LV, Lane MA, Morfini G, Alexander GM, Heiman-Patterson TD, **Baas PW**. 2019. Hereditary Spastic Paraplegia: gain-of-function mechanisms revealed by new transgenic mouse. Hum Mol Genet. 28: 1136-1152.