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TEMASEK LIFESCIENCES LABORATORY

30 March 2021 (Tuesday), 4pm

Hosted by: Dr Yu Fengwei

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Of flies and men: Neuronal network development, maintenance and function

Dr Peter Soba
LIMES Institute, University of Bonn, Germany

Ever since Dr Peter Soba was a kid, he wanted to be a scientist. Originally, he was fascinated by nature documentaries until he realized he had to be on stakeouts for weeks, which he felt was quite boring. Dr Soba turned to studying chemistry to understand the elements of live, again learning that what he was really interested in was the nature of living beings, not test tube reactions. Thus, he finally turned to biology, where he found his calling in trying to understand nervous system function and dysfunction. Originally studying the molecules underlying Alzheimer's disease during his PhD, Dr Soba then discovered his fascination for neuronal network development and function. For the questions that drive him, the *Drosophila* model provides an exciting playground that allows dissecting the inner workings of a brain from the molecular to the behavioral level.

How the nervous system develops and maintains its function is a fundamental biological question. In particular, the sensory systems of animals including our own develop very early in life and remain functional throughout, even while we are still growing. How incoming sensory information is properly processed in a growing organism with a still developing nervous system is not well understood, yet highly relevant for understanding neurodevelopmental disorders.

The work in my lab is focused on the somatosensory system of the fruit fly *Drosophila melanogaster*, where we have identified neuronal network mechanisms required to encode escape responses towards different noxious stimuli. I will give an overview of the recent efforts in my lab to understand how these neuronal circuits function and allow robust generation of appropriate behaviors. Moreover, I will present our recent work of how conserved molecular signals relevant for Autism Spectrum Disorders control the integrity of these functional circuits during development. I will highlight the relevance of our findings for human disorders, which exemplifies how this simple model system enables us to shed light on conserved mechanisms of nervous system development and function.

Recent Publications:

1. Hu C, Kanellopoulos A, Richter M, Petersen M, Konietzny A, Tenedini F, Hoyer N, Cheng L, Poon C, Harvey K, Windhorst S, Parish JZ, Mikhaylova M, Bagni C, Calderon de Anda FC, **Soba P** (2020). Conserved Tao kinase activity regulates dendritic arborization, cytoskeletal dynamics and sensory function in *Drosophila*. J Neurosci 40 (9) 1819-1833

2. Tenedini FM, Saéz Gonzáles M, Hu C, Pedersen L, Petruzzi MM, Wang D, Richter M, Petersen M, Spotowicz E, Schweizer M, Sigrist S, Calderon de Anda F, **Soba P** (2019). Maintenance of cell type-specific connectivity and circuit function requires Tao kinase. Nat Comm 10(1), 3506.

3. Hu C*, Petersen M*, Hoyer N*, Spitzweck B, Tenedini F, Wang D, Gruschka A, Burchardt LS, Szpotowicz E, Schweizer M, Guntur AR, Yang CH, **Soba P** (2017). Sensory integration and neuromodulatory feedback facilitate Drosophila mechanonociceptive behavior. Nat Neurosci 20(8):1085-95. (*equal contribution).