Combi Seminar

Wednesday, 1.25.17 | 1:30 | Foege Auditorium

Dr. Leo Pallanck

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http://depts.washington.edu/lablp/

"Genetic Analysis of a Mitochondrial Quality Control Pathway"

Pallanck Lab:

My laboratory uses the fruit fly *Drosophila melanogaster* as a genetic model system to understand the mechanisms underlying neurodegenerative disorders, such as Parkinson's disease. Flies are a terrific system for this work because of the many powerful genetic tools that have been developed over the long history of their use as a model organism, and because recent work has established that neurodegenerative disorders can be successfully modeled using flies. At present, we are pursuing three different projects in the lab.

Mitochondrial quality control: The accumulation of damaged mitochondria is linked to aging and common neurodegenerative diseases. Previous work has shown that damaged mitochondria can be selectively degraded in the lysosome through a process termed mitophagy, but the underlying mechanisms were completely unknown until recently. Our work on the Parkinson's disease-related factors PINK1 and Parkin helped establish that they play crucial roles in mitophagy. A major focus of our laboratory is now aimed at understanding how PINK1 and Parkin promote mitophagy, and to identify other components of this mitochondrial quality control apparatus.

Functional analysis of the glucocerebrosidase (*GBA*) gene: Mutations in the *GBA* gene are by far the most common genetic association with Parkinson's disease. *GBA* encodes a lysosomal enzyme required for the breakdown of the sphingolipid glucocylceramide, suggesting that the accumulation of glucocylceramide and related sphingolipids upon mutational inactivation of *GBA* triggers the onset of Parkinson's disease. We have created a fly model of *GBA* deficiency and are using it to explore the mechanisms underlying this frequent cause of Parkinson's disease.

Traumatic brain injury: Over the past several years it has become increasingly clear that traumatic brain injuries significantly increase the risk for developing neurodegenerative diseases years or even decades after the injury. We have recently created a fly model of traumatic brain injury and are using this model to explore the underlying mechanisms.

Questions? Contact Brian Giebel at bgiebel@uw.edu or visit the Combi website at http://www.gs.washington.edu/news/combi.htm