NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

School of Social Sciences
College of Humanities, Arts, and Social Sciences

Psychology
cordially invites you to the following seminar

Simple model systems provide insight into mechanisms of human neurodegenerative diseases

by
Prof Aaron Gitler, Stanford University

Date: Wednesday, 17 April 2019
Time: 10 – 11.30am
Venue: HSS Seminar Room 8 (HSS-01-09)

Biography

Dr. Aaron Gitler, Ph.D. has made fundamental discoveries into the mechanisms of neurodegenerative diseases, including Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis (ALS). He uses yeast and human cells as model systems to perform genetic screens to identify modifiers of toxicity associated with the accumulation of misfolded human disease proteins. One of his most pivotal discoveries was the identification of mutations in the ataxin-2 gene as a major genetic contributor to ALS. Dr. Gitler's team recently demonstrated that inhibiting this gene markedly extends lifespan and improves motor performance in a mouse model of ALS, setting the stage for testing this therapeutic approach in human ALS. He has also uncovered the mechanism by which mutations in other genes cause ALS and has discovered a broad role for RNA-binding proteins in ALS and related human neurological diseases. Dr. Gitler co-directs a genetics graduate course for neuroscience students and an upper-level mechanisms of neurodegenerative disease seminar course. Dr. Gitler's awards include being named a Pew Scholar in the Biomedical Sciences, a Rita Allen Foundation Scholar, the Sheila Essey Award for ALS Research, and being a recipient of the NIH Director's New Innovator Award and the NIH NINDS Research Program Award.

Abstract

My goal is to discover the cellular and molecular mechanisms by which protein aggregates contribute to neurodegeneration and to harness these mechanisms to devise novel therapeutic strategies. We use the baker's yeast, Saccharomyces cerevisiae, as a simple, yet powerful, model system to study the cell biology underpinning protein-misfolding diseases, which include Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis (ALS). We are focusing on the ALS disease proteins TDP-43 and FUS/TLS and have generated yeast models to define mechanisms by which these proteins cause ALS. Because these proteins aggregate and are toxic in yeast, we have used these yeast models to perform high-throughput genomewide modifier screens to discover suppressors and enhancers of toxicity. Launching from the studies in yeast, we have extended our findings into animal models and even recently into human patients. For example, we discovered mutations in one of the human homologs of a hit from our yeast TDP-43 modifier screen in ALS patients. Mutations in this gene are relatively common (~5% of cases) making it one of the most common genetic risk factors for ALS discovered to date. These screens are also providing new and completely unexpected potential drug targets, underscoring the power of such simple model systems to help reveal novel insight into human disease.

All are welcome!