

**2011 BEACH
DISTINGUISHED LECTURES
DEPARTMENT OF BIOCHEMISTRY**

Presented by
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*Monday, October 24 at 4:00
Deans Auditorium (PFEN)
Amyotrophic Lateral Sclerosis: Molecular pathogenesis*

*Tuesday, October 25 at 4:00
Deans Auditorium (PFEN)
Mitochondria and neurodegeneration*

Amyotrophic Lateral Sclerosis: Molecular pathogenesis

Amyotrophic Lateral Sclerosis (ALS) is a lethal, late onset neurodegenerative disease that affects the upper and lower motor neurons. The pathogenesis of the disease is poorly understood. ALS8, a familial form of ALS that is caused by a mutation in Vamp associated protein B (VAPB). We study the role of this protein in fruit flies and worms to better understand the molecular mechanisms that cause the disease. VAP coordinates some of the functions of the ER, including lipid synthesis and quality control of proteins. The aminoterminal end of VAP is also cleaved and secreted. It functions as hormone and binds to growth cone guidance receptors that are expressed on the muscle surface. Binding of VAP to these receptors controls Ca^{++} influx as well as mitochondrial dynamics in the muscles. Our study provides a molecular basis for a better understanding of ALS.

Mitochondria and neurodegeneration

We have carried out an extensive screen to isolate mutations that cause neurodegenerative phenotypes in flies. We identified numerous nuclear genes that encode protein that are targeted to the mitochondria and required for specific mitochondrial functions. These include proteins that control fission of mitochondria (Marf), translation of mitochondrial proteins (Aats-met), and mitochondrial import of proteins of Complex 1 (Sicily). I will provide an update on these proteins and how they provide us with a better molecular understanding of three neurodegenerative diseases, including Charcot-Marie-Tooth type 2A peripheral neuropathy (Marf), Autosomal recessive spastic ataxia with leukoencephaly (ARSAL), and Leigh Syndrome (Sicily).

About the Beach Lectures:

David W. Beach was born in 1925 in London, England. Following service in the Royal Navy, he married Doris Holmes and began his career as a Chartered Accountant. Feeling the urge to expand his horizons, he moved to Canada and began a series of jobs in the aluminum industry that included General Manager of Kawneer, Canada and Vice-President of Kawneer, Inc. As Vice-President of ALUMAX Aluminum Corporation he was instrumental in making it one of the largest and most profitable aluminum companies in the world, prior to his retirement. Inspired by his son's enthusiasm for science, he has chosen to share his good fortune by supporting this biochemistry graduate program. This long-term support is intended to promote intellectual curiosity, a commitment to excellence, and an appreciation of science in all those involved.