



## The Department of Pharmacology

Proudly Presents the  
Seminar Series:

### *Frontiers in Pharmacology*

# “Molecular basis of metabolic and mitogenic effects of insulin, insulin analogues and insulin-like growth factors”

Insulin, a pancreatic polypeptide hormone essential for glucose homeostasis, was purified just over 90 years ago, winning Banting and McLeod at the University of Toronto the Nobel Prize in 1923. It was a lifesaving treatment for people with diabetes, but also became a bonanza for scientists interested in the structure of proteins, since many milestones in solving protein structures were accomplished using insulin: the first to be sequenced, winning a Nobel prize to Fred Sanger, the first to be made by total synthesis, the first protein to be measurable by radioimmunoassay, winning a Nobel Prize to Roslyn Yalow, and the first protein therapeutics to be made by recombinant DNA technology. Its 3-D structure was solved in 1969 by Dorothy Hodgkin and her team.

The advent of recombinant DNA technology in the 70's made it possible to make designer insulins tailored for improved PK/PD properties including fast acting and basal insulin analogues, which are now part of modern diabetes therapy. With this engineering came concerns about undesirable side effects such as enhanced mitogenesis and cancer risk of insulin analogues. In my talk, I will review the structural biology of the insulin and related insulin-like growth factors, their receptors and signaling pathways, and the evolution of the insulin-like signaling system. I will discuss the implications of the structural data for the design of insulin analogues with improved pharmacological properties. Finally, I will discuss how these peptides are involved in mitogenesis by regulating the cell cycle.

**Pierre De Meyts,MD,PHD**

**Professor and Director, F.A.C.E**

**Department of Diabetes Biology and Hagedorn Research Institute,  
Novo Nordisk A/S, Gentofte, Denmark**

**Tuesday, March 26, 2013**

**4:00 pm**

**Genome Center (Rm. # 1005)**

**Host: Mary Horne: [mhorne@ucdavis.edu](mailto:mhorne@ucdavis.edu)**

*Light refreshments will be served.*