

*Invited Presentation****BIOMEDICAL ENGINEERING SEMINAR***

11:00 a.m.-12:00 noon, Friday, March 6, 2009
Mann Hall, Medical Sciences Building

Title: The Mechanisms of Cell Membrane Repair

**Presenter: Richard Steinhardt, Ph.D.
Department of Molecular Cell Biology
University of California at Berkeley**

Abstract: When a cell loses its membrane integrity it dies within minutes unless it successfully reseals. There are a variety of mechanisms brought into play depending on the size of the disruption. For breaks on the order of a micron and above, an active exocytotic response is necessary for the membrane to reseal. The loss of this active process is the chief cause of cell death during metabolic inhibition and in anoxia. Could understanding cell membrane repair be of practical use in medicine, for example in the preparation of candidates for high-risk surgeries?

I will describe the evidence leading to the hypothesis of membrane repair by exocytosis. Repeated breaks in cell membranes elicit a more rapid membrane repair response, using signaling pathways that parallel those in enhanced neurotransmission. I will attempt to clear up confusions about which intracellular compartments are used at different scales of membrane breaks.

The process of exocytosis appears to be necessary in order to lower membrane tension to the point where the lipid bilayer is able to reseal. Artificial treatments that lower the tension to the critical point can promote resealing when exocytosis is blocked. For the artificial lowering of tension to be effective it has to be done before the membrane breaks. The effective compound and concentration has already been tested for safety in human volunteers for periods up to 48 hours.

Host: Rolf Hubmayr, Ph.D.

◆ See BME web page for list of speakers:

http://mayoresearch.mayo.edu/mayo/research/physio_bme/2009_bme_seminars.cfm