

JOHN P. MCGOVERN LECTURESHIP  
IN BIOMEDICAL COMPUTING AND IMAGING

**Structure/function of macromolecules: eukaryotic  
phosphofructokinase and bacterial adhesins**



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I am interested on the structural/functional relationship of macromolecular complexes. Currently, my research is focused in certain aspects of the carbohydrate metabolism of eukaryotes and of bacterial adhesion.

- Muscle and cancer cells use glycolysis as their main energy pathway. Deficiencies of the key regulatory enzyme phosphofructokinase, whose structure is largely unknown, can lead to hemolytic anemia and Tauri's Disease. We are analyzing the structure of several yeast phosphofructokinases by cryo-electron microscopy and image processing using different combinations of effectors and substrates to obtain a better understanding of the eukaryotic mechanism.
- Bacterial adhesion, essential for colonization and invasion, represents the first step in the infective process and is mediated by proteinaceous surface appendages. We are studying two major colonizers of the oral cavity, *Streptococcus parasanguinis* and *Aggregatibacter actinomycetemcomitans*, as model systems for other highly infective pathogens. Through a combination of electron microscopy, biochemical and molecular genetic techniques, we are analyzing the structure of the external appendages, their anchorage to the bacterial membrane and the interaction with the various human cell host components.

**Date:** Wednesday, January 27, 2010  
**Time:** 4:00PM  
**Place:** GSBS Large Classroom (BSRB S3.8371)  
Mitchell Basic Sciences Research Building  
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