GMS6040 (Host-Pathogen Interactions) is a 1 credit hour paper-based discussion course and highlights examples involving bacteria, viruses and parasites. Papers are selected from the current and classic literature.

Depending on the interest of the group an overview of basic topics covered include:

- Interference with humoral immunity
- Interference with cell-mediated immunity
- Protective versus non-protective immunity
- Interference with or hijacking of cytokine/chemokine networks
- Interference with apoptosis
- Antigenic Variation/Molecular Mimicry
- Superantigens
- Interference with antigen presentation
- Adhesion and invasion
- Bacterial secretion mechanisms
- Autophagy: possible association with bacterial pathogenesis
- Strategies for intracellular survival of bacteria
- Induction of host-mediated tissue damage
- Interference with host cell intracellular trafficking

Earlier class sessions are led by Dr. Brady and later sessions are led by the students enrolled in the course. Grades are based on short answer written homework questions related to the assigned readings (usually 1-2 basic research papers per class period with accompanying reviews as appropriate), class preparedness and participation, and the presentation of a research paper and an overview of the student’s chosen topic. It is encouraged for students to have a basic immunology textbook and a basic medical microbiology textbook at their disposal for reference and general background information.

The last time the course was offered in 2010 the following topics were covered along with in depth discussion of the indicated papers (*).

**Rethinking Concepts of Virulence**

*The Damage Response Framework of Microbial Pathogenesis*
Nature Reviews Microbiology, October 2003
Arturo Casadevall and Liise-anne Pirofski

*Accidental Virulence, Cryptic Pathogenesis, Martians, Lost Hosts, and the Pathogenesis of Environmental Microbes*
Eukaryotic Cell, December, 2007
Arturo Casadevall and Liise-anne Pirofski

*Bacterial strategies for overcoming host innate and adaptive immune responses*
Nature Immunology, November, 2002
Mathias W. Hornef, et al.
Microbial Subversion of Cell-Mediated Immunity: Interference with Antigen Processing and Presentation

Recent Advances in Antigen Processing and Presentation
Nature Immunology, October 2007
Peter Jensen

Subversion of the MHC Class 1 antigen-presentation pathway by adenoviruses and herpes simplex viruses
Trends in Microbiology, March, 1996
Hans-Gerhard Burgert

Herpes simplex virus infections
The Lancet, May 12, 2001
Richard J. Whitley and Bernard Roizman

*Herpes simplex virus turns off the TAP to evade host immunity
Nature, June 1, 1995
Anne Hill, et al.

*A viral inhibitor of peptide transporters for antigen presentation
Nature, June 1, 1995
Klaus Fruh et al.

Interference with Cell-mediated Immunity- Cont’d

Salmonella: The host and disease: a brief review
Immunology and Cell Biology, (2007) 85
Bryan Coburn, Guntram A. Grassl, and BB Finlay

*Functional analysis of the Salmonella pathogenicity island 2-mediated inhibition of antigen presentation in dendritic cells
Infection and Immunity, November 2008
Serkan Halici, et al.

*Intracellular Salmonella inhibit antigen presentation by dendritic cells
Journal of Immunology, (2005) 174
Cedric Cheminay, et al.

Bacterial Superantigens

The bacterial superantigen and superantigen-like proteins
Immunological Reviews 2008
Volume 225
John D. Fraser and Thomas Proft
*Soluble M1 protein of *Streptococcus pyogenes* triggers potent T cell activation
Cellular Microbiology, September 2007
Lisa I. Pahlman, et al.

**Subversion/Interference of Mucosal Humoral Immunity**

Mucosal Immunity: Induction, Dissemination, and Effector Functions
Scandanavian Journal of Immunology (2009) 70
Per Brandtzaeg

IgA1 Protease
Dippica Mistry and Robert A. Stockley

Antibody-dependent enhancement of infection: Bacteria do it too
TRENDS in Immunology, September 2003
Surendran Mahalingam and Brett A. Lidbury

*Antibody-enhanced pneumococcal adherence requires IgA1 protease
PNAS, April 1, 2003
Jeffrey N. Weiser et al.

**Bacterial Hijacking of the Complement System**

Complement and its role in innate and adaptive immune responses
Cell Research, (2010) 20
Jason R. Dunkelberger and Wen-Chao Song

Complement evasion by human pathogens
Nature Reviews Microbiology, February 2008
John D. Lambris, et al.

Complement inhibition by gram-positive pathogens: molecular mechanisms and therapeutic implications
Journal of Molecular Medicine, January 2010
Alexander Laarman, et al.

Subversion of innate immunity by periodontopathic bacteria via exploitation of complement receptor-3
Advances in Experimental Medicine and Biology, (2008) 632
George Hajishengallis, et al.

*Fimbrial proteins of *Porphyromonas gingivalis* mediate *in vivo* virulence and exploit TLR2 and complement receptor 3 to persist in macrophages
**Bacterial adhesion/Functional amyloid**

Bacterial adhesion and entry into host cells  
*Cell*, February 24, 2006  
Javier Pizarro-Cerda and Pascale Cossart

Polymerizing the fibre between bacteria and host cells: the biogenesis of functional amyloid fibres  
*Cellular Microbiology* (2008) 10  
Elisabeth Ashman Epstein and Matthew R. Chapman

*Synergistic role of curli and cellulose in cell adherence and biofilm formation of attaching and effacing* *Escherichia coli* and identification of Fis as a negative regulator of curli  
*Environmental Microbiology*, (2009) 11  
Zeus Saldana, et al.

**Motility of Intracellular Bacteria**

Regulating cellular actin assembly  
*Current Opinion in Cell Biology*, April, 2001  
James E. Bear, et al.

*Listeria monocytogenes*, a unique model in infection biology: an overview  
Pascale Cossart and Alejandro Toledo-Arana

*Adapter protein SH2-Bβ stimulates actin-based motility of* *Listeria monocytogenes* *in a vasodilator-stimulated phosphoprotein (VASP)-dependent fashion*  
*Infection and Immunity*, July 2007  
Maria Diakonova, et al.

**Student Selected Discussion Papers**

*SNARE protein mimicry by an intracellular bacterium* (*Chlamydia trachomatis*)  
*PLOS Pathogens*, (2008) 4  
Cedric Delevoye, et al.

*Functions of cell surface-anchored antigen I/II and Hsa polypeptides in interactions of* *Streptococcus gordonii* *with host receptors*  
*Infectin and Immunity*, October 2005  
Nicholas S. Jakubovics, et al.
*Heme Oxygenase-1-derived carbon monoxide induces the *Mycobacterium tuberculosis* dormancy regulon
Journal of Biological Chemistry, June 27, 2008
Ashwani Kumar, et al.

*Role of *Porphyromonas gingivalis* SerB in gingival epithelial cell cytoskeletal remodeling and cytokine production
Infection and Immunity, June 2008
Yoshiaki Hasegawa, et al.