**BIOM 253: Spring – "Pathogens and Host Defense" (Course Leader: Victor Nizet, MD)**
Medical Teaching Facilty (MTF), Room 275
Spring Quarter, Wednesdays, 9 AM to 12 PM

## Week 1: APRIL 1st

**09:00 – 09:45:** Introductions, course description, class members will volunteer and/or draw lots for presentation topic and order

**09:45 – 10:15:** Read Article for Discussion Inoshima, et al. *Staphylococcus aureus* pore-forming toxin subverts the activity of ADAM10 to cause lethal infection in mice. Nat Med 2011; 17:1310-4.

**10:15 – 11:00:** Article Discussion moderated by Victor

**11:00 AM hour:** Faculty Didactic Module: VICTOR NIZET: Group A *Streptococcus*

## Week 2: APRIL 8th

**THIS WEEK'S REVIEW:** Bloes DA, Kretschmer D, Peschel A. Enemy attraction: bacterial agonists for leukocyte chemotaxis receptors. Nat Rev Microbiol 2015 Feb;13(2):95-104.

**9:00 AM hour: STUDENT PRESENTATION #1 (Leo Lin):** Cambier CJ, Takaki KK, Larson RP, Hernandez RE, Tobin DM, Ramakrishnan L. Mycobacteria manipulate macrophage recruitment through coordinated use of membrane lipids. Nature 2014 Jan 9;505(7482):218-22.

**10:00 AM hour: STUDENT PRESENTATION #2 (Jessica Lawrence):** Alonzo F 3rd, Kozhaya L, Rawlings SA, Reyes-Robles T, DuMont AL, Myszka DG, Landau NR, Unutmaz D, Torres VJ. CCR5 is a receptor for Staphylococcus aureus leukotoxin ED. Nature 2013 Jan 3;493(7430):51-5.

**11:00 AM hour:** Faculty Didactic Module: **JOSEPH VINETZ, MD** - Leptospirosis

## Week 3: APRIL 15th

**THIS WEEK'S REVIEW:** Nothelfer K, Sansonetti PJ, Phalipon A. Pathogen manipulation of B cells: the best defence is a good offence. Nat Rev Microbiol 2015; 13:173-84.

**9:00 AM hour: STUDENT PRESENTATION #1 (Connal Sauvey):** Nothelfer K, Arena ET, Pinaud L, Neunlist M, Mozeleski B, Belotserkovsky I, Parsot C, Dinadayala P, Burger-Kentischer A, Raqib R, Sansonetti PJ, Phalipon A. B lymphocytes undergo TLR2-dependent apoptosis upon *Shigella* infection. J Exp Med 2014 Jun 2;211(6):1215-29.

**10:00 AM hour: STUDENT PRESENTATION #2 (Shanna Newton):** Neves P, Lampropoulou V, Calderon-Gomez E, Roch T, Stervbo U, Shen P, Kühl AA, Loddenkemper C, Haury M, Nedospasov SA, Calado DP, Fillatreau S. Signaling via the MyD88 adaptor protein in B cells suppresses protective immunity during *Salmonella typhimurium* infection. Immunity 2010 Nov 24;33(5):777-90.

**11:00 AM hour:** Faculty Didactic Module: **Aleem Siddiqui, PhD (Hepatitis C Virus)**

## Week 4: APRIL 22nd (VICTOR OUT OF TOWN)

**NO STUDENT PRESENTATION, ONLY FACULTY LECTURE**

**11:00 AM hour:** Faculty Didactic Module: **John Guatelli, MD (HIV)**

## Week 5: April 29th

**THIS WEEK'S REVIEW:** Archin NM, Sung JM, Garrido C, Soriano-Sarabia N, Margolis DM. Eradicating HIV-1 infection: seeking to clear a persistent pathogen. Nat Rev Microbiol. 2014 Nov;12(11):750-64.

**9:00 AM hour: STUDENT PRESENTATION #1 (Chris Cottrell):** Shan L, Deng K, Shroff NS, Durand CM, Rabi SA, Yang HC, Zhang H, Margolick JB, Blankson JN, Siliciano RF. Stimulation of HIV-1-specific cytolytic T lymphocytes facilitates elimination of latent viral reservoir after virus reactivation. Immunity. 2012 Mar 23;36(3):491-501.

**10:00 AM hour: STUDENT PRESENTATION #2 (Sarah Ur):** Denton PW, Long JM, Wietgrefe SW, Sykes C, Spagnuolo RA, Snyder OD, Perkey K, Archin NM, Choudhary SK, Yang K, Hudgens MG, Pastan I, Haase AT, Kashuba AD, Berger EA, Margolis DM, Garcia JV. Targeted cytotoxic therapy kills persisting HIV infected cells during ART. PLoS Pathog. 2014 Jan;10(1):e1003872.

**11:00 AM hour:** Faculty Didactic Module: **Rob Knight, PhD (Human Microbiome)**

## Week 6: MAY 6th (VICTOR OUT OF TOWN)

**THIS WEEK'S REVIEW:** LaRock DL, Chaudhary A, Miller SI. *Salmonellae* interactions with host processes. Nat Rev Microbiol 2015 Apr;13(4):191-205.

**9:00 AM hour: STUDENT PRESENTATION #1 (Tamara Escajadillo):** Spanò S, Galán JE. A Rab32-dependent pathway contributes to Salmonella typhi host restriction. Science 2012 Nov 16;338(6109):960-3.

**10:00 AM hour: STUDENT PRESENTATION #2 (Afsheen Banisadr):** Winter SE, Thiennimitr P, Winter MG, Butler BP, Huseby DL, Crawford RW, Russell JM, Bevins CL, Adams LG, Tsolis RM, Roth JR, Bäumler AJ. Gut inflammation provides a respiratory electron acceptor for Salmonella. Nature 2010 Sep 23;467(7314):426-9.

**11:00 AM hour:** Faculty Didactic Module: **Emily Troemel, PhD** (**Perturbation of Core Processes Triggers Host Response in C. Elegans)**

## Week 7: May 13th

**THIS WEEK'S REVIEW:** Underhill DM, Iliev ID. The mycobiota: interactions between commensal fungi and the host immune system. Nat Rev Immunol 2014 Jun;14(6):405-16.

**9:00 AM hour: STUDENT PRESENTATION #1 (Rikke Soelbeck Anderson):** Iliev ID, Funari VA, Taylor KD, Nguyen Q, Reyes CN, Strom SP, Brown J, Becker CA, Fleshner PR, Dubinsky M, Rotter JI, Wang HL, McGovern DP, Brown GD, Underhill DM. Interactions between commensal fungi and the C-type lectin receptor Dectin-1 influence colitis. Science 2012 Jun 8;336(6086):1314-7.

**10:00 AM hour: STUDENT PRESENTATION #2 (Sean Lund):** Kim YG, Udayanga KG, Totsuka N, Weinberg JB, Núñez G, Shibuya A. Gut dysbiosis promotes M2 macrophage polarization and allergic airway inflammation via fungi-induced $PGE_2$. Cell Host Microbe 2014 Jan 15;15(1):95-102.

11:00 AM hour: Faculty Didactic Module: **Kelly Doran, PhD (GBS/Bacterial Meningitis)**

**(Something Amazing Topics for Week 9 – Run by Victor by End of this Week)**

## Week 8: May 20th

**THIS WEEK'S REVIEW:** Huang J, Brumell JH. Bacteria-autophagy interplay: a battle for survival Nat Rev Microbiol. 2014; 12:101-14

**9:00 AM hour: STUDENT PRESENTATION #1 (Cindy Chen):** Thurston TL, Wandel MP, von Muhlinen N, Foeglein A, Randow F. Galectin 8 targets damaged vesicles for autophagy to defend cells against bacterial invasion. Nature 2012 Jan 15;482(7385):414-8.

**10:00 AM hour: STUDENT PRESENTATION #2 (Orysya Stus):** Manzanillo PS, Ayres JS, Watson RO, Collins AC, Souza G, Rae CS, Schneider DS, Nakamura K, Shiloh MU, Cox JS. The ubiquitin ligase parkin mediates resistance to intracellular pathogens. Nature 2013 Sep 26;501(7468):512-6.

**11:00 AM hour:** Faculty Didactic Module: **Elizabeth Winzeler, PhD** (Malaria)

**(Invention Topics for Week 10 – Run by Victor by End of this Week)**

## Week 9: May 27th "Something Amazing"

Quick student presentations Pick something that has been revealed the recent (last 2 years) host-pathogen literature that strikes you as particularly fascinating. Develop a snappy, captivating 12 to 15-minute PPT presentation (maximum 10 slides) to BLOW AWAY THE MINDS the rest of the class with this knowledge. Practice your talk to ensure you don't run over the time allotment.

## Week 10: June 3rd Inventions/Provisional Patents

**Provisional Patent Applications - 12 minute-long presentations**

Each application describes an entirely new "outside-the-box" idea to combat an important human pathogen either: (1) by targeting and neutralizing one or more of its virulence factors/mechanisms or (2) by boosting the innate or adaptive immune response to the pathogen. No routine strategies for antibiotic or vaccine therapy are allowed.

Answers to the following questions should be incorporated (verbatim from UCSD Technology Transfer Office initial invention disclosure form):

1. What exactly does your invention do?
2. What is unique, novel, or better about your invention as compared to existing art?
3. What is the existing art to which you are comparing?
4. Describe how your invention works (or may work). If there is a drawings, schematics, figures, etc., that can help explain how the invention works or may work, please include.
5. What are potential commercial applications of your invention?
6. Based on your knowledge, please provide the name(s) of companies that are, or may be, interested in manufacturing, using, and/or further developing your invention.

You can either (a) provide a separate 3-5 page (single spaced) document organized as above in addition to the PPT presentation in class, or instead (b) provide a print out of your PPT presentation if it is organized in a way that touches all the points and is easy to follow.

***In the 11 O'Clock Hour – This Years Class Winds Down with a PIZZA PARTY***