



# **Immunology: New Tracks and Greatest Hits**

<b>Professor:</b>	Jonathan Hoggatt, PhD <a href="mailto:Hoggatt.Jonathan@mgh.harvard.edu">Hoggatt.Jonathan@mgh.harvard.edu</a>	Sherman Fairchild Room 268 MW: 4:30 -5:45
<b>Course Details:</b>		
<b>Teaching Fellow:</b>	Aditya Raguram <a href="mailto:araguram@g.harvard.edu">araguram@g.harvard.edu</a>	

This semester long course will explore cutting edge immunology topics with student presentations of recently published papers discussing topics ranging from stem cells, HIV, gluten, cancer and others. The class will also discuss the classic immunology papers that have shaped the field today, with discussions on the next steps for the future.

**Course work:** Reading of papers, seminar presentations, class participation and final paper.

#### Grading:

20%	Class Participation and Peer Reviews
25%	New Tracks Presentation
25%	Greatest Hits Presentation
30%	Final Paper

A+:	97% - 100%
A:	93% - 96.99%
A-:	90% - 92.99%
B+:	87% - 89.99%
B:	83% - 86.99%
B-:	80% - 82.99%
C+:	77% - 79.99%
C:	73% - 76.99%
C-:	70% - 72.99%
D+:	Let's avoid getting down here...

The course will begin in instruction on how to properly give a “journal club” style presentation, and some of this instruction will be based on relevant literature in psychology and the neurosciences regarding PowerPoint presentations.

For the first half of the semester, the “New Tracks” portion of the course will then include student journal club-style presentations on recent immunology related papers. Two, 25 minute presentations will be given each class session, leaving ~10 minutes for Q&A and class discussion after each presentation.



The second half of the semester will be the “Greatest Hits” portion of the course and will include classic immunology papers. Rather than a standard journal club presentation, these will instead focus on how the field of immunology has progressed since the original paper was published. Were there assumptions made at the time that we now know to be false? What further advancements were made as a result of that original finding? Were therapies formed that we use today?

The final paper will then be based on the “New Tracks” paper presented in the first half of the semester, and this 7-10 page paper will be an assessment on how the field will change in the future. What are the unanswered questions left in that paper? What assumptions do you think may be changed in the future? What are the next logical experiments that should be performed.

# Course Calendar

Monday, January 27<sup>th</sup>

Course Introduction

Wednesday, January 29<sup>th</sup>

## **Example New Track: Aditya Raguram**

Example New Track Presentation: Hasan et al., 2017 – “A human antibody against Zika virus crosslinks the E protein to prevent infection”

Monday, February 3<sup>rd</sup>

## **Principles of an Effective Presentation**

Wednesday, February 5<sup>th</sup>

## **Preparing Your Presentations and Evaluations**

Monday, February 10<sup>th</sup>

## **New Tracks 1. Infection**

Mate et al., 2015 – “Molecular evidence of sexual transmission of Ebola virus”

[Presenter: Angela Balistrieri](#)

Lai et al., 2020 – “Gut-innervating nociceptor neurons regulate Peyer’s patch microfold cells and SFB levels to mediate salmonella host defense”

[Presenter: Jessica Tsang](#)

Wednesday, February 12<sup>th</sup>

## **New Tracks 2. Varied roles of macrophages**

Culemann et al., 2019 – “Locally renewing resident synovial macrophages provide a protective barrier for the joint”

[Presenter: Alex Gibbons](#)

Liu et al., 2019 – “Metabolic rewiring of macrophages by CpG potentiates clearance of cancer cells and overcomes tumor-expressed CD47-mediated ‘don’t-eat-me’ signal”

[Presenter: Sarah Araten](#)

Monday, February 17<sup>th</sup>

*President's Day – NO CLASS*

Wednesday, February 19<sup>th</sup>

## **New Tracks 3. The microbiome**

Shao et al., 2019 – “Stunted microbiota and opportunistic pathogen colonization in caesarean-section birth”

[Presenter: Mariana Sanchez-Medina](#)

Kootte et al., 2017 – “Improvement of Insulin Sensitivity after Lean Donor Feces in Metabolic Syndrome Is Driven by Baseline Intestinal Microbiota Composition”

[Presenter: Sana Shereef](#)

Monday, February 24<sup>th</sup>

#### **New Tracks 4. Diet and the Immune System**

Jordan et al., 2019 – “Dietary intake regulates the circulating inflammatory monocyte pool”

[Presenter: Brendon Lee](#)

Mishra et al., 2019 – “Parabrachial Interleukin-6 reduces body weight and food intake and increases thermogenesis to regulate energy metabolism”

[Presenter: Safa Salem](#)

Wednesday, February 26<sup>th</sup>

#### **New Tracks 5. Autoimmunity**

Sullivan et al., 2018 – “Myeloablative Autologous Stem-Cell Transplantation for Severe Scleroderma”

[Presenter: Tina Liu](#)

Saligrama et al., 2019 – “Opposing T cell responses in experimental autoimmunity encephalomyelitis”

[Presenter: Mazuba Siamatu](#)

Monday, March 2<sup>nd</sup>

#### **New Tracks 6. Psychological implications of immunity**

Snyder-Mackler et al., 2016 – “Social status alters immune regulation and response to infection in macaques”

[Presenter: Charis Palandjian](#)

Filiano et al., 2016 – “Unexpected role of interferon- $\gamma$  in regulating neuronal connectivity and social behavior”

[Presenter: Alexander Afeyan](#)

Wednesday, March 4<sup>th</sup> -

#### **New Tracks 7. Sleep and immunity**

Pedersen et al., 2019 – “CD8+ T cells from patients with narcolepsy and healthy controls recognize hypocretin neuron-specific antigens”

[Presenter: Andrew Castillo](#)

Toda et al., 2019 – “A sleep-inducing gene, nemuri, links sleep and immune function in Drosophila”

[Presenter: Amy Jia](#)

Monday, March 9<sup>th</sup> -

#### **Evaluations with Aditya**

Wednesday, March 11<sup>th</sup> -

#### **New Track 8. Gene editing – from bacteria to humans**

Charlesworth et al., 2019 – “Identification of preexisting adaptive immunity to Cas9 proteins in humans”

[Presenter: Gabriela Palayo](#)

Niu et al., 2017 – “Inactivation of porcine endogenous retrovirus in pigs using CRISPR-Cas9”

[Presenter: Chiamaka Obilo](#)

*March 14<sup>th</sup> – March 22<sup>nd</sup>*

*Spring Break*

Monday, March 23<sup>rd</sup>

**Effective Presentations: Round 2**

Wednesday, March 25<sup>th</sup>

**Open Office Hour**

Monday, March 30<sup>th</sup>

**Greatest Hits 1. Hematopoietic stem cells**

Becker et al., 1963 – “Cytological demonstrations of the clonal nature of spleen colonies derived from transplanted mouse marrow cells”

[Presenter: Sarah Araten](#)

Hutter et al., 2009 – “Long-term control of HIV by CCR5 delta32/delta 32 stem-cell transplantation”

[Presenter: Charis Palandjian](#)

Wednesday, April 1<sup>st</sup>

**Greatest Hits 2. Origins of disease**

Franklin et al., 1957 – “An unusual protein component of high molecular weight in the serum of certain patients with rheumatoid arthritis”

[Presenter: Angela Balistieri](#)

Giblett et al., 1972 – “Adenosine-deaminase deficiency in two patients with severely impaired cellular immunity”

[Presenter: Brendon Lee](#)

Monday, April 6<sup>th</sup>

**Greatest Hits 3. Transplantation Immunology**

Billingham, Brent and Medawar, 1953 – “Actively acquired tolerance’ of foreign cells”

[Presenter: Mazuba Siamatu](#)

Gorer, Lyman and Snell, 1948 – “Studies on the genetic and antigenic basis of tumour transplantation. Linkage between a histocompatibility gene and ‘fused’ in mice”

[Presenter: Jessica Tsang](#)

Wednesday, April 8<sup>th</sup>

**Greatest Hits 4. Antibodies and B-cell Diversity**

Kohler and Milstein, 1975 – “Continuous cultures of fused cells secreting antibody of predefined specificity”

[Presenter: Tina Liu](#)

Hozumi and Tonegawa, 1976 – “Evidence for somatic rearrangement of immunoglobulin genes coding for variable and constant regions”

[Presenter: Alex Gibbons](#)

Monday, April 13<sup>th</sup>

### **Greatest Hits 5. Activating T-cells**

Krummel and Allison, 1995 – “CD28 and CTLA-4 have opposing effects on the response of T cells to stimulation”

[Presenter: Alexander Afeyan](#)

Barber et al., 2006 – “Restoring function in exhausted CD8 T cells during chronic viral infection”

[Presenter: Chiamaka Obilo](#)

Wednesday, April 15<sup>th</sup>

### **Greatest Hits 6. Cancer and immunology**

Friend, 1957 – “Cell-free transmission in adult swiss mice of a disease having the character of leukemia”

[Presenter: Sana Shareef](#)

Bruggen et al., 1991 – “A gene encoding an antigen recognized by cytolytic T lymphocytes on a human melanoma”

[Presenter: Andrew Castillo](#)

Monday, April 20<sup>th</sup>

### **Greatest Hits 7. Antigens: Innate and adaptive**

Steinman, 1973 – “Identification of a novel cell type in peripheral organs of mice”

[Presenter: Safa Salem](#)

Medzhitov et al., 1997 – “A human homologue of the *Drosophila* Toll protein signals activation of adaptive immunity”

[Presenter: Mariana Sanchez-Medina](#)

Wednesday, April 22<sup>nd</sup>

### **Greatest Hits 8. Is it true?**

Wakefield, 1998 – “Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children”

[Presenter: Amy Jia](#)

Biesiekierski et al., 2011 – “Gluten causes gastrointestinal symptoms in subjects without celiac disease: a double-blind randomized placebo-controlled trial”

[Presenter: Gabriela Pelayo](#)

Monday, April 27<sup>th</sup>

### **Stem Cell Donation**

Hoggatt et al., 2018 – “Rapid mobilization reveals a highly engraftable hematopoietic stem cell.”

Wednesday, April 29<sup>th</sup>

Final Paper Writing Workshop

Tuesday, May 12<sup>th</sup> -

### **Final Paper Due**



This course is largely a student driven course, meaning that the quality of what is learned will be based on not only the individual presentations, but also active engagement during class. The course requires self-guided learning through reading primary research articles in the same way that practicing scientists and clinicians learn material in their careers. The expectation is not that you will become an expert in all things immunology at the end of the semester, but rather that you will become an expert in two focused areas, based on the New Tracks and Greatest Hits papers. The final paper is your turn to predict the changes in the field, or to propose the direction immunology researchers should take in the next ten years.