(Aging, the Immune System, and Your Brain)

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Schedule of topics:

Week 1
Immune System Fundamentals
This week will focus on the fundamentals of the immune system. Here you will learn the basics of how the immune system works and how immune cells in your body interact with each other to fight off various viruses/bacteria that you are exposed to.

Suggested Reading: http://theibdimmunologist.com/learning/basic-immunology

Week 2
The Brains Own Immune Cell Microglia: Housekeepers, Gardeners, and Garbage Collectors
This week will focus on how the brain has its own specialized immune system and immune cell. Here you will be introduced to how the immune system that exists in the body is, in part, separated from the immune system in the brain because of a structure known as the blood brain barrier. You will also be introduced to how new preclinical treatment mechanisms are being used to bring treatments into the brain to “fight off” factors involved in diseases including Alzheimer’s disease.

Suggested Reading:

Did you know? Your registration in the LinR program allows you to borrow materials from Carleton University’s MacOdrum Library. To receive a temporary borrowing card, visit the circulation desk and identify yourself as a participant of LinR.
Week 3

Discovering the Connections: How the Immune System Communicates with the Brain and Vice Versa

This week will focus on how the immune system in the body can gain entry into/communicate with the brain. Indeed your body needs to tell the brain that it is infected\that it is sick and there are various routes of communication to do this. In addition, we will talk briefly about how the immune system uses the brain to help turn itself off. We will also discuss how lifestyle factors (e.g. stress, pesticide exposure) can compromise the blood brain barrier allowing for the entry of different factors (including factors involved in the immune response) into the brain leading to brain inflammation.

Suggested Reading: https://www.scientificamerican.com/article/the-seventh-sense/

Week 4

The Immune System and its Relation to Age Related Diseases Including Parkinson’s Disease and Alzheimer’s Disease: Can Viruses Cause Parkinson’s disease?

This week will focus primarily on how an elevation in immune system factors may give rise to the age related disease known as Parkinson’s disease (with some focus on Alzheimer’s disease). We will also focus on the possibility of using anti-inflammatory treatment agents (drugs which block the immune system) as a possible avenue to treat Parkinson’s disease with current treatment approaches.

Suggested Reading: https://www.the-scientist.com/features/can-the-flu-and-other-viruses-cause-neurodegeneration--65498

Week 5

The Immune System and Depressive Disorders: Is There a Role for Anti-Inflammatory Drugs?

This week will focus on how inflammation is related to depression in some individuals. Here we will discuss how the immune system may lead to depression in the brain and how targeting factors of the immune system may help to alleviate depressive symptoms.

Suggested Reading: https://www.scientificamerican.com/article/can-infection-give-you-the-blues/
Week 6

The Gut – Brain Axis. How the foods that you eat can cause inflammation in your gut in relation to Obesity and Aging

This week will focus on the bacteria that resides in your gut. Here we will explore how lifestyle factors (e.g. diet, exercise, aging) can impact the bacteria and membrane in your gut which can in turn lead to various disorders (e.g. obesity, depression). Here you will get to learn how bacteria in your gut communicates with your brain and why it is important to keep a proper diet and to exercise as you age.

Suggested Reading: https://science.sciencemag.org/content/341/6150/1069.full

Recommended readings for continued learning:

(1) “The Immune System and Mental Health” by Hymie Anisman, Shawn Hayley, Alexander Kusenov

(2) “Infectious Behavior: Brain-Immune Connections in Autism, Schizophrenia, and Depression (The MIT Press)” by Paul H. Patterson

(3) “The Other Brain” by Douglas Fields

Other interesting resources:
(1) Podcast: “This Podcast will kill you”

(2) Podcast: “The Brain Science Podcast”