

# THE WAGNER FREE INSTITUTE OF SCIENCE

Winter 2017  
BIOCHEMISTRY SERIES  
**Viruses from the Inside Out**  
Professor Joseph B. Rucker

This course will be held at the **Independence Branch of the Free Library**, 18 S. 7<sup>th</sup> Street (between Market and Chestnut Streets), Philadelphia, PA.

LECTURES ARE HELD FROM 6:15 to 7:30 PM

## Course Description

Zika! Ebola! HIV! Viruses often make front-page news, yet we find them quite mysterious. This course will be a biochemist's view of how viruses work. We will explore the inner machinery of viruses to understand what they are and how they can make us sick.

## Lectures

### 1. Wednesday, January 25, 2017 – What is it like to be a virus?

Course introduction; what is a virus; telling viruses apart; how do scientists study viruses?

### 2. Wednesday, February 1, 2017 – How do viruses infect people and cells?

Breath, bugs, blood, guts, and sex; going from the outside in; viral receptors, or how a virus tells cells apart; should you worry if your dog sneezes on you?; getting across the cell membrane.

### 3. Wednesday, February 8, 2017 – How do viruses replicate?

DNA, RNA, and protein; replicating RNA and the source of viral diversity; getting in and out of the nucleus; how viruses escape the cell.

### 4. Wednesday, February 15, 2017 – The natural history of viruses

Where do new viruses come from?; what the Red Queen can tell us about viruses; Ebola and the search for natural reservoirs; from West Nile Virus to Zika, mosquitoes to people.

### 5. Wednesday, February 22, 2017 – Fighting viruses with anti-viral drugs

Throwing wrenches into the life cycle of a virus; AZT and why one drug is not enough; the controversy over hepatitis C drugs; how do cells protect themselves from viruses?

### 6. Wednesday, March 1, 2017 – Vaccines

From immunity to medicine; teaching our bodies to fight diseases; lessons from smallpox and polio; why we have to get flu shots every year; the challenges of vaccines in the 21<sup>st</sup> century.

**(SNOW DATE: Wednesday, March 8, 2017)**

## Recommended Reading

There is no textbook or required reading for this course. An excellent source of information on viruses is available on the blog of Dr. Vincent Racaniello (Columbia University). The website ([www.virology.ws](http://www.virology.ws)) has much information on viruses as well as a link to his own course on virology at Columbia University.

**Dr. Joseph B. Rucker** is the vice-president of research and development and a co-founder of Integral Molecular, a biotech company in West Philadelphia. His scientific expertise focuses on membrane proteins, sensory receptors, viruses, and antibodies. He is an author on more than 30 publications and has published in journals including Cell, Science, and Nature. He received his Ph.D. in chemistry from the University of California, Berkeley and did post-doctoral work at the University of Pennsylvania. He has been a member of the Wagner faculty since 2015.