



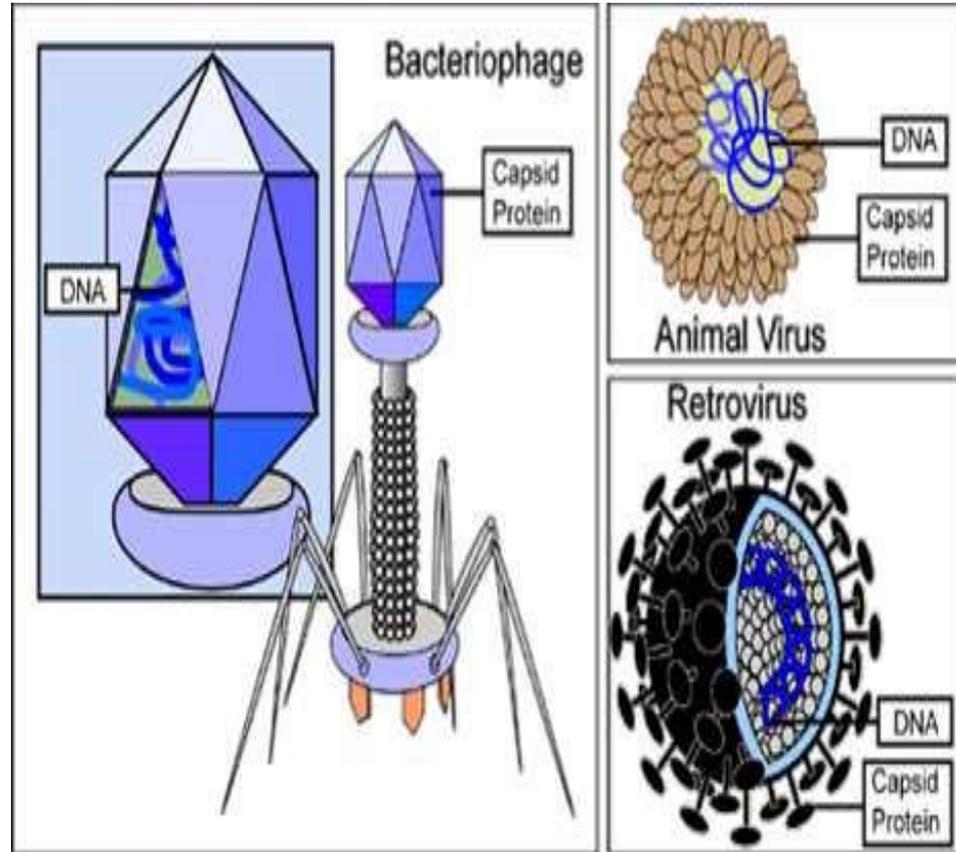
# About Science Prof Online PowerPoint Resources

- Science Prof Online (SPO) is a free science education website that provides fully-developed Virtual Science Classrooms, science-related PowerPoints, articles and images. The site is designed to be a helpful resource for students, educators, and anyone interested in learning about science.
- The SPO Virtual Classrooms offer many educational resources, including practice test questions, review questions, lecture PowerPoints, video tutorials, sample assignments and course syllabi. New materials are continually being developed, so check back frequently, or follow us on Facebook (Science Prof Online) or Twitter (ScienceProfSPO) for updates.
- Many SPO PowerPoints are available in a variety of formats, such as fully editable PowerPoint files (.ppt), as well as uneditable versions in smaller file sizes, such as PowerPoint Shows (.pps) and Portable Document Format (.pdf), for ease of printing. The font "Jokerman" is used frequently in titles. It has a microbiology feel to it. If you do not have this font, some titles may appear odd, oversized and off-center. Find free downloads of Jokerman by Googling "download jokerman font microsoft".
- Images used on this resource, and on the SPO website are, wherever possible, credited and linked to their source. Any words underlined and appearing in blue are links that can be clicked on for more information. PPT files must be viewed in *slide show mode* to use the hyperlinks directly.
- Several helpful links to fun and interactive learning tools are included throughout the PPT and on the Smart Links slide, near the end of each presentation. You must be in *slide show mode* to utilize hyperlinks and animations.
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# Virus Structure



# Cellular Organisms vs Acellular Particles

## 1. Cellular microorganisms:

### Prokaryotes

Domains: Archaea & Eubacteria

### Eukaryotes

Domain: Eukaryota

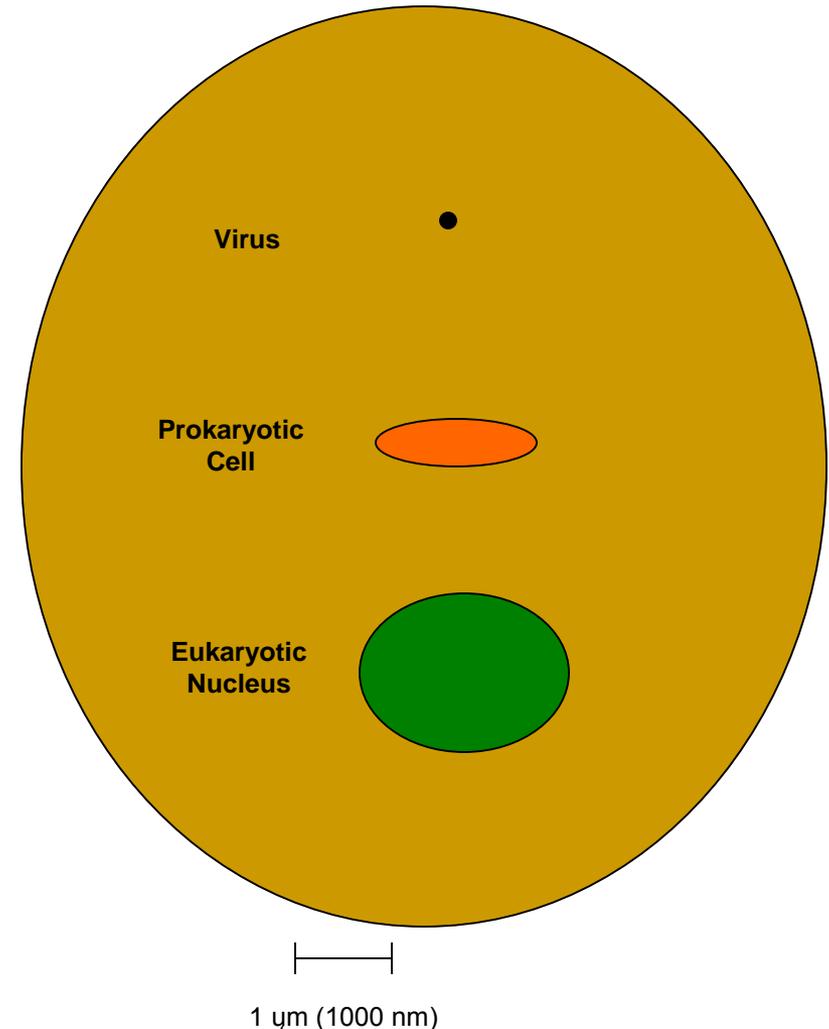
## 2. Acellular infectious particles:

### Viruses

So small can only be seen with an electron microscope.

**Q:** *Are viruses the only type of acellular infectious particle?*

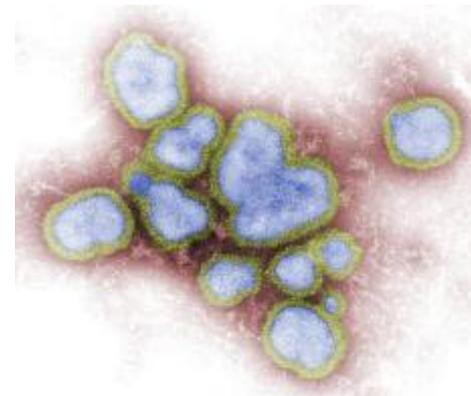
## Eukaryotic Cell



# How Do Viruses Differ From Living Organisms?

- Viruses are not living organisms because they are incapable of carrying out all life processes.
- **Viruses**
  - are not made of cells
  - can not reproduce on their own
  - do not grow or undergo division
  - do not transform energy
  - lack machinery for protein synthesis

Living  
Multicellular  
Organism:  
Kayla



Nonliving  
Acellular  
Infectious  
Agent:  
  
H1N1  
Influenza  
Virus

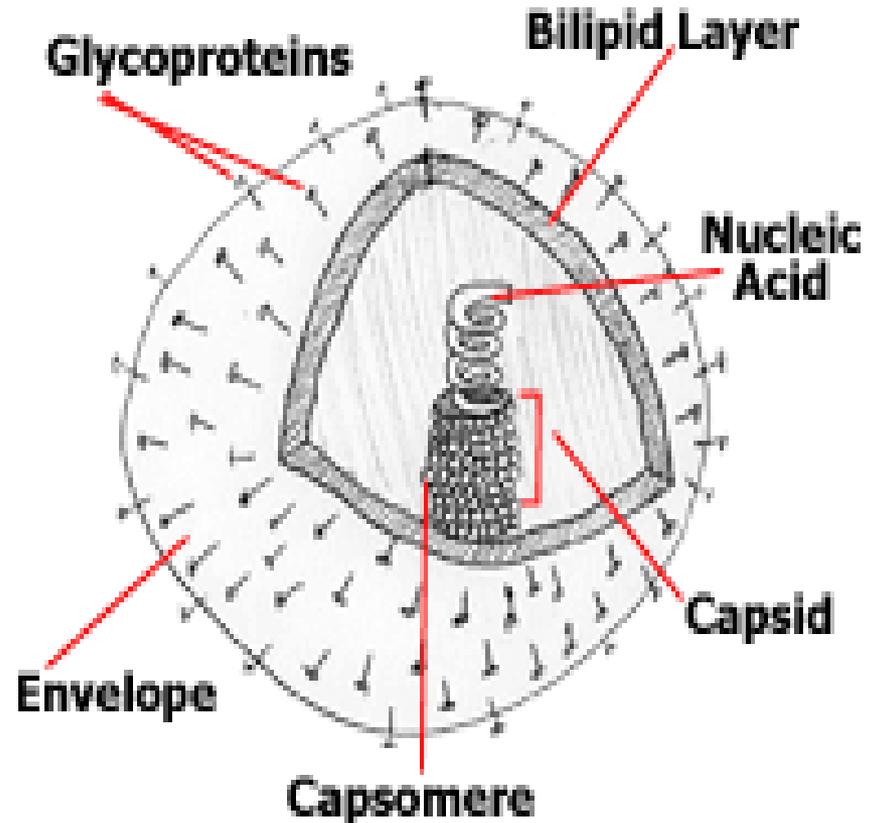
# What Are Viruses Made Of?

- Nucleic acid, proteins, and sometimes, lipids.

**Need a quick chemistry review?**

Here are animated lessons and quizzes on [Organic Macromolecules](#).

- Nucleic acid surrounded by a protective protein coat, called a **capsid**.
- An outer membranous layer, called an **envelope**, made of lipid and protein, surrounds the capsid in some viruses.

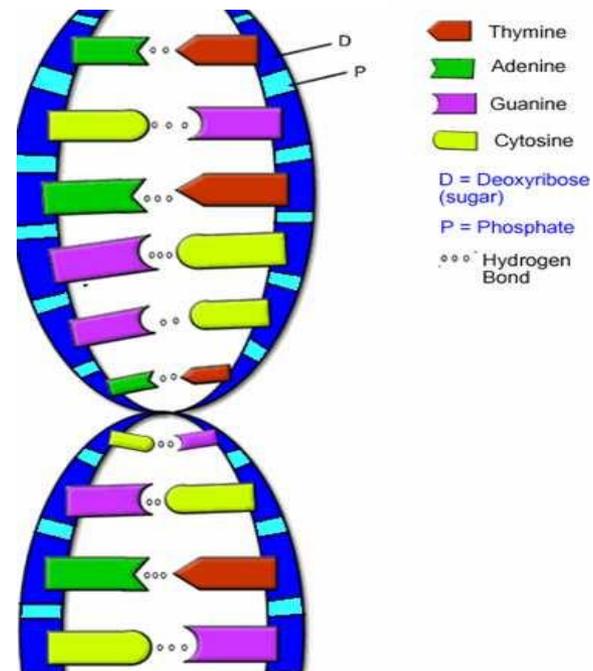
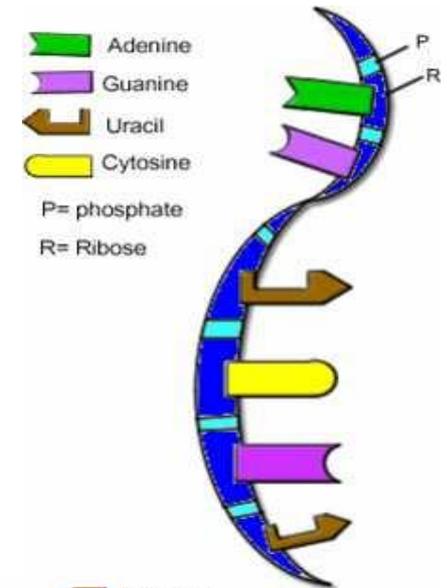


# What Are Viruses Made Of?

## Genetic Material of Viruses

- Show more variety in nature of their genomes than do cells.
- Like cells, viral genome is a nucleic acid.
- Primary way scientists categorize and classify viruses.
- Can be dsDNA, ssDNA, dsRNA, ssRNA.
- May be linear and composed of several segments or single and circular.
- Much smaller than genomes of cells.

**Q:** *What is similar about the genetic materials of cells and viruses. What is different?*

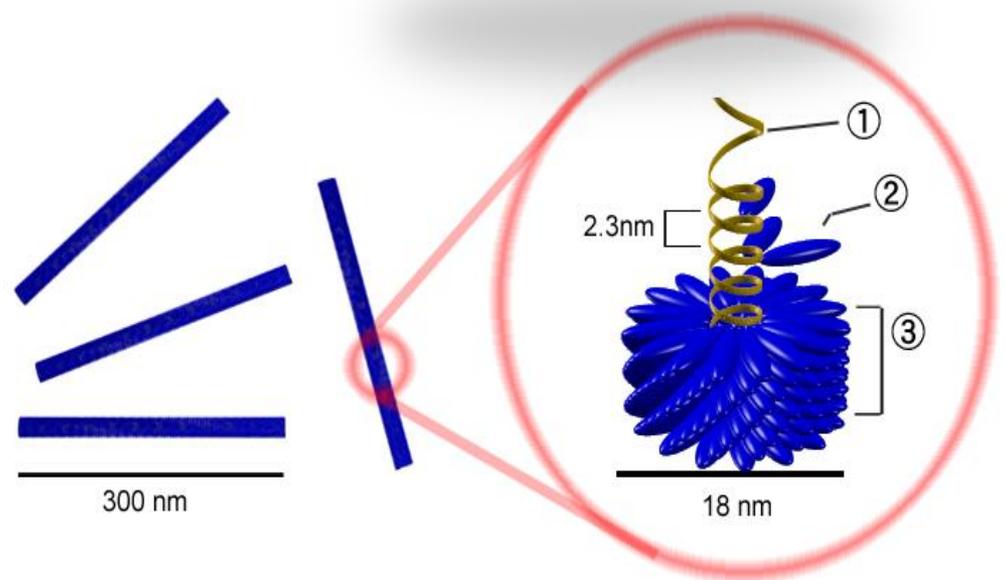
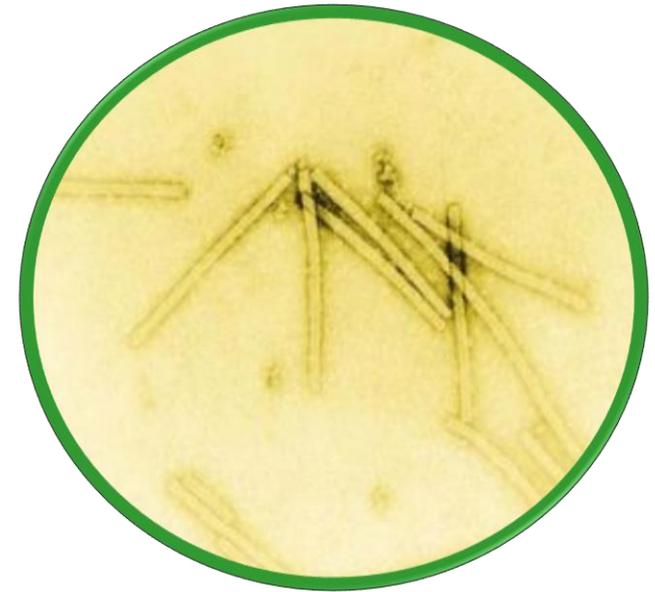


# What Are Viruses Made Of?

## The Viral Capsid

- Protein coat provides protection for viral nucleic acid and means of attachment to host's cells.
- Composed of protein subunits called capsomeres.
- Some capsids composed of single type of capsomere; others composed of multiple types.

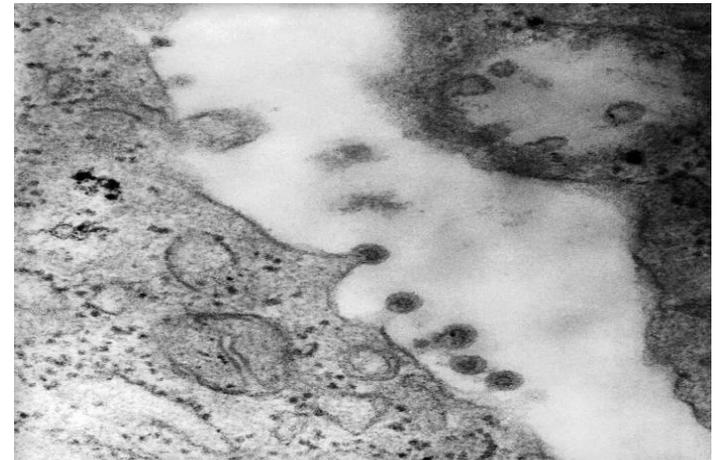
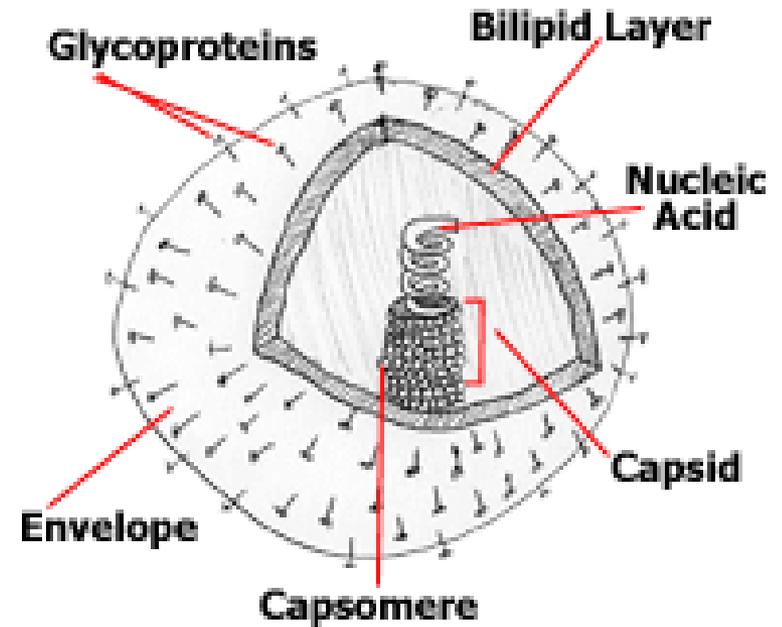
1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



## What Are Viruses Made Of?

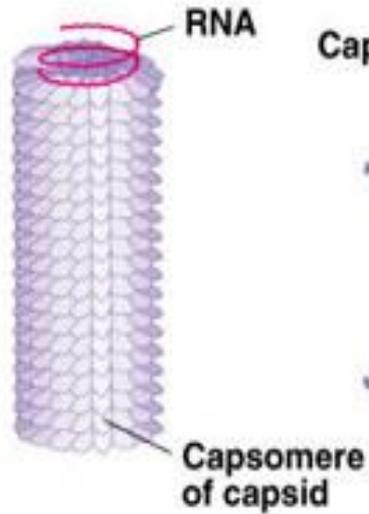
# The Viral Envelope

- Acquired from host cell during viral release; envelope is portion of membrane system of host.
- **Q:** *If the viral envelope is taken from an infected cell's plasma membrane, what macromolecule is the viral envelope primarily made of?*
- Also contains proteins and virally-coded glycoproteins (spikes).
- Envelope's proteins and glycoproteins often play role in host recognition.
- If a [virus](#) doesn't have an envelope, it is considered to be a **naked virus**.

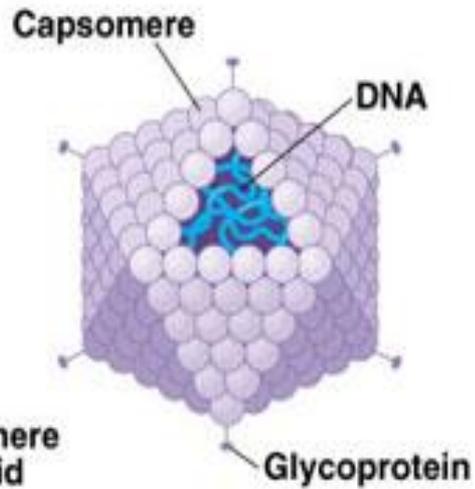


**Watch video:** "[Mechanism for Releasing Enveloped Viruses](#)" from McGraw-Hill

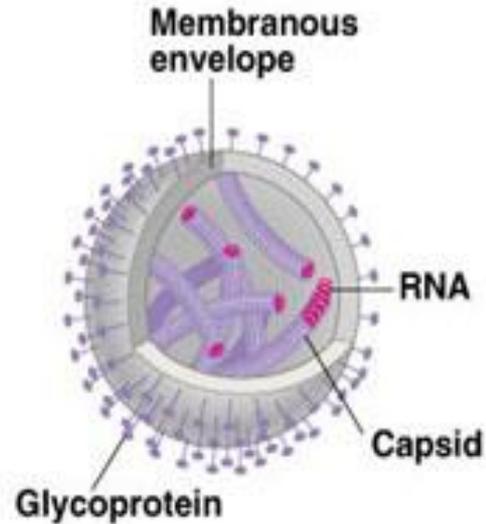
## Helical



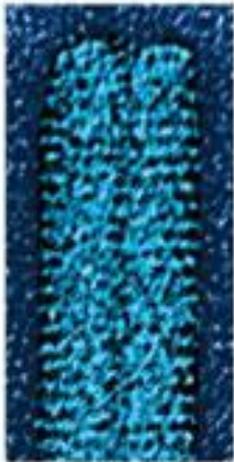
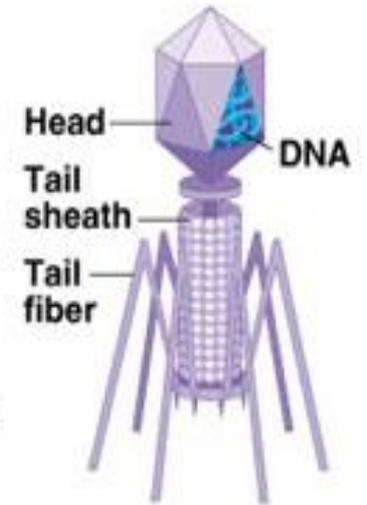
## Polyhedral



## Spherical

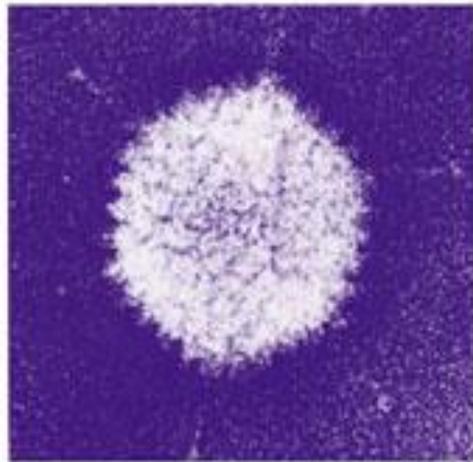


## Bacteriophage



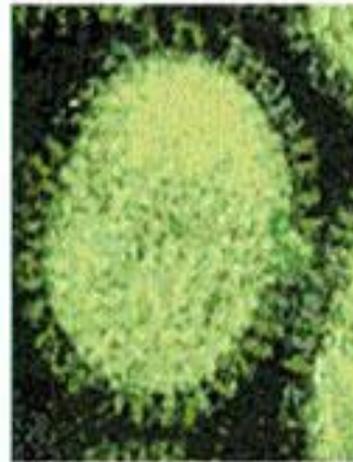
10 nm

(a) Tobacco mosaic virus



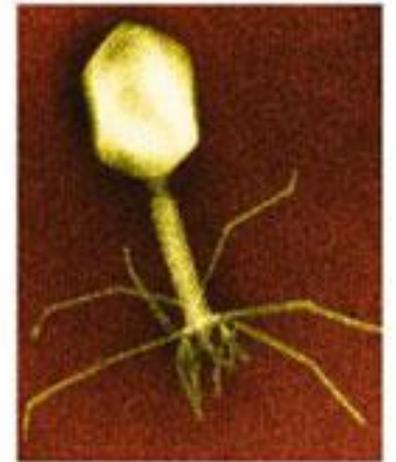
50 nm

(b) Adenoviruses



50 nm

(c) Influenza viruses

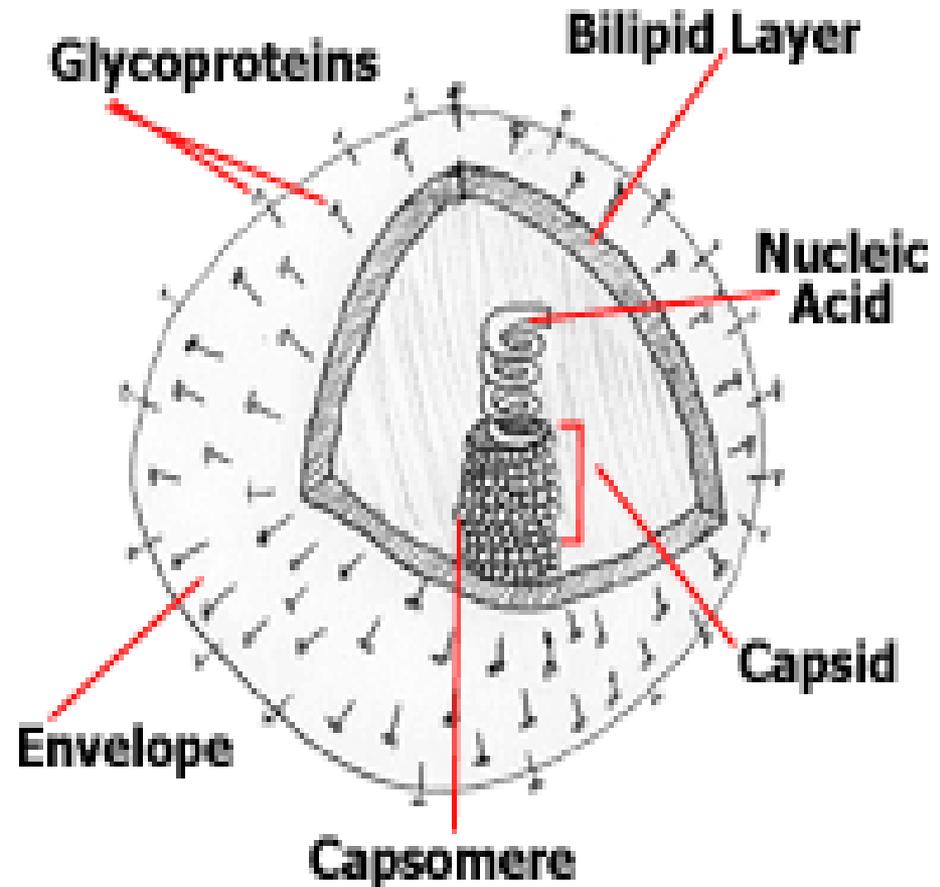


50 nm

(d) Bacteriophage T4

# REVIEW!

- Animated tutorial on [Viruses](#)
- NPR animated video [“Flu Attack! How a Virus Invades Your Body”](#)



# Confused?

Here are links to more fun resources that further explain Microbiology:

## Smart Links

- [Virus Structure Main Page](#) on the Virtual Microbiology Classroom of [Science Prof Online](#).
- Watch video "[Mechanism for Releasing Enveloped Virus](#)" from McGraw-Hill.
- Play [Pandemic 2](#) a video game of strategy, where you try to become a successful pandemic microbe and infect the world. My 13-year old, pink-haired, daughter and I recommend this one to you.
- "[Quarantine](#)" a scary movie about a new infectious disease.
- Play [Disease Defenders](#) educational video game, Rice University.
- "[Catch My Disease](#)" song by Ben Lee.
- [Giant Microbes](#), a company that sells adorable stuffed microbes.



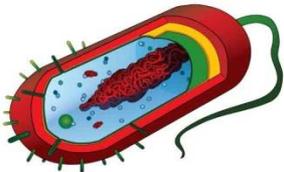
*(You must be in PPT slideshow view to click on links.)*

# Are microbes intimidating you?

*Do yourself a favor. Use the...*

## Virtual Microbiology Classroom (VMC) !

The VMC is full of resources to help you succeed,  
including:



- practice test questions
- review questions
- study guides and learning objectives

You can access the VMC by going to the Science Prof Online website

[www.ScienceProfOnline.com](http://www.ScienceProfOnline.com)