Virus: from the Latin noun *virus*, meaning toxin or poison

“A virus is a bit of nucleic acid surrounded by bad news.”

Sir Peter Medawar
Endocytosis of virus and escape from endosome/lysosome

HIV-1 ON SURFACE OF T CELL

The TCR-MHC complex

Influenza A Life Cycle
### SOME VIRAL VACCINES

<table>
<thead>
<tr>
<th>Vaccine types</th>
<th>Example</th>
<th>Good</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Killed</td>
<td>Salk Polio</td>
<td>safe</td>
<td>not highly protective</td>
</tr>
<tr>
<td>Live attenuated</td>
<td>Sabin Polio</td>
<td>mimics disease</td>
<td>possible reversion</td>
</tr>
<tr>
<td>Recombinant</td>
<td>Hepatitis</td>
<td>safe</td>
<td></td>
</tr>
</tbody>
</table>

**Surface of the capsid of human rhinovirus 16, one of the viruses which cause the common cold**

Image from: en.wikipedia.org/wiki/Image:Rhinovirus.PNG

**Influenza Virus**

Image from: CDC Public Health Image Library (PHIL)
Influenza Virus

Genome: 8 different RNA molecules

**Two of the RNA molecules encode:**

1. The **HA gene**. It encodes the **hemagglutinin**, which helps virus bind to epithelial cells. 3 distinct hemagglutinins, H1, H2, and H3) are found in human infections; 13 others have been found in animal flu viruses.

2. The **NA gene**. It encodes the **neuraminidase**, which helps virus bud off plasma membrane. 2 different neuraminidases (N1 and N2) have been found in human viruses; 7 others in other animals.