

5(a): HOW VIRUSES ENTER CELLS

There are three steps to the entry process. All viruses do (1) and (2). Viruses with envelopes must also do (3).

1) Attach 2) Release genome into cells 3) Merge viral envelope with cell membrane

1 The surface of all cells is covered with a "forest" of receptors. Some are used to identify the cell, some are used for attachment to other cells, some take in nutrients, and some are there to send or receive chemical messages.

Each virus has a unique glycoprotein structure on its surface that happens to match the shape of a cell receptor.

- Sialic acid: a tiny sugar found on the end of many long chains, especially on respiratory system cells
- ACE2: an enzyme that tells blood vessels to relax, found in lungs, heart, blood vessels, intestines
- CD155 aka PVR: used to connect to other cells, found mostly in epithelial cells (skin, lungs, intestines)
- CD4: a receptor found on T cells to communicate with macrophages (both are white blood cells)
- CAR: Coxsackie-Adenovirus Receptor is necessary for proper formation of the heart, and attaches cells to cells

2 The virus must release its genome.
(Exception: Reoviruses)

1) A pore can open in the capsid. (EX: polio)

2) The capsid must fall apart or at least become very leaky (EX: adenovirus)

3 The viral envelope uses a "fusion protein" to merge with the host cell membrane.

1) Fusion occurs at the surface. (EX: HIV and measles)

2) Fusion occurs after the virus is brought inside the cell. (EX: Influenza)