

Variety of Viruses:

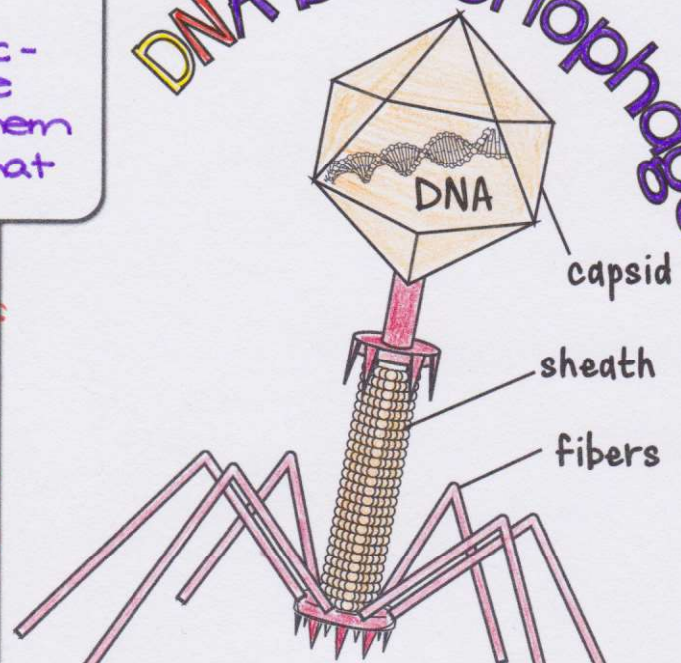
- viruses come in all shapes and sizes
- most viruses are host specific - they use specific proteins on the surface of host cells to infect them
- Bacteriophages are viruses that infect bacterial cells.

Viruses and Human Health:

- Some viruses can cause serious human illness or even death
- vaccines can help prevent viral infection
- when you get a vaccine from your doctor; the doctor injects you with a "dead" or inactivated virus, often just the capsid. This can help your body learn how to fight a virus before you're actually infected with that type of live virus during your lifetime.
- vaccines have very low risks and studies have shown they do not cause autism. (myth!)

Name: _____

DNA Bacteriophage



Viruses

Genetic Information:

Some RNA is found in some viruses; some have DNA as their genetic material, the instructions they use to tell a host cell's machinery to build new viruses.

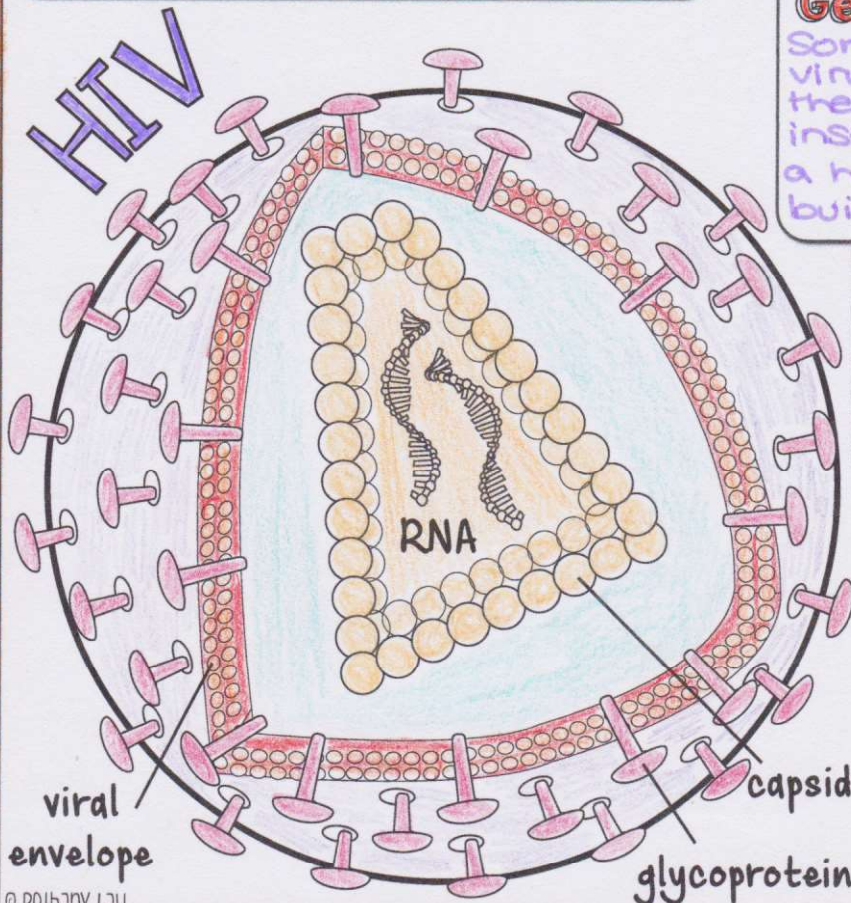
Capsid:

viruses have a protein layer called the capsid that protects their genetic material.

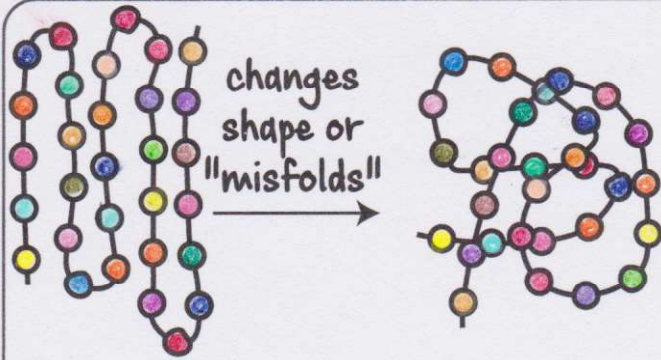
Viral Envelope:

Some viruses have a lipid membrane around their capsid called the viral envelope.

On the surface of the viral envelope, there can be glycoproteins, ~~proteins~~ attached to sugars, that help the virus attach to host cells.

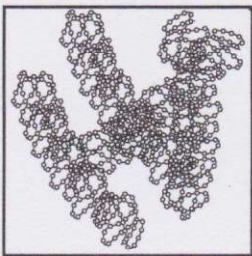


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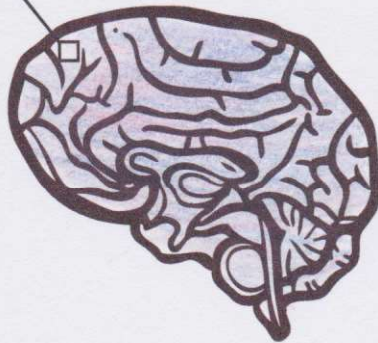


PrP^c
Normal
Protein

PrP^{Sc}
"Infectious"
Prion



plaques



The Misfolding Problem:

- In our nerve cells, a protein called the PrP protein is produced. Scientists don't know what it actually does normally in our cells.
- Normally this protein is folded a particular way and this fold is called isoform PrP^c .
- Rarely, this protein can "misfold" and get stuck in an isoform called PrP^{Sc} .
- This PrP^{Sc} is quite "sticky" as compared to other proteins, and sticks to other PrP^c forcing them to also change structure to form more PrP^{Sc} .
- As more and more PrP^{Sc} stick to each other and build up in the cell, long fibers and plaques build up in the cells and tissues in the brain or the nervous system.
- Prions are known to cause several neurological disorders including scrapie, mad-cows, and human Creutzfeldt-Jakob Disease.
- Prion can be spread by eating infected tissue, making this a unique case of infectious protein.

The Kuru Story:

• The scientists discovered a prion disease called kuru, which was common in the 1900s in the Fore tribe in Papua New Guinea.

• The Fore Tribe was a cannibalistic tribe that would eat their relatives' brains when they died. Scientists and doctors discovered that the prions were being spread by eating infected tissue.



Prions: Infectious Protein Structures

