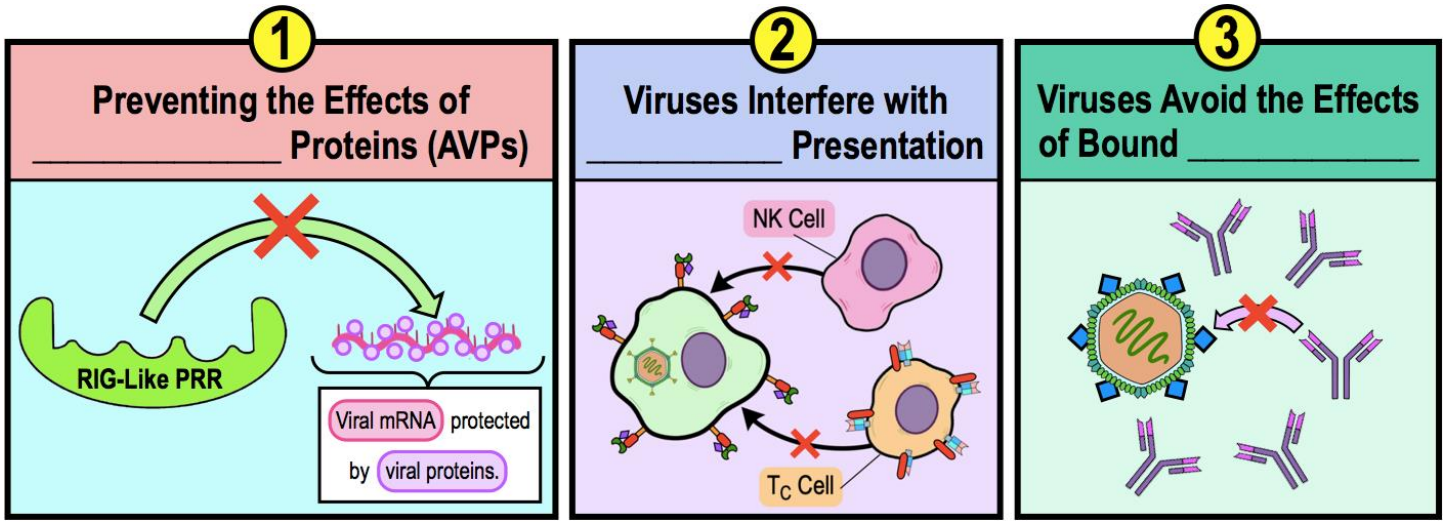
CONCEPT: VIRUSES EVADE THE IMMUNE RESPONSE

●In order to successfully replicate inside of a host, some viruses must evade host defense mechanisms.

●Viruses can evade host defenses in _____ ways:



1) Viruses Prevent Antiviral Effects of AVPs

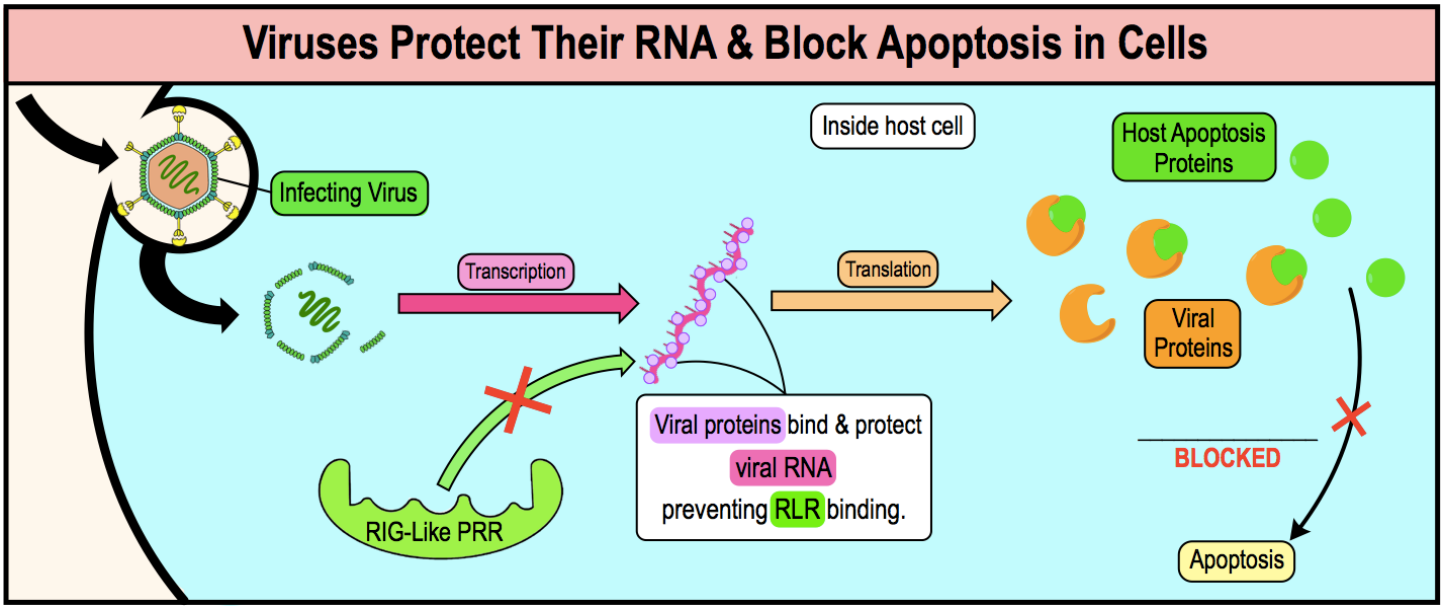
●*Recall:* interferons are cytokines produced by virally infected cells to alert neighboring cells to produce _____.

□ The infected cell identifies viral RNA via *Pattern Recognition Receptors* (*PRRs*) inside the cytoplasm.

□ Some viruses coat their RNA with a protein that "_____" (protects) it from the cell's cytoplasmic PRRs.

●*Recall*: AVPs cause a virally infected cell to immediately go into apoptosis, thereby preventing viral _____.

□ Some viruses inhibit expression of certain genes in the host cell, *preventing* apoptosis so it can replicate.



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PRACTICE: Host cells that are infected with a virus should undergo apoptosis. However, some viruses can prevent host cells from undergoing apoptosis and thus allowing the virus to continue to replicate within the infected cell. All of the following are ways viruses prevent host cell apoptosis ***except*** which of these answers?

a) Covering viral RNA with viral proteins so host cell RIG-Like PRRs do not bind to the viral RNA.

b) Inhibiting the expression of host cell genes which trigger apoptosis during an infection.

c) Evolving antigenic variation to avoid detection by host antibodies and immune cells.

d) Preventing the expression of host antiviral proteins which trigger apoptosis.

2) Viruses Interfere with Antigen Presentation in Infected Cells

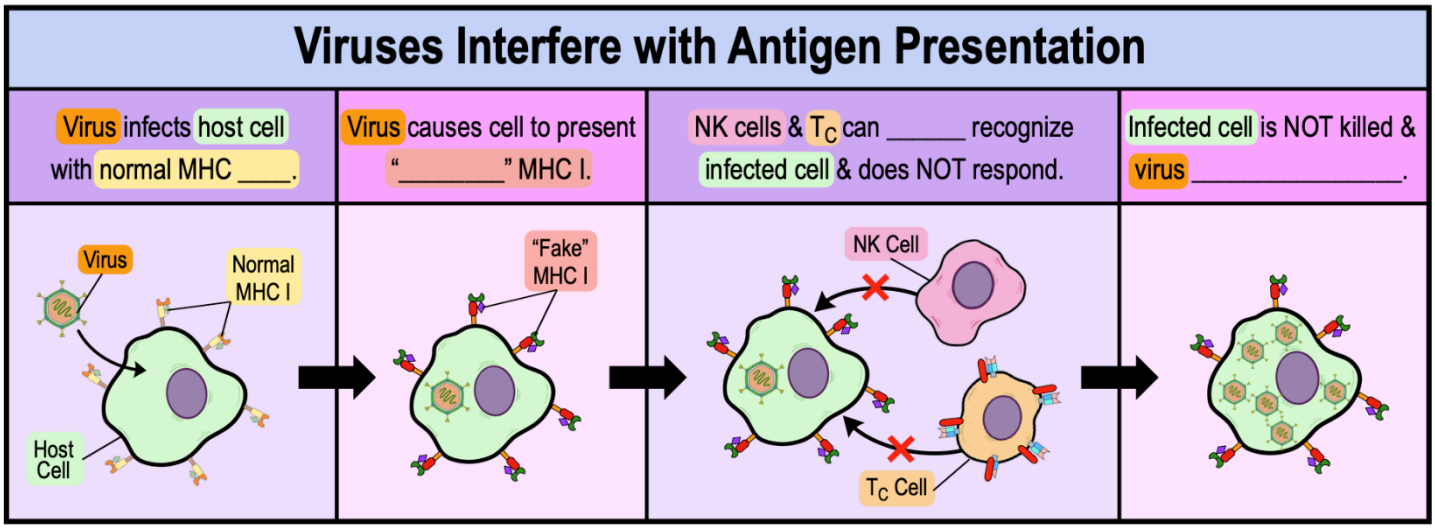
●*Recall*: Infected host cells present intracellular antigens on their surface via MHC I, allowing T_c cells to induce apoptosis.

□ Some viruses _____ the movement of MHC I molecules to the surface of the cell.

□ **BUT** NK cells are programmed to ID host cells that _____ MHC I & immediately destroy them.

□ Other viruses can produce "_____" MHC I molecules presented on the cell surface to "*trick*" NK cells.

□ Host cells presenting these "fake" MHC molecules are _____ destroyed by NK cells & virus replicates.



PRACTICE: A virus that causes the infected host cell to express and present "fake" MHC I molecules on its surface is evading detection from which host immune cells?

a) T_H cells & NK cells.

b) T_C cells & NK cells.

c) T_{REG} cells & T_C cells.

d) NK cells & macrophages.

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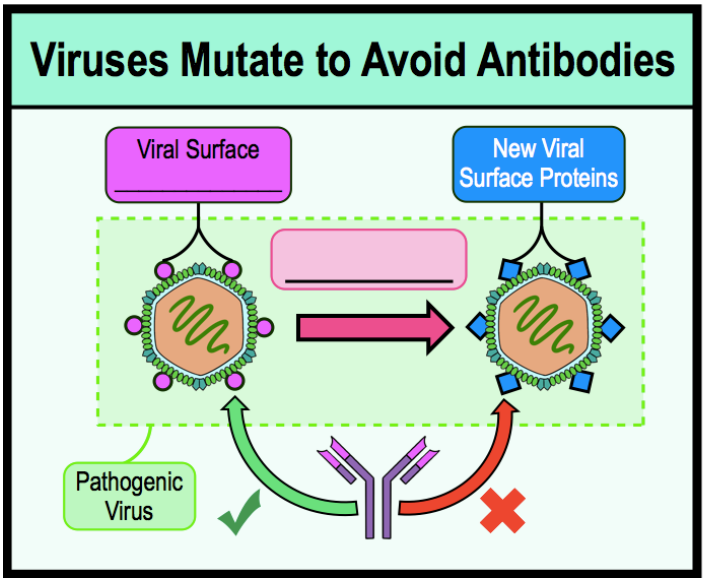
3) Viruses Avoid the Effects of Antibodies

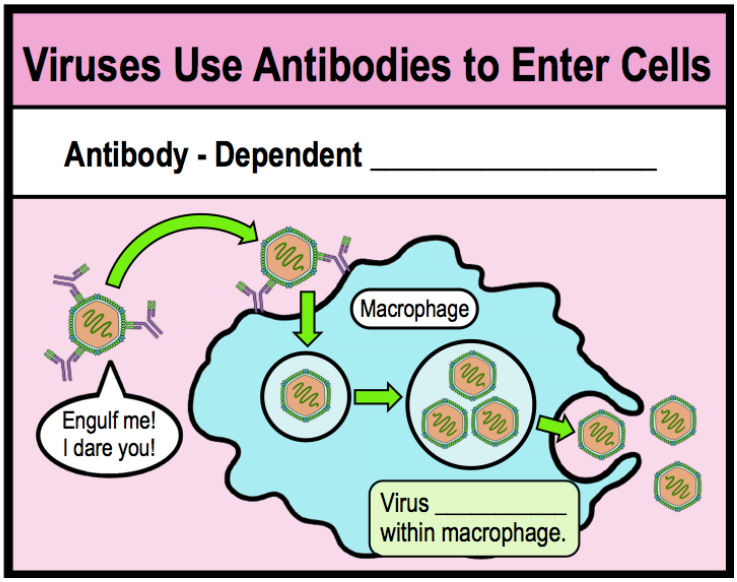
●Similar to bacteria, viruses can rapidly change their surface structures due to _____ during replication.

□ These mutations & changes in surface structures allows them to _____ the adaptive immune response.

●Some viruses use antibodies to *enhance* their infection by the process of **Antibody-Dependent Enhancement (_____).**

□ Viral particles bound by antibodies are engulfed by macrophages where the viruses can actively *replicate*.





PRACTICE: Some viruses want to be engulfed by phagocytic immune cells. These viruses use some of the same survival mechanisms that bacterial pathogens use to survive and replicate within a phagocyte. Those mechanisms include all of the following ***except*** which of these answers?

a) Escaping the phagosome after being engulfed by the phagocyte.
b) Having defenses against the digestive and hydrolytic enzymes of the phagolysosome.
c) Preventing the phagosome and lysosome from fusing to create the phagolysosome.
d) Preventing antibodies from binding the virus and triggering the process of phagocytosis.

PRACTICE: Which of the following statements about viruses is ***false***?

a) They can enter the host cell via endocytosis.
b) They are known to colonize the surface of the skin.
c) They have the ability of preventing apoptosis of infected host cells.
d) They may enter host cells by fusing their viral envelopes with the host cell membrane.
e) They may suppress the expression of MHC I molecules on host cells.