a place of mind

FACULTY OF EDUCATION

Department of
Curriculum and Pedagogy

Biology
Microbiology:
Viruses II

Science and Mathematics Education Research Group

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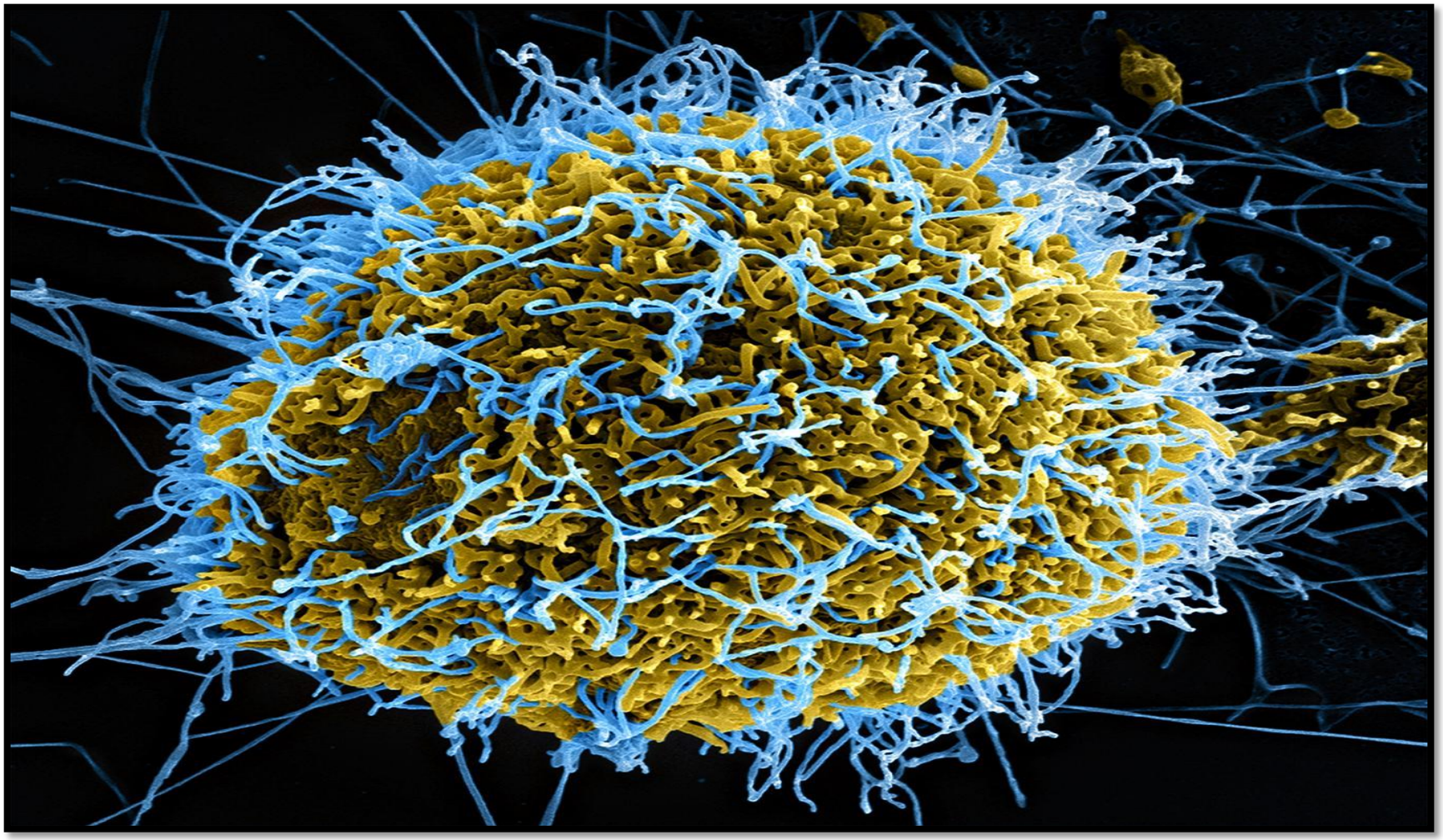
Viruses II



Retrieved from http://news.nationalgeographic.com

Viruses II

Information regarding previous slide:

The image represents:
The Ebola virus through a scanning electron microscope
Photograph by Niaid, Alamy

For more information,
visit the "**Tracking a Serial Killer:**
Could Ebola Mutate to Become More Deadly?"

http://news.nationalgeographic.com/news/2014/10/141015-ebola-virus-outbreak-pandemic-zoonotic-contagion/

Question I

Which of the following diseases are NOT caused by a virus?

A. Chicken pox.

B. AIDS.

C. Ebola.

D. Smallpox.

E. Cholera.

Solution I

Answer: E

Justification:
There are lots of diseases that are caused by both bacteria and viruses. Chicken pox, measles, rabies, influenza, smallpox, hepatitis, AIDS, and Ebola are all examples of diseases which are caused by viruses.

However, Cholera is an infection of the intestine by a bacteria, and not a virus.

Question II

Vaccines help the body to develop immunity for targeted viruses. Why do some vaccines stop being effective against the viruses they are meant to target?

A. The vaccines are not properly manufactured.

B. Vaccines are not effective against viruses with mutated surface proteins.

C. The vaccines are broken down in the body and do not work anymore.

D. Vaccines are only effective against mutated viruses.

E. Vaccines are only effective against viruses that are already recognized by the immune system.

Solution II

Answer: B

Justification:

A vaccine is an antigenic material used to stimulate an individual's immune system to develop adaptive immunity to a specific pathogen (virus). If the surface proteins of the virus mutate, often the new changes are not recognized by the immune system. A new vaccine would have to be produced for this mutated virus.

Vaccines do not stay in the body to combat the virus (answer C), they just train the body to have an immune response to a pathogen with the same surface proteins (or antigen) as the vaccine. Answer E is wrong because vaccines are specifically made to help the immune system recognize **new** viruses it does not already know.

Question III

Choose the answer which places the steps of controlling and eliminating an epidemic caused by a virus in the correct order.

A. Identify the virus, determine route of transmission, quarantine, select treatment, apply treatment

B. Identify the virus, apply treatment, determine route of transmission, select treatment, quarantine

C. Identify the virus, select treatment, quarantine, determine route of transmission, apply treatment

D. Identify the virus, quarantine, select treatment, determine route of transmission, apply treatment

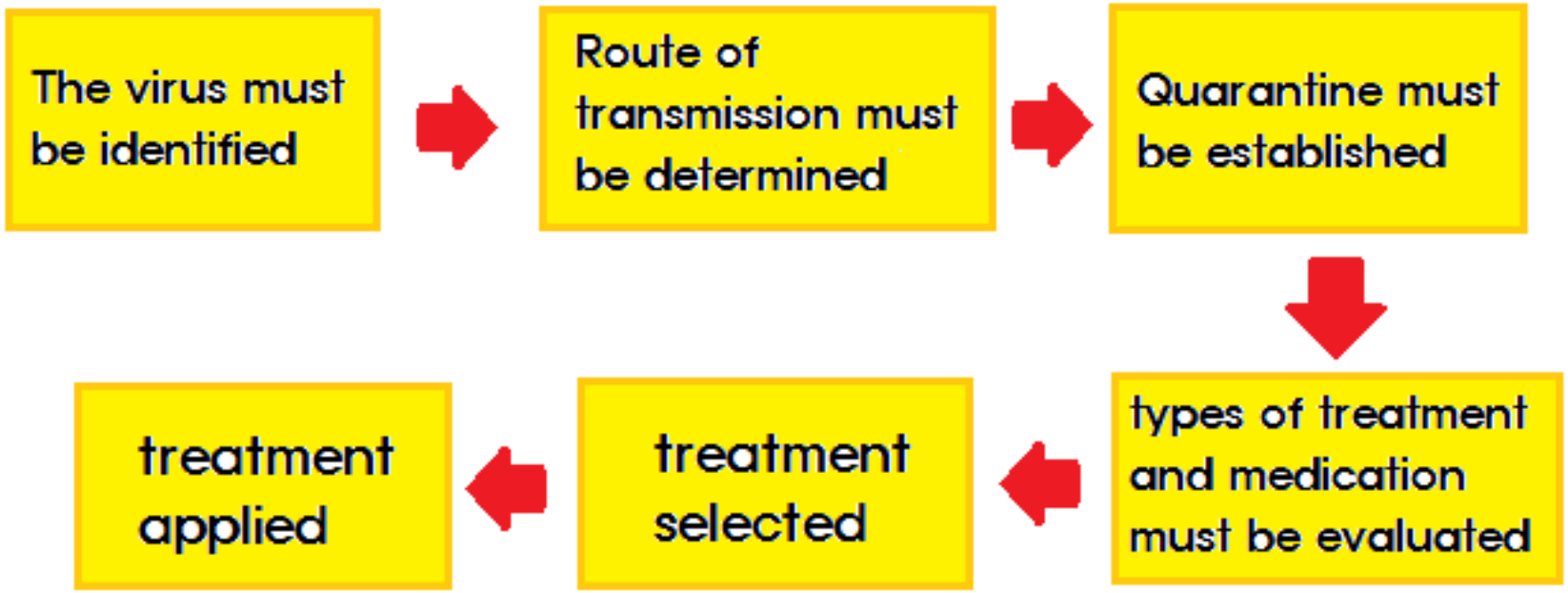
E. Identify the virus, quarantine, select treatment, apply treatment, determine route of transmission

Solution III

Answer: A

Justification:

The steps of the controlling and eliminating an epidemic caused by viruses



Solution III continued

It is important to identify an outbreak quickly so that it can be addressed before it develops into a full epidemic. After identification, the route of transmission also needs to be identified so medical teams can quarantine patients according to their infection levels. This way they can prevent a larger outbreak that might require more extensive control measures. The type of medication and treatment will be evaluated according to the patients' symptoms and type of virus infection. The final step of outbreak control involves the application of treatment to the infected patients.

More information

AFMC Primer on Population Health,

http://phprimer.afmc.ca/Part3-PracticeImprovingHealth/Chapter11InfectiousDiseaseControl/Detectionandcontrolofoutbreaks

Question IV

The **largest and most complex Ebola outbreak** occurred in March 2014. There have been more cases and deaths in this outbreak than all other outbreaks combined, and many health-care workers have been infected while treating Ebola patients. Which of the following is **NOT** a possible reason for this **fast** transmission of the virus between humans?

A. Ebola spreads through the bodily fluids of infected people.

B. Ebola spreads through surfaces and materials contaminated with bodily fluids of infected people.

C. Ebola is a super virus which cannot be treated with current medicine.

D. Ebola spreads via close contact with patients when infection precautions are not strictly practiced.

E. Ebola patients still transmit the virus through their semen for up to 7 weeks after recovery from illness.

Solution IV

Answer: C

Justification:

Retrieved from http://i.huffpost.com

Ebola can be transmitted between humans very fast. This is because it can easily spread through the bodily fluids of infected people and can also spread through surfaces and materials contaminated with bodily fluids of infected people. Ebola patients can still transmit the virus through their semen for up to 7 weeks after recovery from illness. Thus, infection precautions need to be strictly practiced and after-recovery care is also important. Although it is true that there are no current vaccines or treatments for the Ebola virus (except for some experimental procedures), we are able to treat the symptoms of the virus itself. It also doesn't explain the **fast** transmission of the virus between humans – this is explained by poor hygiene practices and containment procedures. Therefore the answer is C.

Question V

AIDS stands for “Acquired Immune Deficiency Syndrome”. It is a viral infection, which caused is by the HIV-human influenza virus. A person diagnosed with AIDS has a weakened immune system and struggles to fight against any infections. Which of following does the HIV virus affect?

A. Red blood cells.

B. Cardiac muscle cells.

C. Reproductive cells.

D. White blood cells.

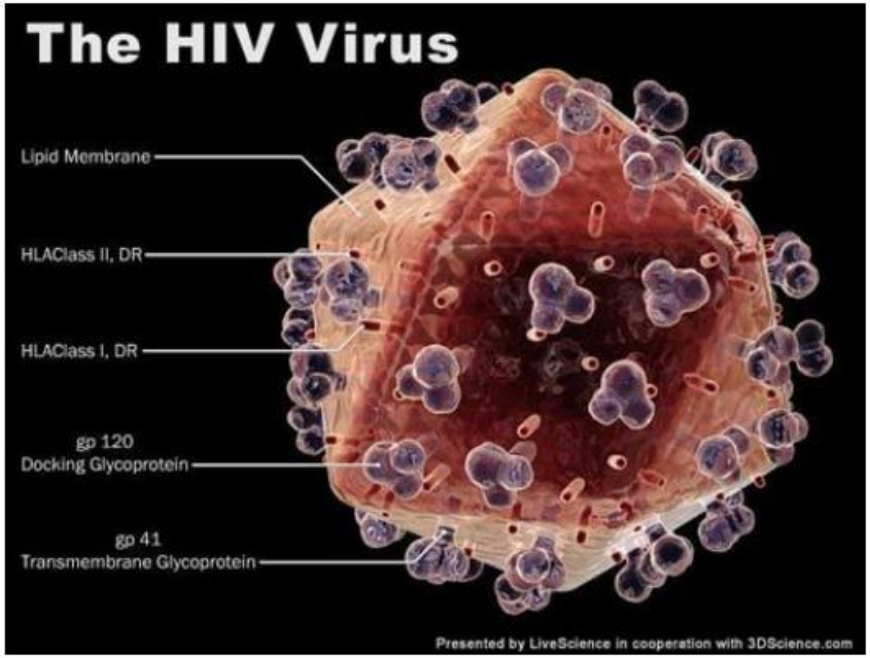
E. Nervous tissue cells.

Solution V

Answer: D

Justification:

The HIV virus affects the immune system and decreases the body's ability to fight against infection. It does this by attacking the white blood cells, which are in charge of protecting the body against infectious disease. Symptoms of AIDS are diarrhea, fatigue, fever, dry cough, shortness of breath, night sweats, difficulty in concentrating, etc. These symptoms are most likely caused by other diseases which can enter the body because of the weak immune system.



Extra information on Virus

BBC News:

Ebola virus: What is it?

https://www.youtube.com/watch?v=C_itlEamvBo

The Daily Conversation:

Ebola: The Deadliest Outbreak Explained.

https://www.youtube.com/watch?v=JNiH18JNmqA

TED-Ed:

How we conquered the deadly smallpox virus.

https://www.youtube.com/watch?v=yqUFy-t4MlQ