Jonathan Quang 12/15/14

Biology - Ms.Prabhu

Homework #14

Part I

1. The purple dots are viruses. The video did not specify a specific number, but many viruses are contained in one droplet of sneeze.  
2. The yellow knobby things are keys to entering a cell. They are receptors on the virus that may or may not bond to complementary proteins on a cell.  
3.When the virus enters the cell, the cell creates a membrane around it and brings it closer to the nucleus. Once it is near the nucleus, the membrane disassembles itself and releases its genetic material.  
4. The pink thing takes the genetic material and weaves it into the current strand of genetic material in the cell and makes a copy of the combined strand as well.  
5.Millions of viruses exit once cell.  
6.An immune cell engulfed the virus.

Part II:  
1.Some example of germs are bacteria, fungi, protozoa, and viruses.  
2. The harmfulness of a germ is called virulence.  
3. Germs that depends less on host mobility cause more serious symptoms because they are not limited by the host's ability to stay alive and mobile. If the germ can make as much of itself as it wants and infect as many people as it wants without having to care whether or not the host is mobile or not can freely replicate.

Part III:  
1.The natural carries of Ebola are thought to be fruit bats.  
2.Ebola victims usually die from a cytokine storm where an explosion of immune responses damages the blood vessels. This leads to internal and external bleeding.  
3.The best treatment currently available for Ebola victims is rehydration therapy and proper care.  
4.The Ebola virus gets its name from a river nearby the area of discovery of Ebola. The river is Ebola river in Yambuku Zaire.  
5.Measeles, Malaria, and Influenza have killed more people than Ebola.  
6. Some of the reasons an effective medicine for Ebola has not been developed are that since there are so few people who have Ebola, there is very little economic incentive to invest in research, a high amount of poverty in areas with Ebola also makes the economic incentive even lower.  
7.The deadliness of Ebola actually makes it less infectious because a person with Ebola is unlikely to be contagious until they show symptoms. This means that once a person shows symptoms and becomes infectious, that person can be put into isolation.  
8. Ebola is difficult to study for two reasons. One reason is that when a virus is contained, it does not exist in the human population until the next outbreak occurs. Another reason is that the mechanism by how fruit bats transmit Ebola is unknown.

Part IV:  
1. A vaccine works by tricking the body into thinking it has been infected.  
2. Immunity occurs when the body has created antibodies post-infection that will contain and attack any of the same virus that enters the body later. A vaccine presents an infection with a low chance of actually being severe that the body can easily fight off and build immunity too.  
3. An antibody is a protein that binds to a specific molecule, or antigen, found only on the germ. Some antibodies can neutralize germs just by binding, and the antibodies will also signal other immune cells to consume the germ.  
4. B cells are really white blood cells.  
5. Vaccines contain antibodies for the weakened pathogen, an altered pathogen, or the antigens from the pathogen, have been injected into the body. The body will treat it as if it were a regular infection.

Part V:  
1. Immunity is a natural defense system of the human body.  
2.When white blood cells sense an invader, they move in onto the invader and begin to make more white blood cells at a greater rate.  
3.The job of a memory cell is to warn the body when the same germ invades the body again. This is advantageous because this response only takes a day or two while the normal immune response may take up to a week.  
4. A weakened or dead version of the germ or its antigens are in a vaccine.  
5.When injected with a vaccine, the human body will get rid of the germ and create memory cells to combat the germ post-infection, even if it is not weakened.

Part VI:  
1. Herd immunity is a way of protecting a whole community from disease by vaccinating a large enough percentage of the populace that the rest do not need to be vaccinated.  
2.In a population where none of the people are vaccinated, most people will suffer from the contagious disease the vaccine would have prevented. In a population where only some of the people are vaccinated, the same contagious disease would only spread through some of the population. If most people in a population are vaccinated, then the disease is contained and is limited to only a few people.  
3. No young children die from chicken pox even though they were not vaccinated because the chain of transmission for the disease was severely disrupted. When the chicken pox vaccine was distributed in 1995, death rates for chicken pox dropped by about 97%. These people and other vaccine takers are immune to the virus. If these people do not spread the chicken pox virus because they are immune to it, then babies will not receive the virus.

Part VII:  
1.An ELISA test works by first removing the red and white blood cells from a patient's blood sample. The watery fluid that remains is the serum. A portion of serum possibly containing the antibody is allowed to react with the target antigen. A correct match causes the antigen and antibody to bind together. To detect this, a second antibody is needed. This antibody is created from the serum of an animal that was injected with the antibodies of the human. The antibodies of the human function as antigens in the animal. The animal produces its own antibodies in response. Once isolated, the second antibody can be chemically linked to a system that can produce a detectable signal. In ELISAs, the antigen antibody complex is exposed to the second antibody, which binds to the antibody portion of the complex. The signaling system consists of an enzyme attached to the second antibody. When the appropriate chemical is added, the enzyme converts it to a colored substance that can be measured. More color means that there is more animal antibodies. More animal antibodies means that there are more human antibodies. More human antibodies means that there are more antigens.  
2.A positive test indicates whether a particular antibody is present in a patient's blood sample.  
3.The measure of color suggests that there is more animal antibodies, which means more human antibodies, which means there is more of the particular antibody present.  
4. The first step is to centrifuge whole-blood samples of patients A, B, and C for 15 minutes at room temperature to get the serum because spinning the samples will separate the cells from the blood so that the cells do not create a false positive. The second step involves using the serum from patient A,B, and C to prepare three dilutions each in an increasingly ratio of dilution by adding phosphate-buffered saline solution to determine the level of antibodies in the sample. The third step is to prepare an ELISA plate (pretreated to bind SLE antigen to each well) with 0.1 ml of the different dilutions of patient serum using a pipette because some proteins can bond to the plastic and putting too much or too little SLE antigen will result in a false-positive and false-negative reaction respectively. The fourth step is to add to the ELISA plate 0.1 ml dilutions for each titer of anti-DNA primary antibody and a buffer as a positive and negative control because if the controls do not function as planned, then the results cannot be expected to be reliable. The fifth step is to warm the ELISA plate to 37° C for 15 minutes so that human body temperature is mimicked and there is enough time for reactions to take place. The sixth step is to remove the fluid from each well with the pipettor and wash it with 0.1 ml of PBS three to six times so that any antibodies that did not bond to the SLE antigen are washed away and do not create a false positive when reacting with an indiscriminate animal antibody. The seventh step is to add 0.1 ml of buffered solution containing the animal's antibody that recognizes antibodies made in humans to react with the human antibodies. The eighth step is to do the same thing as the fifth step for the same reason. The ninth step is to remove fluid from each well and wash it with 0.1 mL of PBS so that unbound antibodies are washed away and do not react with any chemicals added later. The tenth step is to add 0.1 ml of buffered solution containing the chemical substrate and wait 15 minutes so that if there are human antibodies present, the clear substrate will turn yellow and the amount of yellow can be quantitatively estimated.  
5)The end result was that every well except the negative control wells were positive. This is known by the fact that if the well has turned yellow, then the substrate would have bonded to the human antibodies in response to the antigens. These results could be considered unreliable due to the improper cleaning of the wells.