BIO 330 Quiz 3 March 4. 2014

1. What animal model is being used to test for the transmission of bird flu to humans? (2 points) Since smallpox has been eliminated as a disease, why is it important to have drugs that work against the virus? (3 points)

Dr. Kawaoka discussed the use of pairs of ferrets to study the transmissibility of bird flu to humans. Dr. Hruby discussed the development of a drug (ST-246), which blocks the maturation of all orthopoxviruses. In case of an accidental exposure, bioterrorism, or cross species transmission of a related virus, this drug is being stockpiled for use during a major outbreak.

2. Name two characteristics of viral particles that are shared by flaviviruses and togaviruses. (5 points)

Both flaviviruses and togaviruses have a single-stranded, plus-sense, infectious RNA genome. They also have a capsid with icosahedral symmetry, which is bound directly to viral glycoproteins that assume the capsid symmetry. Both viruses have envelopes that contain their anti-receptors. Neither virus packages their RNA-dependent RNA polymerase.

3. Translation is the first step in the replication phase of the infectious cycle of many plus-stranded RNA viruses. Give an explanation. (5 points)

Translation is the first step during the replication of many plus-stranded RNA viruses because they do not carry the polymerase in the viral particle. Since the host cells do not express this enzyme, the viral RNA must associate with the ribosome to get translation of the RNA-dependent RNA polymerase. This enzyme is required to allow synthesis of viral RNA and the completion of the virus replication cycle. Retroviruses are plus-stranded RNA-containing viruses that are an exception to this situation. They must carry an RNAdependent DNA polymerase (reverse transcriptase) in their particles to establish infection.

4. Explain how the drug pactamycin works. (2 points) What information can you learn about virus replication from pactamycin mapping experiments? (3 points)

The drug pactamycin blocks the initiation of translation, but allows any initiated polypeptide to complete translation. This drug can be used to order the polypeptides on a polyprotein from the N-terminus to the Cterminus (5' to 3' on the viral mRNA).