KEY

BIO 330 February 6, 2014 Quiz 2

1. Name at least two types of viral glycoproteins and briefly describe their functions. (5 points)

Viral glycoproteins can be either type I or type II (depending on whether their N-terminus is outside the cell or in the cytosol, respectively). These integral membrane proteins can serve several functions, such as an anti-receptor (e.g., HA or hemagglutinin) or to facilitate spread (e.g., NA or neuraminidase). In addition, integral membrane proteins can contribute to cell-viral membrane fusion (F protein of parainfluenza or gp41 of HIV), or they can be ion channels. Peripheral membrane proteins, such as viral matrix proteins, are NOT glycoproteins.

2. Why do RNA-containing viruses encode their own polymerase? (5 points)

Cells do not encode the polymerases needed by RNA-containing viruses. These viruses must use an RNA-dependent RNA polymerase or an RNA-dependent DNA polymerase (retroviruses).

3. Explain what happens during the "crisis" period after many subcultivations of a cell strain. (5 points)

When a cell strain reaches crisis, most of the cells die because they have no active telomerase that can replicate the repeated sequences at the ends of chromosomes (telomeres). After the repeats are lost, then chromosomes continue to shorten until they lose key cell ular sequences needed for their survival. A few cells undergo mutations, such as chromosomal translocations, that allow them to deregulate gene expression and activate telomerase. These cells have progeny that can divide indefinitely, becoming an immortal cell line.

4. What are the three steps of PCR? What step provides the specificity of this reaction? (5 points)

The first step of PCR is denaturation of the DNA to form single strands. The second step is annealing of specific primers to the single-stranded DNA. This step provides specificity because only complementary sequences will anneal (hybridize) under specific conditions. The third step is polymerization or elongation of the primers by addition of nucleoside triphosphates.