Self-Assessment Lecture 33: Nucleotide Function and Synthesis

1. Which of the following is NOT a use of nucleotides:
    a. Precursors for nucleic acid synthesis
    b. Prime energy source for biologic processes
    c. Activation of biomolecules for synthetic reactions
    d. Primary source of nitrogen for amino acid synthesis
    e. Important parts of many second messenger systems
    f. Source of phosphate for kinase reactions

2. Please indicate PY for pyrimidine and PU for purine, and state DNA, RNA or Both to identify the nucleic acid in which each can be found:
    a. Cytosine_____**Py Both**_____
    b. Guanine_____**Pu Both**_____
    c. Thymine_____**Py DNA only**_____
    d. Uracil_____**Py RNA only**_____
    e. Adenine_____**Pu Both**_____
3. ATP is a:
    a. Ribonucleotide
    b. Deoxyribonucleotide
    c. Ribonuceloside
    d. Deoxyribonucleoside

4. Which of these nucleotides is formed through the addition of a pre-formed base during ***de novo* synthesis.** {Pyrimidine/Purine}

5. During *de novo* synthesis, the initial pyrimidine ring is comprised of {carbamoyl phosphate and aspartate, carbamoyl phosphate and glutamine, bicarbonate and glycine}

6. Carbamoyl Phosphate is comprised of what 3 metabolites:
    a. _____Bicarbonate_____
    b. _____ATP _____
    c. _____ Amino group __

7. Place these intermediates in order of their synthesis: Uridylate, Thymidylate, Orotodylate
    a. _____ Orotodylate ____
    b. _____ Uridylate __
    c. _____TTP_____

8. This common nucleoside monophosphate is an intermediate in *de novo* purine synthesis for the synthesis of both Adenine and Guanine: ___IMP Inosine monophosphate_____
9. It is a common strategy to phosphorylate a keto group to form an activated intermediate for addition of an amino group. In the synthesis of AMP, what is the source of the phosphate? ___GTP_____ And for GMP?_ ATP _____

10. What is the activated ribose platform upon which salvaged bases are added in the salvage pathway? _____ PRPP _____

11. Please name the enzymes that catalyze the transfer of salvaged purine guanine and hypoxanthine bases to the activated ribose in Q11____Phosphoribosyltransferases (HGPRT for instance) _____

12. Please name the two products of Thymidylate Synthase
    a. _____ Thymidylate _____
    b. _____ Dihydrofolate_____

13. Please name a drug which inhibits thymidylate synthesis
    a. ___ Fluorodeoxyuridylate, Methotrexate, Aminopterin____

Other things to study from this lecture Lesch Nyhan Syndrome, Ribonucleotide reductase – Sulfonamides!