

## Cells TA Block 3 Questions (Part 1)

1. What is the committed step in:
  - a. purine biosynthesis?
  - b. pyrimidine biosynthesis?
2. If  $C^{14}$ -labelled glycine is used in the biosynthesis of AMP, which carbon atom(s) get labelled? Be specific.
3. If  $C^{14}$ -labelled aspartic acid is used in the biosynthesis of CTP, which carbon atom(s) get labelled? Be specific.
4.
  - a. What are the symptoms of gout?
  - b. What is the treatment for gout?
  - c. Specify the enzymatic pathway involved and describe two ways that this treatment relieves gout.
5. Name the metabolic pathway(s) and branch(es) of which are used to:
  - a. make nucleotide precursors?
  - b. use nucleotides for energy?
  - c. synthesize NADPH for reducing power?
6. Discuss Xeroderma Pigmentosum and Hereditary Non-Polyposis Colorectal Cancer (HNPPC):
  - a. What are the sign and symptoms of each disease?
  - b. What causes each disease?
  - c. What reactions do or do not occur?
7. What are the mechanisms of transcription termination in prokaryotes?
8. How are the differences between transcription in prokaryotes and eukaryotes used to advantage by antibiotics?
9. How are introns spliced in pre-mRNA (hnRNA)? Be specific as to how a splice region is recognized.
10.
  - a. What are the implications of pre-mRNA (hnRNA) splicing for recombinant biotechnology? In your answer, specifically address the differences between a genomic and a cDNA library.
  - b. Under what circumstances would you use a cDNA rather than a genomic library?
  - c. What is a YAC?
11.
  - a. List four features of human ribosomal RNA genes. What differences between prokaryotic and eukaryotic ribosomal RNA are used to advantage by antibiotics?
  - b. What is the advantage for *E. coli* to have the three ribosomal RNAs (16s, 23s, and 5s) as part of the same RNA precursor?
  - c. What is the mode of action of diphtheria toxin?
12. List four differences between introns in tRNA genes and protein coding genes.
13. What is the function of modified bases in tRNA?
14. There are six codons for the amino acid serine in the genetic code. Using the rules of codon-anticodon pairing (and the wobble hypothesis):
  - a. what is the minimum number of tRNAs needed to read these six codons?
  - b. what are the anticodons for each of these tRNAs