Name:

HST175 Quiz 2 10.05.05

1. Please briefly describe the 12/23 rule:
   RSSs with 12bp spacers recombine only with those with 23bp spacers. This prevents V-V or D-D, etc rearrangements in VDJ recombination.

2. Please match each enzyme with the effect of its deficiency

I.	Rag 1/2	**(a)**	a. No B or T cells
II.	Artemis	**(a)**	b. Normal B, T cell repertoire
III.	TdT	**(c)**	c. Reduced BCR, TCR diversity

3. Please fill in the table

Type of diversity in antigen receptor gene rearrangement	Most relevant enzyme, if applicable	Mechanism
1. Combinatorial	**RAG1/2**	**VDJ recombination Multiple (κ and λ) light chains**
2. Junctional	**TdT**	**N nt (also P nt by other mechanism)**

4. What are two mechanisms for dealing with autoreactive BCRs during development?
   a. **Receptor editing**
   b. **Clonal deletion**

5. Please describe the steps of MHC class I and class II antigen presentation

	MHC I	MHC II
Source of Peptides	**Cytoplasmic**	**Extracellular**
Where are peptides loaded into the MHC molecules?	**ER**	**Lysosomes**
What two molecules are most important in making this peptide loading possible (not MHC or B_2m, etc)?	**Proteasome, TAP, tapasin**	**Invariant chain, HLA-DM**
APCs with this type of MHC present to which group of T cells?	**CD8+ T cells**	**CD4+ T cells**

6. In an HLA-DM-/- what peptide would be almost exclusively presented on the relevant MHC molecules?

   CLIP PEPTIDE

7. Please name three functions of the complement cascade and the complement molecule(s) that mediate those functions
   Function: Lysis of Pathogens — Molecule(s); MAC (C5b, C6, C7, C8, C9)
   Function: Chemoattraction of phagocytes — Molecule(s): C5a, C3a

Function: Opsonization to increase phagocytosis Molecule(s): C3b

8. What is the molecular defect that causes paroxysmal nocturnal hemoglobinuria?
deficiency in CD59 and DAF due to defect in GPI anchor formation