BIOS 328 IMMUNOLOGY
Quiz #5 March 20, 2003

NAME: MASTER

1. Name a *type of T-cell* that has a TCR.

intraepithelial lymphocyte
intraepidermal lymphocyte + 2 points

2. In hematopoesis, there are two lineages which arise from the pluripotent stem cell. Identify those two lineages.

(i) myeloid + 1 point

(ii) lmphoid + 1 point

3. The majority of responses to antigens are thymus dependent. But some immune responses are thymus *in*dependent. Indeed, there are two types of thymus independent antigens, *viz*. type 1 and type 2. Identify the ***mechanism*** by which B-cells are stimulated by each of these types of antigens.

(i) Type 1: mitogenic stimulation + 2 points

(ii) Type 2: extensive crosslinking of mIg + 2 points

4. The majority of responses to antigens are thymus dependent ... Give *examples* of type 1 and type thymus *in*dependent antigens.

(i) Type 1: LPS (lipopolsaccharide) + 2 points

(ii) Type 2: bacterial capsule or bacterial flagella + 2 points

5. During T-cell development, T-cells exist in a double positive state. What is the meaning of double positive ?

having both CD4 and CD8 + 2 points

6. (Once again), define kin*ase*.

7. (1947) an enzyme that catalyzes the transfer of phosphate groups from a high-energy phosphate containing molecule (as ATP) to a substrate + 3 points

8. There are three classes of *professional* Antigen Presenting Cells (APCs). Two of these classes have to be induced. Name the one that needs no induction and which constitutively expresses the co-stimulatory signal B7.

dendritic cells + 2 points

9. The lymph node is divided into three cytologically distinct regions. Name them.

(i) cortex + 1 point

(ii) paracortex + 1 point

(iii) medulla + 1 point

10. Follicular dendritic cells display *soluble* immunoglobulins, *e. g.,* IgG, (as opposed to membrane embedded immunoglobulins [mIgM or mIgD].) How (*i. e.,* through what mechanism or structure) are IgGs displayed on these cells (and iccosomes)?

Fc receptor + 2 points

11. The anamnestic (or secondary or memory) response occurs both more quickly and more intensely. Provide two reasons for the increased potency of the 2° response.

(i) abundant memory cells
more easily activated + 2 points

(ii) affinity maturation
increased Ag display + 2 points

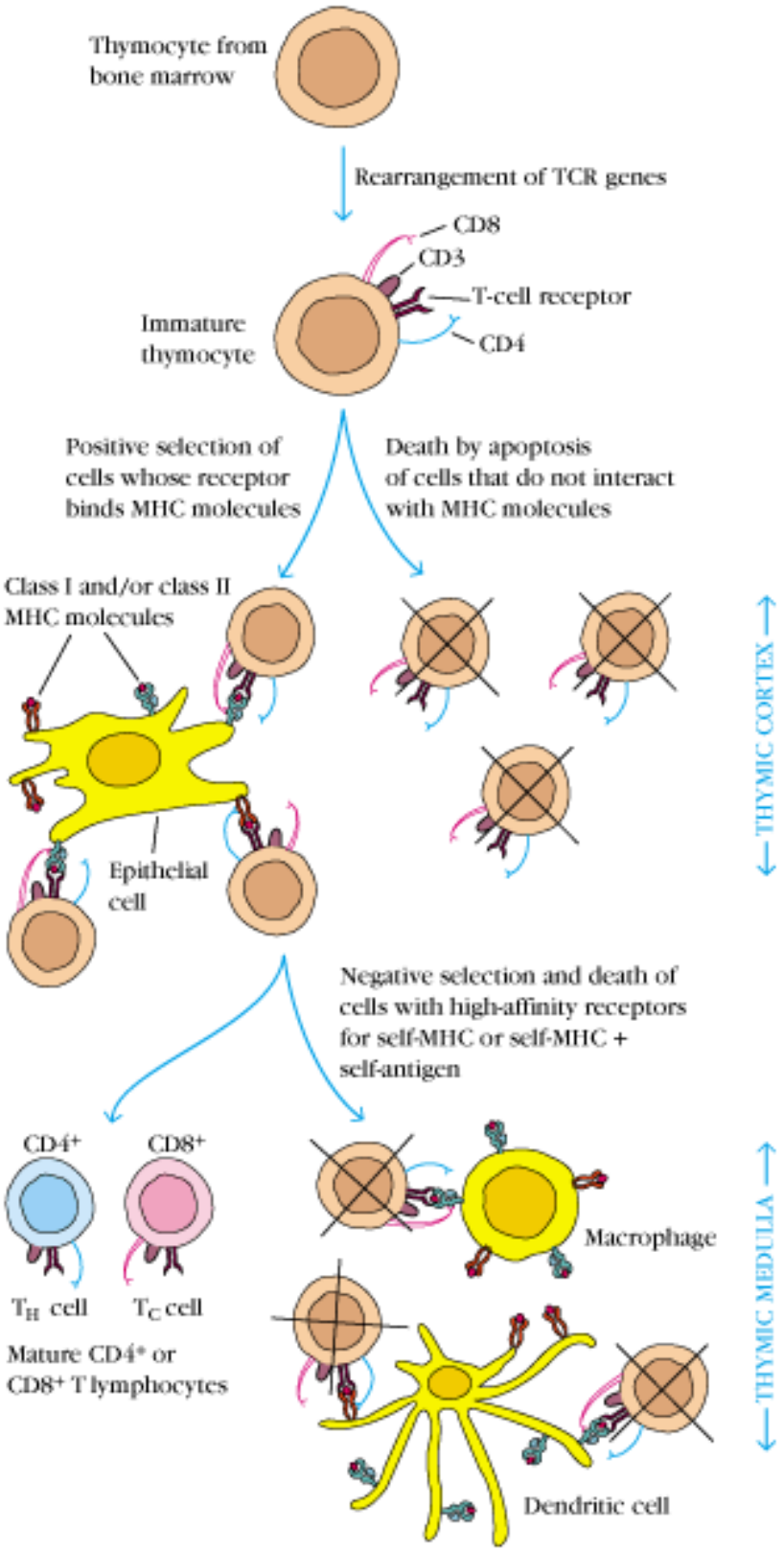
12. Define SUPERantigen.

Any substance that binds to the V domain of the T-cell receptor and residues in the chain of class II mHC molecules... induces activation of all T cells that express T-cells that express T-cell receptors with a particular V domain... functions as potent T-cell mitogen, [and] may cause food poisoning...

+ 2 points

13. T-cells can exist with or TCRs and CD4 or CD8 accessory molecules. All T-cells share a common cluster of + 2 points differentiation. What is it? CD3

PART II Ivan Roitt, le grand fromage of immunology, states that T_{-cells} are born in the bone marrow, receive their education in the thymus, and get a job in the periphery. (Not a bad image.) Describe T_{-cell} education. (I [ssk] write describe. Consider how much more effective your presentation will be if that description is accompanied by illustrations or diagrams.)



(Of course, you would not have to draw so fine an illustration...)

An essay should mention:

double positive
CD3
T-cell receptor

Positive selection for MHC recognition
Apoptosis

The role of APC s.

Negative selection to avoid self-reactivity

The occurrence of these activities in the thymus. The occurrence of a cortex and a medulla in the thymus.

+ 18 points