IMMU 7630 PRACTICE MIDTERM 2017

Try covering up the answer choices and answering the question just from the "stem." It's much better learning to use *recall* rather than *recognition*. Draw diagrams as needed; they can help you get an answer right.
Remember that all classes including those on 4 October will be covered by the midterm test.

In all cases, "IgA" means the complete form as found, for example, in saliva.

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1. **The highest-concentration antibody class in blood is:**

   A. IgA
   B. IgG
   C. IgM

2. **The main antibody class made by the fetus before birth is:**

   A. IgG
   B. IgM
   C. IgD

3. **The antibody that's responsible for allergy, for example to ragweed, is:**

   A. IgA
   B. IgG
   C. IgE

4. **The first immunoglobulin component to appear in a developing B cell is:**

   A. Mu heavy chain
   B. Light chain
   C. Cytoplasmic IgM

5. **The antibody class that penetrates *least* well into the tissue fluid is:**

   A. IgG
   B. IgM
   C. IgE

6. **The antibody class whose only known role is as a B cell receptor is:**

   A. IgG
   B. IgM
   C. IgD

7. A B cell in the spleen is secreting IgG. When you check again in 3 days, which one of the immunoglobulin classes can you be sure it will *not* be secreting?

A. IgA
B. IgG
C. IgM

8. Cells that express class II MHC on their surface include:

A. B cells, Dendritic cells, Helper T cells
B. B cells, Macrophages, Dendritic cells
C. Cytotoxic T cells, Macrophages, Dendritic cells

9. When a T-independent antigen, such as a complex carbohydrate, is injected, you expect to see plasma antibody of which class?

A. IgM
B. IgG
C. IgE

10. In the human H chain locus, there are 65 V, 27 D, and six J gene segments. (65x27x6=10,530). You expect to find in the serum how many different H chains in antibodies?

A. 10,530
B. more than 10,530
C. less than 10,530

11. Each molecule of antigen A has five epitopes; each epitope is different from the others. I make a monoclonal IgG antibody against one of these epitopes. I mix equal numbers of monoclonal antibody molecules and antigen A molecules. Concerning the precipitate I expect to see:

A. I do not expect to see a precipitate.
B. It will contain equal amounts of antigen and antibody molecules.
C. It will contain five times as many antibody as antigen molecules.

12. Properties of complement include two, *but not which one* of the following:

A. It is opsonizing.
B. It is anaphylatoxic.
C. It is MHC-restricted.

13. Cytotoxic T lymphocytes recognize antigen presented on which MHC class(es)?

A. MHC class I
B. MHC class II
C. Either MHC class II or MHC class I

14. If a person lacks the ninth component of complement, by which complement pathway will he or she be able to lyse bacteria?

A. The classical pathway only.
B. The alternative pathway only.
C. Not by either pathway.

15. I mix a normal person's peripheral blood T cells with something. Within three days, 97% of the T cells are observed to have divided at least once. (Without the addition, no T cells divided.) "Something" was probably:

A. A mitogen.
B. An antigen.
C. Someone else's macrophages.

16. I wish to set up a capture ELISA assay to measure a hormone in human plasma. I know the hormone has 2 epitopes called Y and Z. To do this test, I will require at least two antibodies. Which of these do I NOT require?

A. A (mouse) monoclonal antibody against Y.
B. A (mouse) monoclonal antibody against Z.
C. A monoclonal antibody against human IgG.

17. At 12 weeks after birth the concentration of maternal IgG in an infant should be what fraction of the concentration on the day of birth?

A. One quarter
B. One sixteenth
C. One sixty-fourth

18. A woman's phenotype is HLA-A 1,3; HLA-B 5,7; HLA-DR 9,11. A man's phenotype is HLA-A 1,4; HLA-B 6,8; HLA-DR 12,14. Which of these children could NOT be theirs?

A. HLA-A 1,1; HLA-B 5,6; HLA-DR 9,12.
B. HLA-A 1,1; HLA-B 5,7; HLA-DR 9,14.
C. HLA-A 1,4; HLA-B 6,7; HLA-DR 11,14.

19. Cytotoxic T cells must see antigen, and they require help from Th1 cells to become activated. Under which of these transplantation circumstances will I see MOST activation of the recipient's cytotoxic T cells?

A. Donor and recipient are identical at Class I MHC but different at Class II MHC.
B. Donor and recipient are identical at Class II MHC but different at Class I MHC.
C. Donor and recipient are different at Class II MHC and Class I MHC.

20. A surgeon uses a heart valve from an animal to replace a damaged heart valve in a human patient. This type of graft is called:

A. A xenograft
B. An isograft
C. An allograft

ANSWERS ARE ON NEXT PAGE; don't look until you've worked hard on the test!!

1 **B** IgG, at 1000mg/dL is the most abundant immunoglobulin in blood.
2 **B** IgM is the only antibody the fetus can make.
3 **C** IgE is the antibody whose Fc end binds receptors on histamine-containing and inflammatory mediator-releasing mast cells.
4 **A** Mu heavy chain; then L chains = cytoplasmic IgM; then surface IgM; then surface IgM + surface IgD.
5 **B** IgM is too big to diffuse readily into the tissue fluids.
6 **C** IgD.
7 **C** IgM, because given the order of C region genes, when a cell is making IgG it has lost the IgM C region gene segment.
8 **B** B cells, Mφ, dendritic cells.
9 **A** IgM, as T-independent B cell responses don't class-switch.
10 **B** More than the germline predicts, due to both N-region "sloppiness" and antigen-induced CDR hypermutation (mechanism behind affinity maturation).
11 **A** No precipitate, since the biggest complex you could make has 2 antigens and 1 antibody (draw a diagram!)
12 **C** There is no MHC-restriction in this antibody-mediated reaction.
13 **A** Only on MHC Class I, which is on all cells; their CD8 binds to Class I.
14 **C** Not by either pathway, which start differently but need to get to C9 for lysis.
15 **A** Nearly all cells are dividing, so this isn't an antigen, but is almost surely a mitogen like PHA or ConA.
16 **C** The standard capture ELISA uses 2 mAbs, one to capture the Ag and the other (labeled with an enzyme) to reveal that it's been captured. Even if you used a third antibody (labeled with the enzyme) to detect the second one, it would have to be anti-*mouse* IgG. I know we didn't discuss this in class, but it's in the notes and the Learning Objectives.
17 **B** Half-life of IgG is 3 weeks, so after 4 half-lives it's a sixteenth of birth level.
18 **B** The "choice B" baby has no HLA-B allele from the woman.
19 **C** In choice A, there's no Class I difference so there's no alloantigen for CTL to see, and they don't get activated, even though Th1 get activated; in choice B, there's no Class II difference so no Th1 helpers get activated, so there's no production of IL-2 for CTL that need it to get activated.
20 **A** Different species = xenograft.