|  |  |
| --- | --- |
| **Name:** |  |
| **Date:** |  |

**Flipped Class Assignment**

**A560: Cell Biology and Histology**

|  |
| --- |
| *Please complete the following questions prior to the immune and lymphatic flipped class and turn in electronically before class. Feel free to use any resources uploaded to Canvas, including: Dr. Mescher’s 2012 podcast, Dr. Mescher’s 2012 PowerPoint, Junqueira, 13 edition – Chapter 14, the laboratory guide, or the laboratory PowerPoint.* |

1. **Compare and contrast:**
2. **Innate** and **adaptive immunity** (differentiate and provide a few examples of each)
3. **Primary** and **secondary lymphoid organs**
4. **Primary** and **secondary lymphoid nodules (follicles)**
5. **T cells** and **B cells** (physically and functionally)

***Practice Questions:***

1. **Which of the following correctly describes antigen-presenting cells (APCs)?**
2. They are memory cells that produce antibodies
3. They display exogenous antigens
4. They are only found in lymph
5. They are paracrine factors that hydrolyze bacterial cell walls
6. **Antibodies are glycoproteins secreted by plasma cells in response to infection. Patients with humoral immune deficiency present with a decrease of one or more types of antibodies. Which of the following would you likely see in an immunocompromised patient?**
7. Activation of complement
8. Precipitation and agglutination
9. Decreased phagocytosis
10. NK cell activation
11. **Which of the following is false regarding the thymus?**

a. It undergoes involution at puberty

b. Negative selection functions to prevent autoimmunity

c. Positive selection occurs in the cortex ensuring T cells have functional receptors

d. Hassall’s corpuscles function in phagocytosis of apoptotic T cells

1. **Which of the following is true regarding thymic epithelial cells (TECs)?**
   1. TECs are thymocytes
   2. TECs line thymic cortex microvasculature
   3. TECs produce reticulin fibers that fill the stroma of the thymus
   4. TECs form concentric aggregates in the cortex, known as Hassall’s corpuscles
2. **Which of the following is true about MALT?**
   1. It is found deep to M cells in the ileum
   2. It is located between the two layers of muscularis of the gastrointestinal tract
   3. It is only found as concentrated masses in the tonsils, appendix, and Peyer’s patches
   4. It is considered an encapsulated lymphoid organ
3. **Lymph is a clear substance formed from interstitial fluid that eventually drains back into circulation. Olof Rudbeck was one of the first to correctly describe lymphatic circulation in 1652. Which of the following is true about this fantastic fluid?** 
   1. It carries antigens, antibodies, and APCs
   2. It returns to venous circulation by draining into the superior vena cava
   3. It arrives at lymph nodes through efferent lymphatic vessels
   4. It travels through high endothelial venules (HEVs)
4. **Although small, lymph nodes are important when diagnosing metastases. Which of the following would be the best response to a patient asking about the normal function of these little bean-shaped organs?**
   1. They filter the blood, recycling old and damaged blood cells
   2. They produce immunologically competent lymphocytes with functional TCRs
   3. They provide sites for blood cell production
   4. They participate in filtration, preventing exogenous material from reaching circulation
5. **Which of the following is true when considering the spleen?**
6. Red pulp and white pulp are located in the splenic cortex and medulla, respectively
7. In closed circulation, ensheathed capillaries drain directly into splenic sinuses
8. Cells arrive to the spleen through the afferent vessels
9. B cells form PALS around trabecular arteries

*Love Your Lymphocytes! Complete the following memory matrix.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Receptor** | **Coreceptor** | **Binds to MHC #** | **Functions** |
| **Helper T cells**  **(TH cells)** |  |  | MHC class II |  |
| **Cytotoxic (killer) T cells (TC cells)** | T cell receptor (TCR) |  |  |  |
| **Regulatory T cells (Treg)** |  | CD4, CD25 |  |  |
| **B cells** |  | Complex of CD21, CD19, and Tapa-1 (CD81) | MHC class II |  |

**10) Match the number in the right column that describes the letter in the left column.**

|  |  |  |  |
| --- | --- | --- | --- |
| a. Negative selection |  |  | i. Displays peptide fragments of exogenous antigens to other cells |
| b. Antigen |  |  | ii. Immature T cells, aka T-lymphoblasts |
| c. Dendritic cell |  |  | iii. Antibody binding to increase the efficiency of phagocytosis |
| d. Antigen presenting cell (APC) |  |  | iv. Elongated endothelial cells lining splenic sinuses |
| e. Thymocyte |  |  | v. A molecule recognized by the adaptive immune system |
| f. Autograft |  |  | vi. Vessels lined with cuboidal epithelial cells expressing addressins for diapedesis of lymphocytes |
| g. Opsonization |  |  | vii. Splenic parenchyma consisting of lymphoid nodules and PALS |
| h. White pulp |  |  | viii. Transplantation where donor and host are the same individual |
| i. Stave cells |  |  | ix. Cell survival by not binding MHC displaying self-antigen |
| j. HEVs |  |  | x. An APC with long, branched processes |
|  |

***Final question: Muddiest Point(s)***

What is something that remains unclear to you about the lymphatic system?