**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Understanding Immunity: A Modeling Activity**

**Purpose:** In this activity, you will investigate the workings of innate immunity, the humoral response and the cell-mediated response.

**Learning Objectives:**

1. Understand key players and their functions in different types of immune response (innate, and adaptive, including humoral and cell-mediated)
2. Relate the structures and functions of the different proteins and involved in immune pathways.

**Directions:**

Working in small groups, you will become the expert for one of the following types of immune responses assigned to you:

1. Innate response
2. Humoral response
3. Cell-mediated response

Your task is to make a model of the immune response assigned to you. You must show how it works and then use the model to explain the response to the other groups. When designing the model, you should demonstrate the structures as well as the functions of the proteins involved. Key cells, structures and proteins for each of the immune responses are listed below. You may include additional relevant terms that are not listed here. Models should also show the spatial reference, in other words, you need to show where these events are occurring.

***Key terms that must be included in your model:***

**Innate response**

Basophils Granulocytes Monocytes Pyrogens

Histamines Natural killer cells Cytokines Lysozymes Neutrophils Dendritic cells Macrophages Complement

Eosinophils Mast cells Toll-like receptors system

**Humoral response**

Antibodies Complement system Memory B cells Antigen

Constant region Neutralization of microbe Antigen recognition Disulfide links Plasma cells B cell antigen receptor Epitope Light chain

Clonal selection Heavy chain Variable region Antibody surface

**Cell-mediated response**

Antigen-presenting cells Constant region Memory T cells Dendritic cells Cytotoxic T cells Perforin CD4 cells Granzymes

T cell antigen receptor CD8 cells Helper T cells Clonal selection

Chemokines MHC-I MHC-II

After the model is assembled, you should practice your presentation, first in your small group and then in larger groups. The larger groups should consist of members from an innate response group, a humoral response group and a cell-mediated response group. Each group should present the model they developed and explain the processes involved to the other members in the group.

When all presentations are completed, summarize the immune response with the activity on the following page.

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Understanding Immunity: Assessment for Learning**

***After viewing the models of all the immune responses, complete the following:***

**1. General Comparison of the three types of immune responses:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Innate Response** | **Humoral Response** | **Cell-Mediated Response** |
| **How it is initiated: what starts the process?** |  |  |  |
| **Speed of response** |  |  |  |
| **Types of cells involved** |  |  |  |
| **Types of protein molecules involved** |  |  |  |
| **Is memory acquired?**  **If so, what cells?** |  |  |  |

2. Compare and contrast MHC I and MHC II. What is the significance of each? Which cells have MHC II? How does the presence of MHC II relate to the functions of these cells?

3. What is the complement system? Is it involved in both innate and adaptive immunities? Explain.

4. You have a respiratory infection and the culprit is the adenovirus. Using a flow chart or infographic, show how the immune system responds to the virus.