TABLE OF CONTENTS

How Do Immunologists Study Disease?
Focus: Identification of the Rfv3 Gene and Determination of its Mechanism of Resistance to Retroviral Disease

I. OVERVIEW

Activity One: Pre-assessment of student knowledge of immunology?

OVERVIEW: Students will prepare a concept map using key immunology terms. The map will serve as a primer and pre-assessment of student immunology understanding.
OBJECTIVES: Before doing this activity students should understand

- how to make a concept map.

After doing this activity students should understand

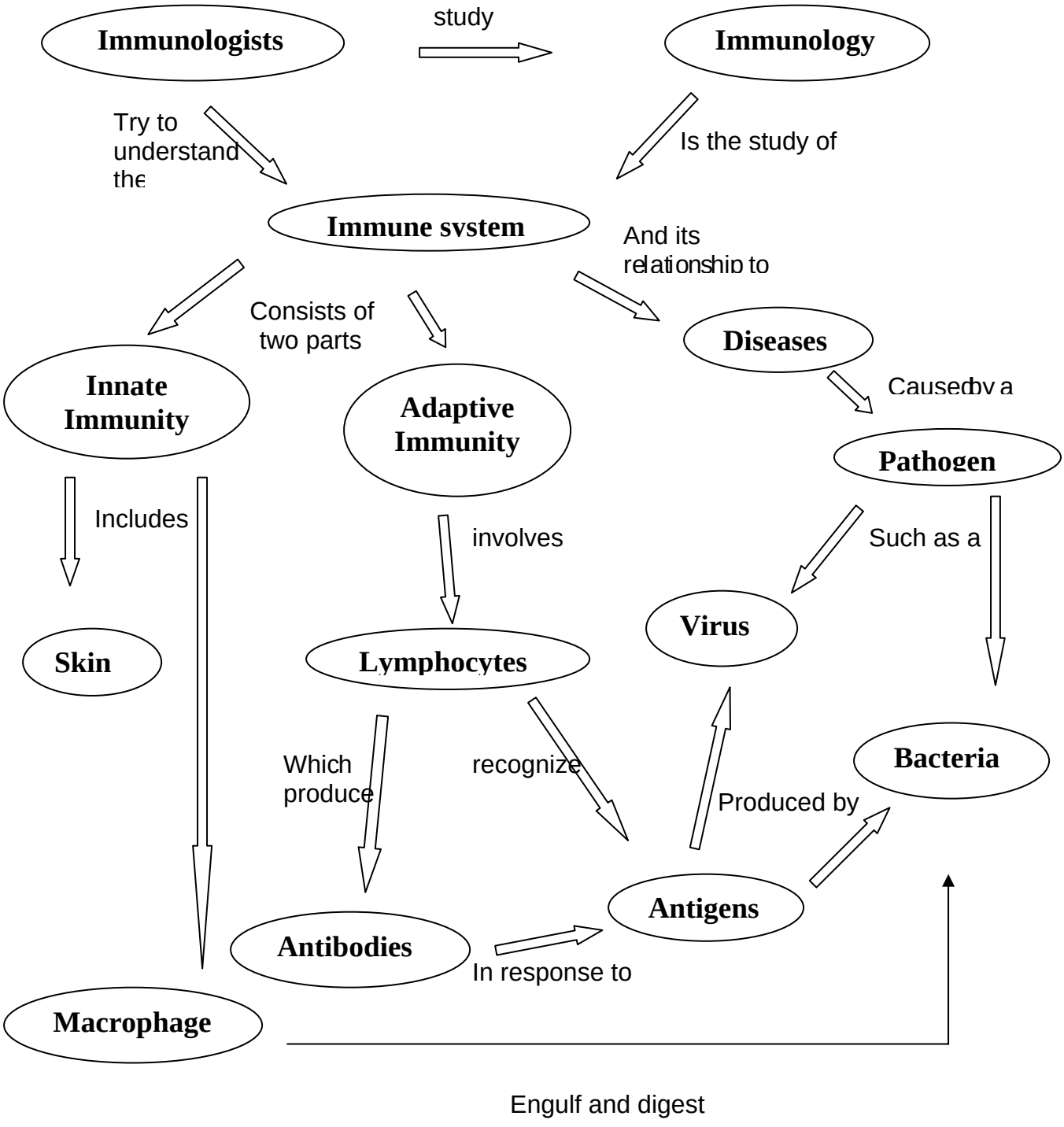
- more about their level of understanding of immunology.

INTRODUCTION: In order to orient students to the upcoming activities have students prepare a concept map following the instructions below. Instruct students that the concept map will not be graded on its content, only on its completion. Students should complete the exercise using only their prior knowledge and no other resources. After completion of the map the teacher should collect the maps and summarize misconceptions and areas of weakness. Students should be informed that they will be asked to make a concept map using the same terms at the end of the unit. An example map is included as a reference of one possible correct way to organize the terms. It should be noted that there are many correct ways to organize these terms on a concept map. The teacher should engage students in a short discussion after the act of mapping and help students to understand some of the correct relationships between the terms and to help them realize that the rest of the unit will be helping them learn these concepts.

TIME REQUIREMENTS: 15-25 minutes
EXERCISE:
Construct a concept map using the following terms:

Immunologist
Immunology
Immune system
Pathogen
Virus
Bacteria
Innate Immunity
Adaptive Immunity
Skin
Macrophages
Lymphocytes
Antigens
Antibodies
Disease

EXAMPLE CONCEPT MAP



Activity Two: Understanding Retroviral Disease? HIV and Friend Virus Disease

OVERVIEW: In this activity students will learn about retroviruses like HIV and Friend Virus and how they cause disease. Students will use a National Institute of Health website (http://www.niaid.nih.gov/factsheets/howhiv.htm) as a resource and use a short reading included in this document to learn about Friend Virus. It is possible to print and

Charlotte Friend
Photo courtesy of The New York Academy of Sciences Archives

ACTIVITY TWO:STUDENT HANDOUT
FRIEND VIRUS

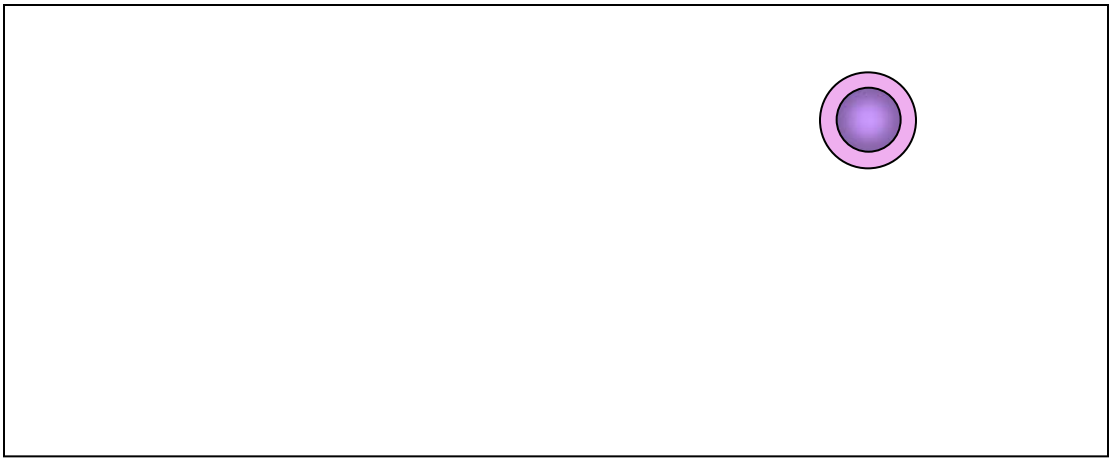
In 1956 a woman name Charlotte Friend discovered the first direct link between a virus and cancer. Although she did not discover the identity of the actual virus she did discover that some unknown particle was causing a deadly erythroleukemia (red blood cell cancer) in mice.

Years later that "particle" was determined to be a retrovirus and was named in her honor – Friend Virus**. The virus wa**

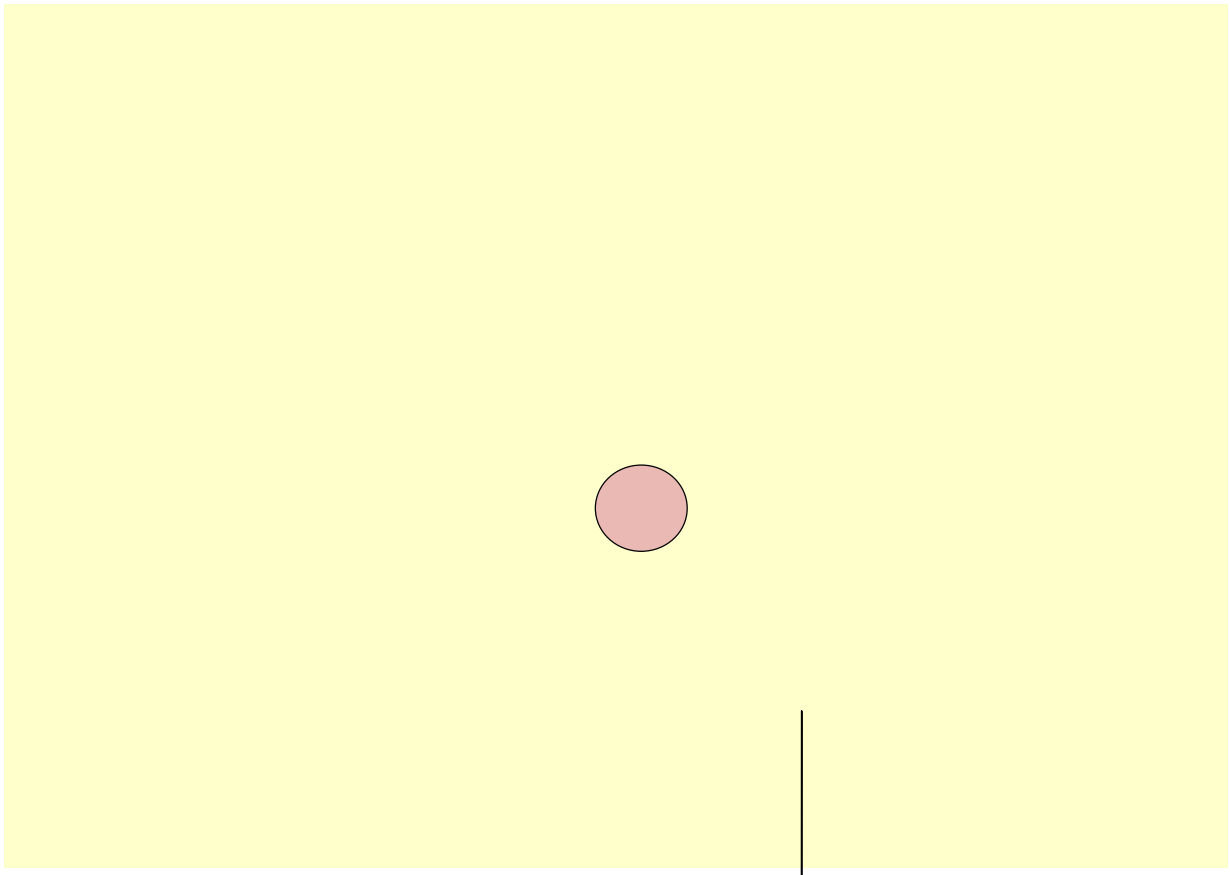
Activity Three: What are the cells of the immune system?

OVERVIEW :. This is as collaborative activity in which students gather information about cells of the immune system and present that information to each other. Initially, the teacher will present information on hematopoiesis (production of blood cells) and ati2 287. 661.0805 Tm

2. Each student in the group chooses one or two of the cells of the immune response to research. The cell types are basophils, eosinophils, neutrophils, monocytes, T-lymphocytes, B-lymphocytes and NK cells.
3. Using resources in the classroom, library and/or internet, give students time (30 mintues or more) to research his/her cell(s) and create a notecard which follows this example:



STUDENT HANDOUT



Activity Four : How do Immunologists Study Disease? Determining the role of the Rfv3 Gene in Resistance to Friend Virus

OVERVIEW: This activity consists of an interactive powerpoint presentation that helps students understand how an immunologist might study a disease.

OBJECTIVES: Before doing this activity students should understand

- Basic immunology
- How to use the scientific method

After doing this activity students should understand

- How an immunologist sets up experiments
- How scientists use the scientific method
- The retroviral disease caused by Friend Virus.
- The role of the Rfv3 gene in providing immunity to Friend Virus Disease..

TIME REQUIREMENTS: Two forty five minute class periods, or one block. .

INTRODUCTION: This activity uses a powerpoint presentation that is designed to be shown to an audience. It could be used by individual students on a personal computer. There are included student and teacher materials. An outline with speaker notes is included for the teacher. The student materials include: two handouts and a question/answer sheet. The teacher is encouraged to make the powerpoint as interactive as possible. Inquiry type questioning can be used throughout to engage the students. It is recommended that the teacher review the powerpoint before presenting.

EXERCISE:

1. Handout the two diagrams and one question/answer sheet to students.
2. Begin powerpoint.
3. Allow students opportunities to ask questions and answer questions on their worksheet.
4. After the presentation discuss the experiment with students.

Activity Four
Student Handout #1

Activity Four
Student Question and Answer Sheet

How Do Immunologists Study Disease? –
Why are some mice resistant to Friend Virus Disease?

1. What is Viremia?

2. What is Erythroleukemia?

3. What is a retrovirus?

4. Why would an immunologist study a mouse disease (Friend Virus) in order to find a cure for AIDS?

5. Why do you think some mice recover from Friend Virus Infection?
   HYPOTHESIS:

6. What would an immunologist do next? What question might he/she ask?

7. With your teacher design an experiment to answer this question. How could you find out what Rfv3 does???

8. Viremia Data: What can you conclude from this data?

9. Antibody Production Data: What can you conclude from this data?

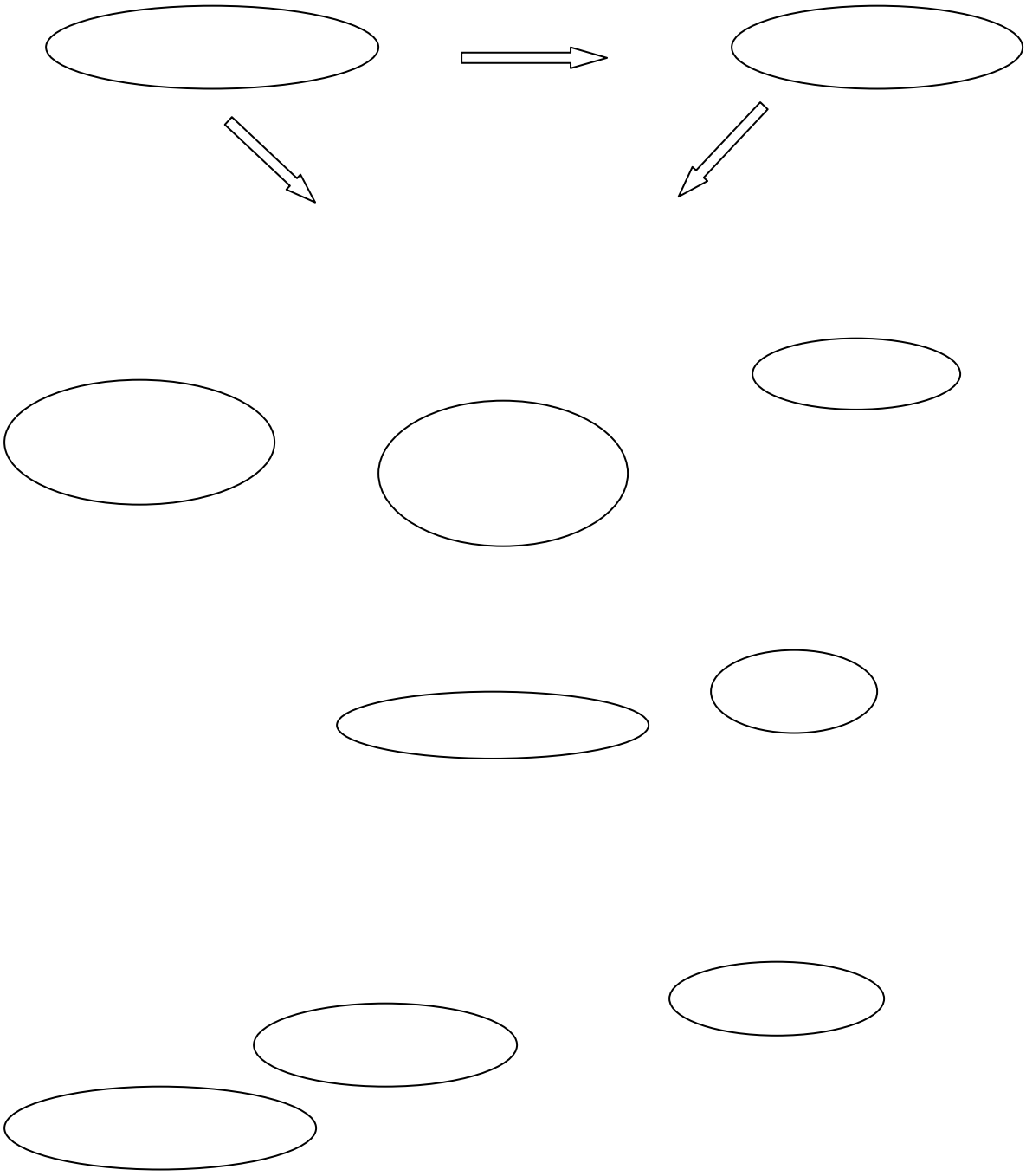
10. What do we do next? What is the next important question to ask?

11. How does the Rfv3 gene participate in the antibody response you make a

Activity Five Post Unit Concept Map?

OVERVIEW: Students will prepare a concept map using key immunology terms. The map will serve as a post assessment of key ideas learned during the unit..

EXAMPLE CONCEPT MAP



This curriculum was prepared by