

Understanding Lupus and Auto-Immune Diseases

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Understanding Lupus and Auto-Immune Diseases

Teacher Section

I. Overview

Understanding the Immune system is a difficult concept for high school biology students. Yet, it is essential for not only students' academic success but also for their overall health and well being. Usually the triggers, also called antigens, are well documented and understood. The introduction of antigens to the body results in cellular response and antibody production. Occasionally, the system goes array and the body fails to recognize itself, producing harmful auto-antibodies.

Throughout this curriculum, students investigate how the immune system works. First, students review previously taught concepts and vocabulary by playing an engaging game. Next, students investigate Lupus, an auto-immune disease. In order to better understand immunology lab procedures, students conduct an on-line interactive tour. Then, students perform an actual ELISA lab to detect the presence of antibodies. Finally, students apply their newly gained knowledge towards an independent research project of another auto-immune disease. Students conclude the unit by presenting a poster to the class. This unit should be taught along with a high school biology immune system unit.

II. Science Background

Required vocabulary: from the "Dana Sourcebook of Immunology"

Active or Acquired Immunity: usually long-lasting immunity that is acquired through the production of antibodies and memory T cells within the organism in response to the presence of antigens.

Antibody: a protein on the surface of B cells that is also secreted in large amounts into the blood or lymph in response to an antigen

Antigen: a foreign substance (usually a protein or carbohydrate) capable of triggering an immune response in an organism.

Autoantibody: an antibody produced against one's self such as anti-DNA antibody.

Autoimmune Disorders: conditions in which the body's own immune system acts against the body.

B cells: a type of lymphocyte that produces antibodies.

Cytokines: a class of substance secreted by cells of the immune system to regulate Immune cells.

ELISA: (Enzyme- Linked Immunosorbent Assay) a testing technique for the detection of proteins.

Immunoglobulins: immune antibodies

Immunosuppressive: describes a treatment that suppresses natural immune responses for example, chemotherapy for cancer.

Inactivated (attenuated) vaccines: made by growing and purifying large numbers of the target organism in the laboratory and then killing them with heat, radiation, or chemicals.

Inflammation: a buildup of fluid and cells that occurs as the Immune system fights a hostile invader.

Innate immune system: component of the immune system that consists of a set of genetically encoded responses to pathogens and does not change or adapt during the lifetime of the organism.

Lupus Erythematosus: an auto-immune chronic inflammatory disease that can affect various parts of the body, especially the skin, joints, blood and kidneys.

Lymphocytes: a type of white blood cell involved in the human body's immune system, of which there are 2 main categories: B and T cells.

Macrophages: large phagocyte cells that remove harmful microbes from the body.

Memory B and T cells: B and T cells that remain in the body after the completion of an immune response to ward off future attacks by the same microbe.

Passive Immunity: immunity acquired by the direct transfer of antibodies. (as in prenatal)

Pathogen: a specific causative agent of disease, such as a bacterium or virus.

Phagocyte: a cell such as a white blood cell that engulfs and consumes foreign material, such as microorganisms.

Plasma Cell: an antibody producing lymphocyte derived from a B cell upon reaction with a specific antigen

T Cell: a type of lymphocyte that possesses highly specific cell-surface antigen receptors.

Helper T cells: coordinate an immune system attack.

Regulatory T cells: special T cells that regulate or suppress immune responses, preventing autoimmunity for example.

Killer T cells: directly kill infected cells marked for destruction by phagocytes.

Interactive demonstrations

- Antigen/Antibody complexes: www.biology.arizona.edu- select Immunology. This is a wonderful resource either to enhance teacher comprehension or to use during instruction with students. There is an additional ELISA tutorial available as well.
- B and T cell activity: www.cancer.gov/cancertopics/understandingcancer/immunesystem/-This is a detailed and downloadable PowerPoint with a complete overview of the Immune system.
- Immunology Lab at: www.Biointeractive.org- This is the interactive lab where students detect the presence of antibodies by utilizing the ELISA technique. It is suggested to run this as a class in a computer lab or with a class set of laptops.
- ELISA testing at: www.explorer.bio-rad.com - select ELISA Immuno Explorer animation-antibody. This is a short, informative animation of the principles of the ELISA test. This should be run prior to performing the actual ELISA test.
- Lupus tutorial at: www.nlm.nih.gov/medlineplus/tutorials/ - available from the Patient Education Institute. Select under topics- Lupus. This is the tutorial necessary to accurately describe the disease process of Lupus for students.

III. Learning Objectives

The following objectives are linked to the New York State Living Environment Core Curriculum Science Standards which specify that:

Standard 1: “Students will use mathematical analysis, scientific inquiry, and engineering designs, as appropriate, to pose questions, seek answers, and develop solutions.”

- **NYS Standard 1: Key Idea 1:** “The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing and creative process.”
- **NYS Standard 1: Key Idea 2:** “Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.”

- **NYS Standard 1: Key Idea 3:** “The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into natural phenomena.”

Standard 4: “Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.”

- **NYS Standard 4: Key Idea 1:** “Living things are both different from each other and from nonliving things.”
 - **NYS Standard 4: Key Idea 2:** “Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.”
 - **NYS Standard 4: Key Idea 5:** “Organisms maintain a dynamic equilibrium that sustains life.”
-
- Students will review the basics of the Immune system by participating in a Jeopardy review game to activate prior knowledge. Reviewing previous immune system basics will allow students to recall, restate and explain the concepts in a game like setting. –**NYS Standard 4: Key Idea 5: Performance Indicator 5.2** “Explain disease as a failure of homeostasis.”
 - Viewing and discussing a Lupus tutorial will enable students to effectively identify and describe the disease.- **NYS Standard 4: Key Idea 5: Performance Indicator 5.2g:** “Sometimes the immune system may attack some of the body’s own cells or transplanted organs.”
 - Students will differentiate between simple disease and those of an auto-immune nature by analyzing characteristics of Lupus.
 - Utilizing an interactive on-line immunology lab, students will investigate techniques and procedures to successfully identify patients with the disease.
 - Performing an actual ELISA analysis will allow students to formulate connections between laboratory testing and actual disease processes.-**NYS Standard 4: Key Idea 5: Performance Indicator 5.2j:** “Biological research generates knowledge used to design

ways of diagnosing, preventing, treating, controlling, or curing diseases of plants and animals.”

- Researching and presenting a poster depicting an auto-immune disease will result in students incorporating prior knowledge while assembling a new model.- **NYS Standard 1: Key Idea 2: Performance Indicator 2.2:** “Refine research ideas through library investigations, including electronic information retrieval and reviews of the literature, and through peer feedback obtained from review and discussion.”
- Comparing and evaluating other students’ presentations allows an opportunity not only to appraise others’ work but also to evaluate their own.- **NYS Standard 1: Key Idea 3: Performance Indicator 3.5:** “Scientists use peer review to evaluate the results of scientific investigations and the explanations proposed by other scientists.”

IV. Time Requirements

For double class periods, about 6 days will be needed to complete these activities.

- Introduce terminology and engage in vocabulary Jeopardy review game-1 or 2 class periods (time can vary from 40-80 minutes)
- Web based tutorial Powerpoint presentation on Lupus and testing methodologies-1 class period (40 minutes)
- Computer lab interactive immunology lab simulation-1 class period (40 minutes)
- ELISA Analysis testing- 2 class periods (80 minutes)
- Internet research of individual poster presentation on an auto-immune disease-1 class period (40 minutes)- finish for homework
- Poster presentations-1 class period (40 minutes)

V. Advance Preparation

- Prepare for Jeopardy Review game
 - Students will have received preliminary classroom instruction in the basics of the immune system. They will have completed definitions for the vocabulary list for homework prior to coming to class.
 - Divide class into teams of 3-4 students.

- Make a Jeopardy game using a powerpoint template to review key Immune system concepts and vocabulary
- Prepare for Lupus discussion
 - View an online tutorial explaining Lupus available at: <http://www.nlm.nih.gov/medlineplus/tutorials/> -Select topic “Lupus”
- Prepare computer lab or lap top cart by making sure that plug-ins and macromedia are loaded and check the Immunology Virtual Lab availability at www.Biointeractive.org .
- Obtain educational ELISA Immuno Explorer kit(s):Catalog #166-2400 EDU from Biorad corporation and prepare all reagents necessary One kit is sufficient for 12 student workstations consisting of 2-4 students at each workstation.
- Obtain a list of at least 5 suitable websites for students to research autoimmune diseases to incorporate into their poster presentations- some suggestions:
 1. American Autoimmune Related Diseases Association, Inc: www.aarda.org/
 2. Medline Plus: Autoimmune Diseases: www.nlm.nih.gov/medlineplus/autoimmunediseases.htm
 3. Autoimmune diseases: www.healthline.com
 4. Autoimmune Disease in Women- The Facts: www.aarda.org/women.html
 5. Autoimmune Diseases: www.fhcrc.org/research/diseases/autoimmune/

VI. Materials and Equipment

- 1) Vocabulary Jeopardy Review Game:
 - copy vocabulary words for students to define for homework
 - Jeopardy powerpoint game templates
 - LCD projector
- 2) Lupus Tutorial:
 - computer
 - LCD projector
- 3) Interactive Immunology Lab
 - student computers with appropriate plug –ins to run the interactive (either access via the internet at [www. Biointeractives.org](http://www.Biointeractives.org) or request a CD from the Howard Hughes Medical Institute)

4) ELISA Testing:

-Explorer Activity kit from Biorad corporation

5) Poster Presentation:

-poster paper

-markers

-computers with print capabilities

-easel for display

VII. Student Prior Knowledge

Before beginning these activities, students need to understand the components of an immune response including: the cellular response, the humoral response, B and T cell types, and active and passive immunity. In particular, students must comprehend that from a Biology perspective, disease is seen as the body's inability to maintain homeostasis. The review game will assist in bridging the gaps in the prior knowledge that is needed to fully comprehend the remainder of the unit.

Students should also be able to use laboratory tools such as pipettes and volumetric glassware and follow a written procedure.

VIII. Student Expectations

Upon completion of this unit, student will.....

- demonstrate understanding of key immunological terms
- describe Lupus including:
 - Diagnosis
 - Testing for
 - Organs/systems affected
 - Treatment
 - Prognosis
- be able to perform an actual ELISA immunological analysis and to interpret the results accurately

- research autoimmune disease using reputable web sites on the Internet and design a detailed instructional poster to present an informative presentation for the purpose of educating the other class members

IX. Anticipated Results

Interactive Immunology Lab

Students will accurately determine which patient(s) (A,B,C) has Lupus by detecting a positive ELISA test for anti-DNA antibodies. Any error or deviation from the detailed procedure will result in failure to successfully identify the correct patient(s).

Biorad ELISA activity

Students will accurately determine the presence of antibodies following the manufacturer's procedure.

Poster presentation

Students will be assessed on their presentation using a standard rubric resulting in an individual grade.

X .Lesson Planning/Classroom Discussion

Day 1:

-Review of immune system and associated vocabulary previously assigned for homework.

Students will be divided into teams of approximately 3 students each to play Immune System Jeopardy. There are 2 rounds.

Assessment: Each question has a specific point value. Every time a question is correctly answered the corresponding points will be written on the board for that team. Incorrect answers are not penalized with subtraction of points in an effort to keep it more positive. Teams answer questions on a rotating basis. An incorrect answer allows the next team to “steal” the question. This is a good opportunity for teachers to circulate and listen to discussions amongst team members as they form their responses. This can also be an informal assessment of participation and comprehension.

Day 2:

-Students will be exposed to the specific disease Lupus by viewing and discussing the interactive tutorial presentation available at the following X-Plain Tutorial web address available from the Patient Education Institute:

<http://www.nlm.nih.gov/medlineplus/tutorials/> -Select Lupus

Assessment: Students will be given a worksheet to fill in while viewing the Lupus tutorial.

Day 3:

-Students will perform an interactive Immunology lab utilizing ELISA techniques to determine if individuals have Lupus. Depending on their attention to technique and detail, they may accurately perform the analysis. Their status can be assessed by printing out their results.

Assessment: When they have completed the activity, students are to print out a copy of their lab results.

Day 4:

-Students will perform actual Elisa testing for the detection of Lupus antibodies by performing Biorad's Explorer ELISA kit.

Assessment: Students will be performing the actual ELISA analysis for a lab grade. Detailed answers to questions posed will be included in the formal laboratory write-up.

Day 5:

-Students individually will conduct on-line research into a specific auto-immune disease that they will incorporate into a poster presentation for the class. This will be initiated in a classroom setting and completed over the course of 2 nights for homework.

Assessment: Students will be given a checklist of mandatory items to incorporate into their poster. A rubric will be used to review their ability to successfully do this.

Day 6:

-Students will give a 5 min presentation to the rest of the class on their specific disease utilizing their poster.

Assessment: Students will be reviewed by their peers using a short mini-rubric.(See student page 49)

XI. Assessment

- Lupus tutorial worksheet
- Printout out of simulated immunological testing from www.Biointeractive.org website
- Laboratory report and question sheet for Biorad Explorer Elisa kit activity
- Rubric for auto-immune disease poster
- Peer review form for poster presentations

XII. Additional materials and Keys

Lupus Tutorial Study Guide Key

1. Name 2 components of the immune system:
 - a. white blood cells
 - b. antibodies
2. Name some parts of the body affected by Lupus:
 - a. joints, skin, kidneys, heart ,lungs ,blood vessels ,brain
3. What substances are produced as a result of the body's inability to recognize itself?
 - a. auto-antibodies
4. What is 1 possible cause of Lupus?
 - a. combination of hereditary, environmental, and possible hormonal factors contributes to lupus
5. What part of the body does Discoid Lupus usually affect?
 - a. the skin
6. Name 2 symptoms of the disease:
 - a. extreme fatigue
 - b. painful or swollen joints
 - c. inexplicable fever
 - d. skin rashes
 - e. kidney problems
7. Describe some of the diagnostic criteria:
 - a. positive syphilis test
 - b. presence of anti-nuclear antibodies
 - c. low complement levels
8. What other factors need to be considered in the treatment plan?
 - a. patient's age, gender, health, symptoms, and lifestyle
9. What is the most common treatment?
 - a. corticosteroids
10. Why is a support team so important with regards to Lupus?
 - a. staying healthy takes effort and care, so it is especially important to maintain wellness and keep stress low. A well designed support team is essential for this to occur.

Biotechnology Explorer

ELISA Immuno Explorer Kit

Catalog # 166-2400EDU

BIORAD ELISA ACTIVITY FOR ANTIBODY DETECTION PROTOCOL III

BIORAD ELISA ACTIVITY KIT

Prelab Focus Questions-ANSWER KEY

Answer and discuss these questions prior to performing the lab:

1. How does the immune system protect from disease?
 - a. T cells devour bacteria and viruses
 - b. B cells produce antibodies
 - c. Tears, saliva, skin, stomach acid prevent entry
2. How do doctors use the immune response to protect you from disease?
 - a. They administer vaccines which result in antibody production
3. What is an example of a disease of the human immune system?
 - a. Lupus, AIDS, Multiple Sclerosis, Scleroderma
4. What problems can prevent the immune system from working properly?
 - a. failure to recognize antigens or disease causing agents
 - b. failure to recognize self
5. Why is it important to detect antibodies in people who don't appear sick?
 - a. if the disease is contagious to prevent spreading
 - b. to assess whether early treatment is of benefit
6. What does ELISA stand for?
 - a. Enzyme Linked Immunosorbent Assay
7. Why are enzymes used in this immunoassay?
 - a. Enzymes are specific; therefore, they can directly target 1 antibody.
8. Why do you need positive and negative control samples as well as your experimental sample?
 - a. Performing ELISA testing is a technique sensitive form of testing. Positive and negative controls allow us to interpret the results with reasonable certainty.

BIORAD ELISA ACTIVITY KIT

Post-Lab Questions-ANSWER KEY

1. Which serum(s) have Lupus antibodies?
 - a. The positive control and Patient A both have Lupus antibodies.
2. If you test positive for Lupus antibodies, does it mean that you have the disease?
 - a. No, other diseases and infections can interfere in the testing.
3. What can cause a false positive result?
 - a. A mistake in performing the analysis can result in a false positive result as well as an existing infection.
4. Why did you assay your samples in triplicate?
 - a. Because the testing is based on accuracy and technique, obtaining the same result 3 times means that the procedure was followed.
5. When you added serum samples to the wells, what happened to the serum antibodies if the sample was positive? What if it was negative?
 - a. If the sample was positive, the antibodies bound to other antibodies contained within the well's walls. If it was negative, there were no antibodies to bind.
6. Why did you need to wash the wells after every step?
 - a. You need to wash thoroughly to remove any unbound antibody.
7. When you added secondary antibody, what happened if your serum sample was positive? What if it was negative?
 - a. If the serum sample was positive, there was a color change due to the enzymatic activity of the secondary antibody with the detected antibody. It turned blue. If the sample was negative, there was no color change.
8. What antibody tests can you buy at your local pharmacy?
 - a. A home pregnancy kit is based upon the detection of circulating antibodies that react with chemicals imbedded in a paper stick, resulting in a color change.

POSTER PRESENTATION TEACHER REVIEW RUBRIC

Student presenter:_____

Immune Disorder Topic_____

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
little effort	some effort	satisfactory effort	above average effort	superior effort

Using the 1-5 scale, please evaluate the poster on the following guidelines:

- 1) Use of color:_____
- 2) Use of space:_____
- 3) Inclusion of all required elements on poster:_____
- 4) Neatness of written component:_____
- 5) Overall creativity:_____

TOTAL SCORE= _____/25

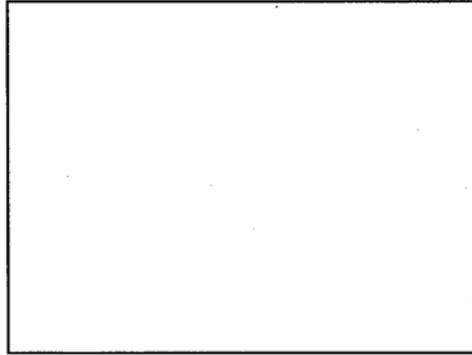
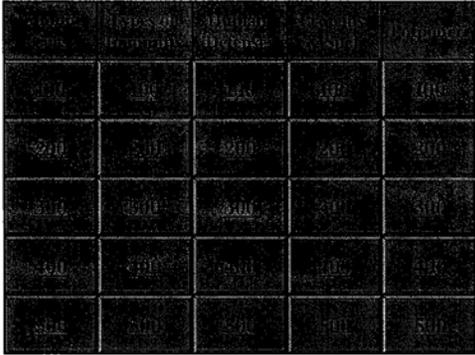
Using the 1-5 scale, please evaluate the presentation on the following guidelines:

- 1) All required disease criteria met:_____
- 2) Student met 5 min requirement:_____
- 3) Incorporation of poster into presentation:_____
- 4) Logical sequence to presentation (introduction, body, conclusion)_____
- 5) Encouraged participation/questions from the audience:_____

TOTAL SCORE= _____/25

Jeopardy PowerPoint Templates and Questions
Round 1:

Immune Cells	Types of Immunity	Human Defenses	Proteins & Such	Potpourri
<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>
<u>300</u>	<u>300</u>	<u>300</u>	<u>300</u>	<u>300</u>
<u>400</u>	<u>400</u>	<u>400</u>	<u>400</u>	<u>400</u>
<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>



These are the “soldier cells” of the body helping to fight disease and infection.

What are white blood cells?

Type of white blood cell responsible for antibody production.

What are the B cells?

Helper and killer are 2 types of this particular white blood cell.

What are T cells?

This particular cell is known for its ability to "gobble up" invaders.

What are Phagocytes?

These cells are reactivated when a pathogen is reintroduced.

What are memory cells?

This type of immunity is given from mother to child through the umbilical cord.

What is Passive Immunity?

This type of immunity results from your body producing antibodies.

What is Active Immunity?

Describe 2 ways an individual can develop active immunity.

What is: by actually getting the disease or by getting a vaccine?

This term is used to refer to an antigen that is weakened or killed.

What is attenuated?

Name 2 benefits of students receiving vaccinations prior to attending school.

What is:
-they won't get sick or die
-they won't spread disease to classmates
-they won't bring home disease to unvaccinated younger siblings or adults
-reduced absenteeism from school?

Name 1 physical barrier to disease.

What is:
-the nose (cilia)
-skin
-tears
-saliva
-stomach acid
?

Name 2 organs of the immune system.

What are: adenoids, tonsils, lymph nodes, spleen, bone marrow, appendix and thymus?

Name the 2 basic components or types of immunity.

What is Active (acquired) and Passive (innate) immunity?

Explain why a newborn should not be taken "out and about" for several weeks.

What is the infant's immune system is undeveloped and exposure to a pathogen could be fatal?

Describe 2 ways that a 5year old child could obtain immunity to a disease.

What is they could: 1) obtain a vaccine or 2) actually get the disease and recover?

The red colored pigment in blood is called.....

What is hemoglobin?

Name 3 food sources that are excellent sources of protein.

What are meats, nuts and soy?

Bacteria, fungi and parasites that cause disease are called this.

What are pathogens?

This type of protein is produced by the body in response to stimulation by foreign proteins.

What is an antibody?

This term literally means "foreign protein."

What is antigen?

HIV is this type of virus because its genetic information is carried as RNA.

What is a Retrovirus?

These chemicals are produced by the immune system for cellular communication. Interferon is one such chemical.

What are cytokines?

Common childhood disease characterized by itchy pustules that there is now a vaccine for.

What is chicken pox?

Name 2 vaccines mandatory for kindergarten enrollment.

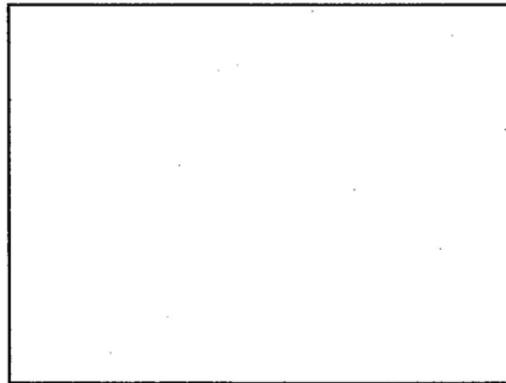
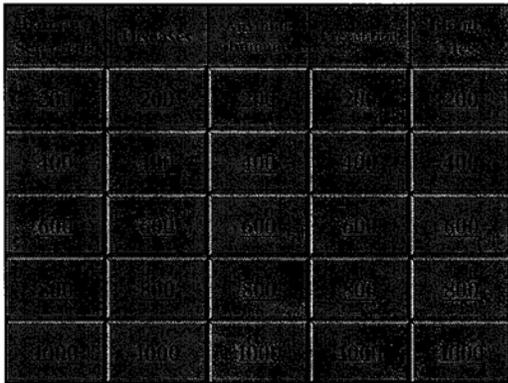
What are: measles, mumps, rubella, polio and hepatitis b?

Name 2 autoimmune diseases.

What are: lupus, rheumatoid arthritis, type 1 diabetes, MS ?

Round 2:

Famous Scientists	Diseases	Anything Immune	Prevention	Bloody Mess
<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>	<u>200</u>
<u>400</u>	<u>400</u>	<u>400</u>	<u>400</u>	<u>400</u>
<u>600</u>	<u>600</u>	<u>600</u>	<u>600</u>	<u>600</u>
<u>800</u>	<u>800</u>	<u>800</u>	<u>800</u>	<u>800</u>
<u>1000</u>	<u>1000</u>	<u>1000</u>	<u>1000</u>	<u>1000</u>



Scientist who coined the term "cell"

Who is Robert Hooke?

He developed one of the first vaccines for smallpox from cows.

Who is Edward Jenner?

Heralded as a hero for defeating the Polio virus.

Who is Jonas Salk??

Invented a technique for processing milk by heating it to kill bacteria and other harmful organisms.

Who is Louis Pasteur?

Developed a series of rules used to identify the microorganism that causes a specific disease.

Who is Robert Koch?

Drugs that kill bacteria are called this.

What are antibiotics?

Name 1 way that a doctor can determine that you have an infection.

What is: a fever, elevated white blood cell count, redness or swelling at the site?

This type of disease can result when a patient is given an organ transplant.

What is Graft vs. Host disease?

Name a specific disease that each of the 4 pathogens (bacteria, virus, fungus, parasitic) can cause.

What is:

Bacteria: strep throat, diphtheria, pertussis

Virus: rabies, polio, common cold, AIDS

Fungus: Athlete's foot, ringworm, thrush

Parasite: malaria, worm infestation ?

Describe 3 ways that HIV can be spread.

What are: sharing needles, unprotected sexual intercourse with an infected individual, contact with blood or blood products , and from an infected mother to an infant during pregnancy, birth or from breast feeding?

The injection of a weakened form of a pathogen to produce immunity.

What is a vaccination?

A common overreaction of the immune system to an antigen such as pollen is this.

What is an allergy?

Chronic respiratory disease in which the air passages become narrower than normal.

What is Asthma?

Explain the difference between humoral and cell-mediated immunity.

What is humoral immunity involves B cells and the production of antibodies and cell mediated involves T cells attacking against abnormal cells and pathogens within living cells?

Name 5 causes of disease.

What are: bacteria, viruses, fungi, parasites, specific genes, and such environmental agents as smoke or toxic chemicals?

Name the most important thing that you can do to prevent the spread of disease.

What is to wash you hands?

Name 3 modes of transmission for infectious disease.

What is by: sneezing, coughing, direct contact, and blood to blood exposure?

A person is said to be this when taking medications that lower their resistance to infection.

What is immuno-suppressed?

Explain how a vaccine and/or boosters can give lifelong immunity to a disease.

What is that :when you are given a vaccine you develop antibodies to a particular disease that remain in your body and you develop memory for that disease so that when it appears again it is destroyed before it can cause disease?

Explain the difference between an epidemic and a pandemic.

What is: an epidemic is easily spread but locally contained, a pandemic is also easily spread but can infect worldwide?

Name the component of blood responsible for clotting.

What are platelets?

Malaria specifically infects this part of your blood.

What are red blood cells?

This blood component is made primarily of water.

What is plasma?

Name the 4 components of blood.

What are: red blood cells, white blood cells, platelets, and plasma?

Name the 4 common blood types

What are A, B, AB, and O?

XIII. References

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Understanding Lupus and Auto-Immune Diseases Curriculum Unit

Student Section

Name: _____

Period: _____

Vocabulary List

Define the following words utilizing the “Dana Sourcebook for Immunology”

1. Active or Acquired Immunity:
2. Antibody:
3. Antigen:
4. Autoantibody:
5. Autoimmune Disorders:
6. B cells:
7. Cytokines:
8. ELISA:
9. Immunoglobulins:
10. Immunosuppressive:
11. Inactivated (attenuated) vaccines:
12. Inflammation:
13. Innate Immune system:

14. Lupus Erythematosus:

15. Lymphocytes:

16. Macrophages:

17. Memory B and T cells:

18. Passive Immunity:

19. Pathogen:

20. Phagocyte:

21. Plasma Cell:

22. T Cell:

23. Helper T Cell:

24. Regulatory T Cell:

25. Killer T Cells:

Name: _____

Period: _____

Lupus Tutorial Study Guide

1. Name 2 components of the immune system:
2. Name some parts of the body affected by Lupus:
3. What substances are produced as a result of the body's inability to recognize itself?
4. What is 1 possible cause of Lupus?
5. What part of the body does Discoid Lupus usually affect?
6. Name 2 symptoms of the disease:
7. Describe some of the diagnostic criteria:
8. What other factors need to be considered in the treatment plan?
9. What is the most common treatment?
10. Why is a support team so important with regards to Lupus?

Name: _____

Period: _____

BIORAD ELISA ACTIVITY KIT

Prelab Focus Questions

Directions: Answer and discuss the following questions prior to performing the lab

1. How does the immune system protect from disease?
2. How do doctors use the immune response to protect you from disease?
3. What is an example of a disease of the human immune system?
4. What problems can prevent the immune system from working properly?
5. Why is it important to detect antibodies in people who don't appear sick?
6. What does ELISA stand for?
7. Why are enzymes used in this immunoassay?
8. Why do you need positive and negative control samples as well as your experimental sample?

Name: _____

Period: _____

BIORAD ELISA ACTIVITY KIT
Post-Lab Questions

Directions: Please answer each question in complete sentence form.

1. Which serum(s) have Lupus antibodies?
2. If you test positive for Lupus antibodies, does it mean that you have the disease?
3. What can cause a false positive result?
4. Why did you assay your samples in triplicate?
5. When you added serum samples to the wells, what happened to the serum antibodies if the sample was positive? What if it was negative?
6. Why did you need to wash the wells after every step?
7. When you added secondary antibody, what happened if your serum sample was positive? What if it was negative?
8. What antibody tests can you buy at your local pharmacy?

Research Guidelines for Auto-Immune Disease Poster and Presentation

The following items must be included in your project:

- 1) Complete name of the disease and explanation of the origin of that name (is it named after the individual that discovered it or the organ it affects, etc.):
- 2) What part(s) of the body does it affect?
- 3) What are the clinical symptoms?
- 4) Is there a specific age, sex, or ethnicity that is at a greater risk of having the disease?
- 5) How is it diagnosed? Laboratory tests? Clinical diagnosis?
- 6) Are there any treatment options?
- 7) Is it preventable?
- 8) Is it genetic or is there a genetic predisposition?
- 9) Are there remission and relapse states?
- 10) In what direction is current research progressing?

POSTER PRESENTATION PEER REVIEW RUBRIC

Student presenter:_____

Immune Disorder Topic_____

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
little effort		some effort	satisfactory effort	above average effort	superior effort

Using the 1-5 scale, please evaluate the poster on the following guidelines:

- 1. Use of color:_____
- 2. Use of space:_____
- 3. Inclusion of all required elements on poster:_____
- 4. Neatness of written component:_____
- 5. Overall creativity:_____

TOTAL SCORE= _____/25

Using the 1-5 scale, please evaluate the presentation on the following guidelines:

- 1. All required disease criteria met:_____
- 2. Student met 5 min requirement:_____
- 3. Incorporation of poster into presentation:_____
- 4. Logical sequence to presentation (introduction, body, conclusion)_____
- 5. Encouraged participation/questions from the audience:_____

TOTAL SCORE= _____/25