You Are the Doctor!

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This activity was designed--ultimately--to help students learn about the immune system while simulating the work of a team of physicians. It will work best with four students per group.

Students working individually will use information available on the internet to investigate the symptoms and treatments associated with one of four conditions associated with the immune system. Each student will summarize the information that they have obtained in the form of a pamphlet that could be distributed to their patients and their families.

They will then meet as a team--or "practice"--to discuss their individual findings. Next, they will review the information provided by a new patient and determine which additional information (i.e., tests) they need to order. Once they receive the results of these tests (provided by you!), they will meet together to reach a consensus as to what the disease is. Finally, they will present their conclusions as

Acute Lymphocytic Leukemia (ALL): Acute leukemia results in the production and accumulation of large numbers of immature lymphocytes in the blood and bone marrow. White blood cell counts, normally between 5,000 and 10,000 cells/microliter, can be higher than 50,000. As a result, the bone marrow can't produce enough *normal* red blood cells, white blood cells or platelets. So, leukemia patients are often anemic, have difficulty fighting off infections, bruise and bleed easily. Most cases of leukemia occur in older adults. However, acute lymphocytic leukemia (ALL) accounts for 80% of all childhood leukemia cases. The peak incidence of ALL is in children between the ages of 2 and 5 years. ALL is slightly more common in males that females, and the incidence is higher among Americans of European descent that of African, Japanese, Chinese, and Korean descent. The disease is diagnosed using a combination of blood tests, bone marrow aspirates and biopsies. Lumbar punctures or spinal taps are also performed to determine the presence of leukemic cells in the CNS. The leukemia death rate for children in the US has decreased dramatically over the past thirty years, but it is still one of the leading causes of death for children under 15. The primary treatment for ALL is chemotherapy. Radiation therapy may be used in some cases. Bone marrow transplantation may be considered in the event of a relapse. Complete remission that lasts five years often indicates a cure.

consuming. The symptoms of IM usually begin to decrease within three to four weeks--but patients may continue to feel fatigue for up to six months. Treatment mainly involves bed rest, fluid intake, and use of over-the-counter pain relievers. Antibiotics are ineffective against viral infections.

Systemic Lupus Erythematosus (SLE): SLE is a chronic, inflammatory, autoimmune disease. It occurs nine times more often in women than in men, and is seen more frequently in people of African-American, Indian, and Asian origin. It is often difficult to diagnose, because the symptoms may appear to indicate a variety of other conditions. In addition, different people will exhibit different combinations of symptoms. Common signs of lupus include a red rash on the face which worsens in sunlight, sensitivity to sunlight, swollen joints, arthritis, extreme fatigue, low blood (WBC + platelet) counts, trouble thinking/memory problems. Blood clots may form, due to the presence of anti-phospholipid antibodies, which target lipids involved in blood clotting. Inflammation of parts of the heart or the lining of the lung tissue may occur, resulting in chest pain. In more serious cases, kidney function may be affected, resulting in renal failure.

caused by the body's immune system attacking the cells of the myelin sheath. This destruction leads to areas of demyelination or "plaques" or "lesions" in the brain and spinal cord. These plaques disrupt the transmission of information--and result in the symptoms seen in MS. The location of the lesions is associated with the specific symptoms that are exhibited. Currently, a diagnosis begins by *eliminating* other possibilities. Physicians must find evidence of lesions or plaques in at least two areas of the CNS. This is done (or confirmed)cerebrs that

4. work in a team setting where success is dependent upon cooperation among "experts";
5. make a diagnosis using results from medical tests.

Besides what the students learn from their investigation, this activity should allow students to practice employing the following skills:

6. locating and evaluating web-based information;
7. note-taking skills;
8. investigative skills;
9. evaluating and interpreting evidence;
10. reaching a conclusion based on evidence.

B. How students will demonstrate specific knowledge and skills

Students working individually will be assigned one of the four conditions (ALL, IM, SER, MS) on which to become the team "expert." They will use information available on the internet to investigate the symptoms and treatments associated with one of four conditions associated with the immune system. Because of the vast amount of information available, specific websites--along with web addresses--have been identified for use by each "expert." This will enable students to simply click on the address--or, cut and paste the address into the web browser--rather than having to type in the specifics of each web address. Students will be provided with a summary sheet containing specific questions to help them organize their research as they work. Upon completion of the web-based research, each student will summarize the information that they have obtained in the form of a pamphlet that could be distributed to their patients and their families. [A potential rubric for scoring this pamphlet is provided.]

They will then meet as a team--or "practice"--to discuss their individual findings. Next, they will review the information provided on the chart of a new patient and determine which additional information (i.e., tests) they need to order. They will identify which tests they would like performed by completing the "Request for Tests" form. Once they receive the results of these tests, they will meet together to reach a consensus as to what the disease is. Finally, they will present their conclusions as a team at a conference attended by the other physicians in their class. The students should be able to defend their conclusion with evidence during these five-minute presentations to the other physicians in the class. [A potential rubric for scoring this presentation is provided.]

IV. Time Requirements

A. Suggested time blocks (for use in either single or double class periods)

Two to four single class periods will be needed for research and pamphlet preparation.

One period (or less) will be required for the initial meeting of the "practice" for the purpose of discussing the initial patient information and

- Students should understand the difference between antibodies and antigens

VIII. What is Expected From Students

A. Pamphlet

Each physician in the practice will be responsible for the development of the pamphlet describing the condition with which they have the most experience and training. The intended audience includes the patients, their friends and their families. The pamphlet topics are listed below:

- Pediatric Oncologist--Acute Lymphocytic Leukemia (ALL)
- Hematologist--Infectious Mononucleosis (IM)
- Rheumatologist--Systemic Lupus Erythematosus (SLE)
- Neurologist--Multiple Sclerosis (MS)

To prepare the pamphlet, each student will engage in web-based research. A summary sheet will help the students organize their research as they work--and a list of suggested websites for students to use is provided. The pamphlet that the student prepares should provide the required information in an understandable, clear, and concise manner. The pamphlet should address the following issues:

1. What is the common name of the disease?
2. Are there other name(s) for the disease?
3. What are some other types of diseases that are in the same category/group?
4. What are the signs and symptoms of this disease?
5. What are the causes of the disease? (Is it inherited? acquired?)
6. Can the disease be spread from one human to another?
7. If the disease *can* be spread from one person to another, how is it transmitted?
8. How is the disease diagnosed? (i.e., What tests should be ordered? What signs should you be looking for? What would be normal?)
9. What is the prevalence of the disease in the US? What is the prevalence of the disease in the world?
10. Among what groups of people is the disease most common? (Consider gender, ethnicity, age, etc.)
11. Is the disease lethal? (If yes, how often is it lethal?)
12. If the disease is lethal, what actually causes the victim to die?
13. What is the quality of life like following diagnosis?
14. How long does a patient usually survive after diagnosis?
15. How is the condition treated?
16. How is the immune system involved in this condition?
17. What is the focus of the current research on this disease?

[A potential rubric for scoring this pamphlet is provided.]

B. Conference Presentation

Once the web-based research has been completed, the practice will meet as a team. They will be provided with a chart containing information from a new patient. The four members of the practice will review the initial information provided by the patient and determine which tests they would like to order. Upon receiving the requested test results, the team will first make a preliminary diagnosis, and then a five-minute presentation of the case. The conference presentation should include the following:

- a concise, summative description of the patient, including the information that is relevant to the diagnosis;
- the diagnosis;
- an accurate, clear explanation providing evidence that supports the diagnosis and disproves a diagnosis of the three other conditions;
- one visual used during the presentation that enhances and clarifies the argument(s);
- a description of the appropriate course of treatment;
- participation by all members of the practice.

[A potential rubric for scoring this conference presentation is provided.]

IX. Anticipated Results

A. Beatriz, Isabelle

Diagnosis: Systemic Lupus Erythematosus (SER)

Evidence: Symptoms of lupus exhibited by patient include--swollen joints, fatigue, sensitivity to bright light, fever, previous rash on face, memory trouble. Test results--low RBC, Hgb, platelets, WBC with decreased lymphocytes, positive for presence of autoantibodies, complement level low

Other: Although symptoms exhibited

Evidence: Symptoms of MS exhibited by patient include--vision problems, symptoms exacerbated in heat, fatigue, memory problems, tingling sensations in legs, loss of balance and muscle coordination. Test results--average WBC, RBC, Hgb, platelets, MRI lesions, decreased response time in evoked potentials, spinal tap results.

Other: Although symptoms exhibited by patient similar to lupus, average RBC, WBC, negative tests for autoantibodies, normal blood complement levels help to rule out lupus.

F. Taylor, Miles

Diagnosis: Infectious Mononucleosis (IM).

Evidence: Symptoms of mono exhibited by patient include--fever, sore throat, headaches, fatigue, swollen lymph glands, pain in side which may be swollen spleen, jaundice. Test results--modestly elevated WBC, high lymphocyte differential, low RBC, Hgb, platelets, increased bilirubin, positive tests for EBV antigens, mono-spot test, and Paul-Bunnell heterophile antibody test.

Other: Although symptoms exhibited by patient similar to lupus, rash may be allergic response to ampicillin; elevated WBC, negative tests for autoantibodies, normal blood complement levels help to rule out lupus.

X. Assessment

A. Pamphlet Rubric

Pamphlet Rubric--first page

Pamphlet Rubric--second page

Pamphlet Rubric--third page

B. Conference Presentation Rubric

Conference Presentation Rubric--first page

Conference Presentation Rubric--second page

XI. Appendices

A. Student Instructions/ALL

BIOLOGY Name_____

Unit V/Anatomy + Physiology Class_____

"You Are the Doctor!" Date_____

SETTING THE SCENE/Part I: You are a member of a small group practice of physicians that specializes in the diagnosis and treatment of conditions associated with the immune system. In your practice, there is one Pediatric Oncologist, one Hematologist, a Rheumatologist, and a Neurologist. Through your work with your patients, you realize that four of the conditions that you see and try to explain to your patients can be very confusing--and that the printed information you have to give them is often confusing, as well. As a result, your practice has decided to develop easy-to-read pamphlets describing these four conditions. Each physician in your practice will be responsible for the development of the pamphlet describing the condition with which they have the most experience and training. Your intended audience includes your patients, their friends and their families. The pamphlet topics are listed below:

- Pediatric Oncologist--Acute Lymphocytic Leukemia (ALL)
- Hematologist--Infectious Mononucleosis (IM)

- Rheumatologist--Systemic Lupus Erythematosus (SLE)
- Neurologist--Multiple Sclerosis (MS)

SETTING THE SCENE/Part II: Once your pamphlets have been completed, your practice will "meet" a new patient. The four members of the practice will review the initial information provided by the patient and determine which tests you need to order. Upon receiving the requested test results, your team will first make a preliminary diagnosis, and then a five-minute presentation of this case at a conference attended by the other physicians in your class!

YOUR GOALS: So, by the time you've completed these activities, you should be able to:

A. apply an understanding of the workings of the immune system to diagnose a medical problem;
B. analyze data in the form of medical test results;
C. understand and be able to utilize the vocabulary of basic immunology in both written and oral contexts;
D. work in a team setting where success is dependent upon cooperation among "experts";
E. make a diagnosis using results from medical tests.

You Are the Doctor/Part I

Preparing Your Pamphlet--ALL

In your practice, you are the **Pediatric Oncologist**. You specialize in the cancers of children. The pamphlet you will be preparing will describe the symptoms and treatments associated with **Acute Lymphocytic Leukemia (ALL).** To do that, you will need to do some web research. A summary sheet is attached that will help you organize your research as you work--and a list of suggested websites for you to visit are indicated below. But, raw information is not what your patients need right now. They need the information to be presented to them in an understandable, clear, and concise manner. And they need to be able to get this information in a way that is not confusing or difficult to follow. So, keep these goals in mind as you begin your research and design your pamphlet. [If *you* need more clarity on this, feel free to refer to the "Pamphlet Rubric" provided by your publisher!]

GENERAL RESOURCES

http://www.nlm.nih.gov/medlineplus/tutorials/leukemia.html

Start with this interactive tutorial describing ALL.

http://www.cancer.gov/cancer_information/cancer_type/leukemia/

10. Among what groups of people is the disease most common? (Consider gender, ethnicity, age, etc.)

11. Is the disease lethal? (If yes, how often is it lethal?)

12. If the disease is lethal, what actually causes the victim to die?

13. What is the quality of life like following diagnosis?

14. How long does a patient usually survive after diagnosis?

15. How is the condition treated?

16. How is the immune system involved in this condition?

17. What is the focus of the current research on this disease?

You Are the Doctor/Part II

Diagnosing the Patient!

1. Provide the other members of your "practice" with a copy of the pamphlet you prepared. They will each give you a copy of the three they produced. At home, review each pamphlet, and come to class with any questions you still need answered.

2. In class, spend about 15 minutes with the other members of your practice clarifying any questions that came up during the pamphlet reviews.

3. Next, obtain copies of the "Patient Chart" for the patient assigned to your practice. Each member of the practice should read through the information, looking for evidence (i.e., "symptoms") that seem to point in the direction of one of the four conditions you have researched.

4. What additional information would you like to have? What additional tests need to be performed? (Remember--we are in a health care crisis! The patient's health insurance company--if they *have* health insurance to begin with!!--will not pay for extravagant tests. In addition, you do not want to make patients submit to uncomfortable or painful tests if it is not necessary….Choose your test requests *wisely*….) As a team, complete and submit the attached "Request For Tests" form.

5. Reconvene the "practice" when the test results are available. What is your tentative diagnosis? Why? What evidence do you have in support of this diagnosis? What

evidence do you have that disproves a diagnosis of one of the remaining three conditions? What are some suggested treatments?

6. Once the "practice" has been able to answer these questions, prepare a short (4-5 minute) presentation of this case to be made at a conference attended by the other physicians in your class. Your conference presentation should include the following:

    - a concise, summative description of the patient, including the information that is relevant to your diagnosis;
    - your diagnosis;
    - an accurate, clear explanation providing evidence that supports your diagnosis and disproves a diagnosis of the three other conditions;
    - one visual used during the presentation that enhances and clarifies your argument(s);
    - a description of the appropriate course of treatment;
    - participation by all members of the practice.

    If *you* need more clarity on this presentation, feel free to refer to the "Conference Presentation Rubric" provided by the conference organizers!

B. **Student Instructions/IM**

BIOLOGY Name_____

Unit V/Anatomy + Physiology Class_____

"You Are the Doctor!" Date_____

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YOUR GOALS: So, by the time you've completed these activities, you should be able to:

A. apply an understanding of the workings

http://www.mayoclinic.com/invoke.cfm?id=DS00352

This is an easy-to-navigate, informative, website from the internationally renowned Mayo Clinic.

http://www.health.state.ny.us/nysdoh/communicable_diseases/en/infect.htm

Some general information about communicable diseases from the state of New York….

http://www.emedicine.com/emerg/topic319.htm

This site contains information for health professionals…so it is pretty technical. For those who dare to try…!

SPECIALIZED RESOURCES

1. If you need info about normal blood counts—and problematic counts…

http://www.nlm.nih.gov/medlineplus/ency/article/003642.htm

http://www.lymphomaininfo.net/tests/bloodcounts.html

http://www.patientcenters.com/leukemia/news/BloodCounts.html

http://www.leukemia-lymphoma.org/all_mat_tdid.adp?item_id=9452&sort_order=4&cat_id=

2. For info about the mono test…

http://www.labtestsonline.org/understanding/analytes/mono/test.html

B. For links to information about antibody and immunofluorescence tests, try this site. It is a fairly simple site. But it does have some interesting images.

http://health.yahoo.com/healthencyclopedia/000591/0.html

Use this sheet to summarize what you have learned about diseases associated with the immune system

1. What is the common name of the disease?
2. Are there other name(s) for the disease?
3. What are some other types of diseases that are in the same category/group?
4. What are the signs and symptoms of this disease?
5. What are the causes of the disease? (Is it inherited? acquired?)
6. Can the disease be spread from one human to another?
7. If the disease *can* be spread from one person to another, how is it transmitted?
8. How is the disease diagnosed? (i.e., What tests should be ordered? What signs should you be looking for? What would be normal?)
9. What is the prevalence of the disease in the US? What is the prevalence of the disease in the world?
10. Among what groups of people is the disease most common? (Consider gender, ethnicity, age, etc.)
11. Is the disease lethal? (If yes, how often is it lethal?)
12. If the disease is lethal, wh h

14. How long does a patient usually survive after diagnosis?

15. How is the condition treated?

16. How is the immune system involved in this condition?

17. What is the focus of the current research on this disease?

You Are the Doctor/Part II

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6. Once the "practice" has been able to answer these questions, prepare a short (4-5 minute) presentation of this case to be made at a conference attended by the other physicians in your class. Your conference presentation should include the following:

- a concise, summative description of the patient, including the information that is relevant to your diagnosis;
- your diagnosis;
- an accurate, clear explanation providing evidence that supports your diagnosis and disproves a diagnosis of the three other conditions;
- one visual used during the presentation that enhances and clarifies your argument(s);
- a description of the appropriate course of treatment;
- participation by all members of the practice.

If *you* need more clarity on this presentation, feel free to refer to the " Conference Presentation Rubric" provided by the conference organizers!

C. Student Instructions/MS

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Unit V/Anatomy + Physiology Class_____

"You Are the Doctor!" Date_____

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YOUR GOALS: So, by the time you've completed these activities, you should be able to:

Use this sheet to summarize what you have learned about diseases associated with the immune system

1. What is the common name of the disease?
2. Are there other name(s) for the disease?
3. What are some other types of diseases that are in the same category/group?
4. What are the signs and symptoms of this disease?
5. What are the causes of the disease?

17. What is the focus of the current research on this disease?

- one visual used during the presentation that enhances and clarifies your argument(s);
- a description of the appropriate course of treatment;
- participation by all members of the practice.

If *you* need more clarity on this presentation, feel free to refer to the " Conference

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A. apply an understanding of the workings of the immune system to diagnose a medical problem;
B. analyze data in the form of medical test results;
C. understand and be able to utilize the vocabulary of basic immunology in both written and oral contexts;

http://www.niams.nih.gov/hi/topics/lupus/shades/index.htm

This, too, is a link from NIAMS--with information especially for people living with lupus.

http://www.rheumatology.org/patients/factsheet/sle.html

A fact sheet from the American College of Rheumatologists.

http://www.acponline.org/journals/annals/15dec98/curlupus.htm

"New Approaches for Treatment of Systemic Lupus Erythematosus." This is a fairly complex article--but immunologically interesting…

SPECIALIZED RESOURCES

1. If you need info about normal blood counts—and problematic counts…

http://www.nlm.nih.gov/medlineplus/ency/article/003642.htm

http://www.lymphomaininfo.net/tests/bloodcounts.html

http://www.patientcenters.com/leukemia/news/BloodCounts.html

http://www.leukemia-lymphoma.org/all_mat_detail.adp?item_id=9452&sort_order=4&cat_id=

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7. If the disease *can* be spread from one person to another, how is it transmitted?
8. How is the disease diagnosed? (i.e., What tests should be ordered? What signs should you be looking for? What would be normal?)
9. What is the prevalence of the disease in the US? What is the prevalence of the disease in the world?
10. Among what groups of people is the disease most common? (Consider gender, ethnicity, age, etc.)
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Diagnosing the Patient!

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2. In class, spend about 15 minutes with the other members of your practice clarifying any questions that came up during the pamphlet reviews.

3. Next, obtain copies of the "Patient Chart" for the patient assigned to your practice. Each member of the practice should read through the information looking for evidence (i.e., "symptoms") that seem to poi to75 0ch-17 Tc -0514.4401 Tm 0 T2621 Tm 61.0 T98 10.75 0 TD2401 Tm 0.e043J E22 TD 45 0 TD ( )Tj /F1

If *you* need more clarity on this presentation, feel free to refer to the " Conference Presentation Rubric" provided by the conference organizers!

F. Patient Chart/Beatriz, Isabelle

Patient Chart

1. **Name:** Isabelle Beatriz
2. **Sex:** female
3. **Age:** 21
4. **Race:** African-American + Hispanic
5. **Home:** Detroit, MI; currently in college at the University of Massachusetts/Amherst
6. **Number of Children:** none
7. **Initial complaint:** swollen hands and wrists
8. **When did the symptoms first appear?** earlier in the month
9. **Have other family members showed similar symptoms?** no
10. **Have any friends experienced similar symptoms?** no
11. **Have you traveled outside the country in the last 6 months?** Toronto, Ontario CANADA, week of December 25, 2002
12. **Have you taken any medications (over-the-counter or prescription) recently?** nothing
13. **How do you feel today?** swollen hands and wrists; exhaustion

Request For Tests

Patient Name: _____

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count		
Hemoglobin (Hgb) Concentration		
Hematocrit (Packed Cell Volume or PCV)		
White Blood Cell (WBC) Count		

F. Patient Chart/Huang Julia

Patient Chart

1. **Name:** Julia Huang
2. **Sex:** female
3. **Age:** 17
4. **Race:** Chinese-American
5. **Home:** Boston, MA
6. **Number of Children:** none
7. **Initial complaint:**red rash on face
8. **When did the symptoms first appear?** ca. 1 week ago
9. **Have other family members showed similar symptoms?** no
10. **Have any friends experienced similar symptoms?** no
11. **Have you traveled /F2 1 Tf 0**

3.

14. Specific Complaints:

Symptom	Comments
Appetite loss?	Yes, sometimes
Breathing difficulty or shortness of breath?	Sometimes
Bright lights--discomfort looking into?	Sometimes
Bruising?	No more than usual
Chest pain?	Sometimes when breathing
Chills?	Sometimes with fever
Cough?	No

Request For Tests

Patient Name: _____

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count		
Hemoglobin (Hgb) Concentration		
Hematocrit (Packed Cell Volume or PCV)		
White Blood Cell (WBC) Count		
WBC Differential Values: Segmented neutrophils		5 e e $
Band neutrophils		
Basophils		
Eosinophils		
Lymphocytes		
Monocytes		

G. Patient Chart/Hutchinson, Theo

Patient Chart

1. **Name:** Theo Hutchinson
2. **Sex:** male

Symptom	Comments
Appetite loss?	Yes
Breathing difficulty or shortness of breath?	Yes--seems to tire quickly
Bright lights--discomfort looking into?	No
Bruising?	Yes--but, Mom reminds us that he is 5!
Chest pain?	No
Chills?	Sometimes--with fever
Cough?	No
Depression or trouble thinking?	No
Diarrhea?	No
Fatigue?	Yes
Fever?	Yes--today 100 degrees (has been febrile on and off for past 3 weeks)
Glands swollen?	Yes
Headaches?	No
Jaundice?	No
Joint or muscle or bone pain?	Theo says he hurts "inside [his] arms and legs"
Memory problems?	No
Muscle coordination or balance problems?	No
Nausea or vomiting?	No
Numbness or tingling sensations?	No
Petechiae?	Yes--eyes
Rash?	No
Side or abdominal pain?	He has complained about a pain in his side--but not today
Skin lesions?	Yes--cuts and bruises--but he's 5!
Sore throat?	Yes
Prolonged thirst?	No
Weight loss?	Possibly

Request For Tests

Patient Name: _____

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count		
Hemoglobin (Hgb) Concentration		
Hematocrit (Packed Cell Volume or PCV)		
White Blood Cell (WBC) Count		

1. **Name:** Donna Leao
2. **Sex:** female
3. **Age:** 9
4. **Race:** Caucasian
5. **Home:** Taunton, MA
6. **Number of Children:** none
7. **Initial complaint:** on-going fever
8. **When did the symptoms first appear?**

Appetite loss?	Maybe

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count		
Hemoglobin (Hgb) Concentration		
Hematocrit (Packed Cell Volume or PCV)		
White Blood Cell (WBC) Count		
WBC Differential Values: Segmented neutrophils Band neutrophils Basophils Eosinophils Lymphocytes Monocytes		
Absolute Neutrophil Count (ANC)		
Lymphocyte Count		
Platelet Count		
Bilirubin (total)		

Other

shortness of breath?	
Bright lights--discomfort looking into?	No
Bruising?	No
Chest pain?	No
Chills?	No
Cough?	No
Depression or trouble thinking?	Patient indicates that she feels as though she can't concentrate well. Sometimes she says she loses her train of thought.
Diarrhea?	No
Fatigue?	Yes--lately, all the time
Fever?	No
Glands swollen?	No
Headaches?	No
Jaundice?	No
Joint or muscle or bone pain?	No
Memory problems?	Patient indicates that she feels as though she can't concentrate well. Sometimes she says she loses her train of thought.
Muscle coordination or balance problems?	Patient indicates that she feels dizzy at unexpected times. She also states that she is dropping things more than usual.
Nausea or vomiting?	No
Numbness or tingling sensations?	Yes--"pins and needles" in right thigh from time to time
Petechiae?	No
Rash?	No
Side or abdominal pain?	No
Skin lesions?	No
Sore throat?	No
Prolonged thirst?	No
Weight loss?	No

Request For Tests

Patient Name: _____

Doctors' Names: _____

Blood Tests

2. **Sex:** male
3. **Age:** 15
4. **Race:** African-American
5. **Home:** Brockton, MA
6. **Number of Children:** none
7. **Initial complaint:** fever, sore throat, fatigue
8. **When did the symptoms first appear?** 2-3 weeks ago
9. **Have other family members showed similar symptoms?** Younger sister had sore throat a month ago
10. **Have any friends experienced similar symptoms?** no
11. **Have you traveled outside the country in the last 6 months?** Toronto, Ontario CANADA, week of December 25, 2002
12. **Have you taken any medications (over-the-counter or prescription) recently?** Tylenol + sister's ampicillin or amoxicillin (patient unsure which antibiotic consumed)
13. **How do you feel today?** Sore throat, exhaustion, low fever

14. Specific Complaints:

Symptom	Comments
Appetite loss?	Yes
Breathing difficulty or shortness of breath?	Not really
Bright lights--discomfort	No

looking into?	
Bruising?	No
Chest pain?	No
Chills?	Sometimes--with fever
Cough?	No
Depression or trouble thinking?	No
Diarrhea?	No
Fatigue?	Yes
Fever?	Yes (100-102 degrees)
Glands swollen?	Yes
Headaches?	Yes--on and off
Jaundice?	Patient responds negatively; physician notes some yellow cast in sclera
Joint or muscle or bone pain?	Yes--aches throughout
Memory problems?	No
Muscle coordination or balance problems?	No
Nausea or vomiting?	No
Numbness or tingling sensations?	No
Petechiae?	Patient responds negatively; physician notes petechiae on roof of mouth
Rash?	Yes--reddish rash on chest + neck
Side or abdominal pain?	Patient responds negatively; physician appreciates some tenderness
Skin lesions?	No--with exception of rash indicated above
Sore throat?	Yes--patient indicates that it was worse earlier in the week, but appears to be improving
Prolonged thirst?	No
Weight loss?	Not appreciable

Request For Tests

Patient Name: _____

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count		
Hemoglobin (Hgb) Concentration		
Hematocrit (Packed Cell Volume or PCV)		
White Blood Cell (WBC) Count		
WBC Differential Values: Segmented neutrophils Band neutrophils Basophils Eosinophils Lymphocytes Monocytes		
Absolute Neutrophil Count (ANC)		
Lymphocyte Count		
Platelet Count		
Bilirubin (total)		

Other

TEST	RESULTS	REQUESTED?
Bone biopsy		

Other--please indicate:

Blood Tests

TEST	RESULTS	REQUESTED?

	Lumbar puncture/Spinal Tap-- **no** indication of leukemic cells; **no** presence of IgG antibodies, breakdown products of myelin, or proteins [oligoclonal bands] Evoked potentials--response time **normal** "mono spot" test--**negative** Paul-Bunnell heterophile antibody test--**not elevated; negative** Antibodies to EBV-associated antigens [i.e., viral capsid antigen, early antigen, EBV nuclear antigen (EBNA)]--**negative** Autoantibody tests [i.e., anti-nuclear antibody, antiphospholipid antibody, anti-ds anti DNA test, anti-Smith test]--**positive** Blood complement values--**low** Lupus erythematosus cell test--results not available; not used today	

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count	4.0 million cells per microliter	
Hemoglobin (Hgb) Concentration	11.5 grams per deciliter	
Hematocrit (Packed Cell Volume or PCV)	.35 or 35%	
White Blood Cell (WBC) Count	3,500 cells per microliter	
WBC Differential Values: Segmented neutrophils Band neutrophils Basophils Eosinophils Lymphocytes Monocytes	 50% 2% 1% 3% 40% 4%	
Absolute Neutrophil Count (ANC)	.52 x 3,500 = 1820 cells per microliter	
Lymphocyte Count	.4 x 3,500 = 1400 cells per microliter	
Platelet Count	90,000 platelets per microliter	
Bilirubin (total)	1.0 mg/dl	

Other

TEST	RESULTS	REQUESTED?
Bone biopsy	Karyotype--**normal**; no hyperdiploidy	

Other--please indicate:	MRI--**no** MS lesions observed Lumbar puncture/Spinal Tap-- **no** indication of leukemic cells; **no** presence of IgG antibodies, breakdown products of myelin, or proteins [oligoclonal bands] Evoked potentials--response time **normal** "mono spot" test--**negative** Paul-Bunnell heterophile antibody test--**not elevated; negative** Antibodies to EBV-associated antigens [i.e., viral capsid antigen, early antigen, EBV nuclear antigen (EBNA)]--**negative** Autoantibody tests [i.e., anti-nuclear antibody, antiphospholipid antibody, anti-ds anti DNA test, anti-Smith test]--**positive** Blood complement values--**low** Lupus erythematosus cell test--results not available; not used today	

M. Test Results/Hutchinson, Theo

Request For Tests

Patient Name: _____Theo Hutchinson_____

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?

Other--please indicate:	MRI--**no** MS lesions observed Lumbar puncture/Spinal Tap-- **no** indication of leukemic cells; **no** presence of IgG antibodies, breakdown products of myelin, or proteins [oligoclonal bands] Evoked potentials--response time **normal** "mono spot" test--**negative** Paul-Bunnell heterophile antibody test--**not elevated; negative** Antibodies to EBV-associated antigens [i.e., viral capsid antigen, early antigen, EBV nuclear antigen (EBNA)]--**negative** Autoantibody tests [i.e., anti-nuclear antibody, antiphospholipid antibody, anti-ds anti DNA test, anti-Smith test]--**negative** Blood complement values--**normal** Lupus erythematosus cell test--results not available; not used today	

N. Test Results/Leao, Donna

Request For Tests

Patient Name: _____Donna Leao_____

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count	2.5 million cells per microliter	
Hemoglobin (Hgb) Concentration	8.0 grams per deciliter	
Hematocrit (Packed Cell Volume or PCV)	.24 or 24%	

	presence of IgG antibodies, breakdown products of myelin, or proteins [oligoclonal bands] Evoked potentials--response time **normal** "mono spot" test--**negative** Paul-Bunnell heterophile antibody test--**not elevated; negative** Antibodies to EBV-associated antigens [i.e., viral capsid antigen, early antigen, EBV nuclear antigen (EBNA)]--**negative** Autoantibody tests [i.e., anti-nuclear antibody, antiphospholipid antibody, anti-ds anti DNA test, anti-Smith test]--**negative** Blood complement values--**normal** Lupus erythematosus cell test--results not available; not used today	

O. Test Results/Simondson, Nora

Request For Tests

Patient Name: _____Nora Simondson_____

Doctors' Names: _____

Blood Tests

TEST	RESULTS	REQUESTED?
Red Blood Cell (RBC) Count	4.8 million cells per microliter	

Hemoglobin (Hgb) Concentration	13.6 grams per deciliter	
Hematocrit (Packed Cell Volume or PCV)	.41 or 41%	
White Blood Cell (WBC) Count	7,000 cells per microliter	
	50%	
	2%	
	1%	
	2%	
	41%	

	leukemic cells Evoked potentials--**response time lower** than normal "mono spot" test--**negative** Paul-Bunnell heterophile antibody test--**not elevated; negative** Antibodies to EBV-associated antigens [i.e., viral capsid antigen, early antigen, EBV nuclear antigen (EBNA)]--**negative** Autoantibody tests [i.e., anti-nuclear antibody, antiphospholipid antibody, anti-ds anti DNA test, anti-Smith test]--**negative** Blood complement values--**normal** Lupus erythematosus cell test--results not available; not used today	

P. Test Results/Taylor, Miles

Request For Tests

Patient Name: Miles Taylor

Hemoglobin (Hgb) Concentration	13 grams per deciliter	
Hematocrit (Packed Cell Volume or PCV)	.40 or 40%	
White Blood Cell (WBC) Count	20,000 cells per microliter	
WBC Differential Values: Segmented neutrophils Band neutrophils Basophils Eosinophils Lymphocytes Monocytes	 37% 2% 1% 2% 53% 5%	
Absolute Neutrophil Count (ANC)	.39 x 20,000 = 7800 cells per microliter	
Lymphocyte Count	.53 x 20,000 = 10,600 cells per microliter	
Platelet Count	100,000 platelets per microliter	08 -1.1147 TD 0.0023 Tc -0.

	[oligoclonal bands] Evoked potentials--**response time normal** "mono spot" test--**positive** Paul-Bunnell heterophile antibody test--**elevated, positive** Antibodies to EBV-associated antigens [i.e., viral capsid antigen, early antigen, EBV nuclear antigen (EBNA)]--**positive** Autoantibody tests [i.e., antiphospholipid antibody, anti-ds anti DNA test, anti-Smith test]--**negative** **BUT,** anti-nuclear antibody [an autoantibody] was **positive first time, negative second time**	