Challenging the Immune System: diagnosis and understanding the disease

Case 1: Jason- an athlete becomes overly tired

Part 1: Feeling the burn

Jason, a 17 year old high school student, had been complaining of muscle aches all over his body, including his back and legs. He had been tired for a few weeks and noticed that he was easily worn out by running up and down the stairs at school. Because he was an athlete, he was used to the aches and pains from weight lifting, but this seemed different. He never used to get tired from going up and down stairs. Jason also noticed a few bruises on his back and legs. He has played sports for years and has had bruises before, but he didn't remember having any contact or falls lately and wondered where they were coming from.

After talking to his parents, they made an appointment and met with Jason's family doctor. When they arrived, Dr. Numata decided to check his oxygen levels, which looked good. He suggested that Jason should get some blood testing done. Maybe he had caught mononucleosis or some other virus that was going around at school. Jason had been working extra hard as a junior athlete-scholar and was looking ahead to start planning for college. It was a stressful time for Jason, and he thought it was probably nothing. However, he went home to await the results of his blood test and could not get rid of a sick feeling in his stomach.

Unfortunately, two days later, Jason's mother received a phone call that would change this family forever. The blood testing revealed that Jason could possibly have leukemia.

Questions: before reading part 2, answer the following questions in groups. Jot down some notes while your group discusses.

1. What were the symptoms that Jason was having? Why do you think he went to the doctor? What made his symptoms serious enough for him to seek treatment? Would you have gone?

2. What do you know about leukemia? Where have you heard about it? Do you know anyone who has battled leukemia?

3. Homework/In class internet research:
    a. What are other symptoms of leukemia?
    b. What types of leukemia are there?
    c. What is the cause of leukemia?
    d. What are the treatment options?

Part 2: Well, what is it?

After the initial shock and disbelief, there came distress and a sort of grief that affected the entire family. They immediately drove to the Children's hospital for more testing and to confirm the diagnosis. They walked into the oncology unit and were met by the nurse. She ran a complete blood count to make sure it wasn't a lab error. After waiting two hours, they got the news that there was no mistake. It was leukemia.

Dr. Gowd, the oncologist, explained that Jason would need to have a surgery scheduled for the next day for a bone marrow aspiration (removing bone marrow from his hip) to check for cancer cells. He will need to have a spinal tap to check the spinal fluid for cancer. These tests will give a full diagnosis of the type of cancer it could be and will give them more information about what the treatment plan should be.

The next day, after all of the tests, Jason and his parents were called into a room to talk with Dr. Gowd and another oncologist. Jason was diagnosed with ***acute lymphocytic leukemia*** *(ALL). Fortunately it had not spread too far and did not enter the brain or spinal column. Some types of acute leukemia respond well to treatment, and many patients can be cured. That afternoon they started him on chemotherapy and began to flush his kidneys to remove the toxin build-up.*

The doctors sat the family down to explain the basics of leukemia: It is a cancer that is characterized by uncontrolled growth of one of the types of white blood cells. There are two common forms of leukemia (lymphocytic and myelogenous). Some leukemia progresses quickly (acute) and others progress slowly (chronic).

ALL means there are too many immature lymphocytes in the blood. They can be B-lymphocytes or T-lymphocytes. Abnormal cells are called lymphoblasts or blasts. ALL starts in the bone marrow and may spread to other places, but fortunately for Jason, it hasn't spread too far. In ALL, the bone marrow cells do not mature properly. Immature leukemia cells continue to reproduce and build up. Being immature, they do not function correctly and crowd out other blood cells.

Questions: before reading part 3, answer the following questions in groups. Jot down notes during your discussion.

1. What is an oncologist? What do you think they are looking for by doing a complete blood count?

2. What is Jason's diagnosis? What types of cells are involved?

3. What is the difference between lymphocytic and myelogenous leukemia?

4. What is the problem with having too many immature lymphocytes in the blood?

5. What other questions should the family ask the doctors? Make a list of some important questions you would ask if you were this family.