What do these findings suggest?

- Open this form and summarize the key laboratory findings, especially in regards to the leading diagnosis and what diagnosis you would give to PJ.

- After you have finished summarizing the results and what they suggest, you may proceed with the case.

(Type your responses in the online form)

PJ has XLA, or X-linked agammaglobulinemia

PJ's lab results show almost no circulating B cells (CD19+) with no deficit of T cells or NK cells. He has otherwise normal white blood cell counts, normal red blood cells and platelets. He has no evidence of organ dysfunction on his CMP. His immunoglobulin levels are undetectable, consistent with the lack of mature B cells.

XLA is the most common clinical syndrome caused by a block in B cell maturation. In this disorder, pre-B cells in the bone marrow fail to expand, resulting in a marked decrease or absence of mature B lymphocytes and serum immunoglobulins. The disease is caused by mutations in the gene encoding a kinase called Bruton tyrosine kinase (BTK), resulting in defective production or function of the enzyme. The enzyme is activated by the **pre-B cell** receptor expressed in pre-B cells, and it delivers signals that promote the survival, proliferation, and maturation of these cells. The **BTK gene** is located on the X chromosome. Therefore, women who carry a mutant BTK allele on one of their X chromosomes are carriers of the disease, but male offspring who inherit the abnormal X chromosome are affected. In about a fourth of patients with X-linked agammaglobulinemia, autoimmune diseases, notably arthritis, develop as well. A link between an immunodeficiency and autoimmunity seems paradoxical. One possible explanation for this association is that BTK contributes to B cell receptor signaling and is required for central B cell tolerance, so defective BTK may result in the accumulation of autoreactive B cells.