Inherited Immunodeficiency

The two major arms of the immune system – antibody (B cell) mediated immunity and cellular (T cell) immunity help to defend the hold against infections. Immunodeficiency may be caused by a deficiency of T cell or B cell origin. Patients with deficiency in B cell function do not produce effective antibody response and suffer from pyogenic bacteria such as Streptococcus or Staphylococcus . Patients with defective T cell function (cell mediated immunity) are also prone to infection and to the development of neoplasm as a result of failed immune surveilance.

Primary immunodeficiency diseases are caused by intrinsic defects in the cells of the immune system and are often caused by inherited genetic defects. This is in contrast to secondary immunodeficiency diseases such as acquired immunodeficiency syndrome caused by infections (AIDS).

Immunodeficiency disorders are as follows:

a. Immunoglobulin (B cells) immunodeficiency disorders: X linked agammaglobulinemia

b. Cellular (T cells) deficiency diseases – Severe combined immunodeficiency (SCID)

X linked agammaglobulinemia

- Also called X linked hypogammaglobulinemia
- XLA
- Bruton type agammaglobulinemia
- Bruton Syndrome
- Sex linked agammaglobulinemia

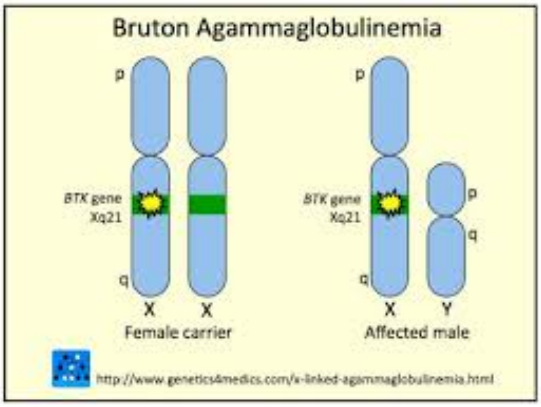
It is a rare x linked genetic disorder that affects the body's ability to fight infections.

First immunodeficiency disease ever identified and classified as a Primary immundeficiency disorder.

X linked means the gene which causes this disease is located on the X chromosome , more common in males.

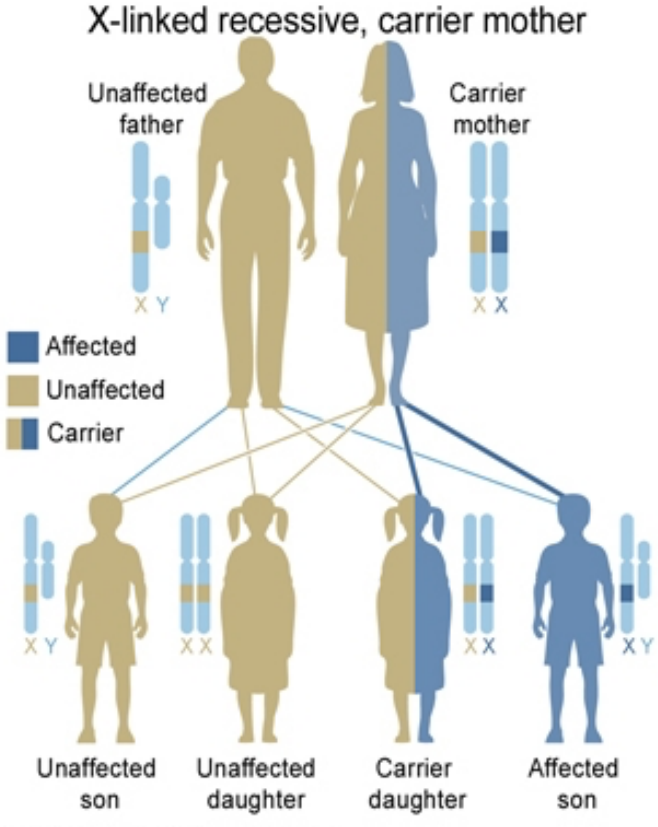
XLA patients do not generate mature B cells.

XLA is caused by a mutation on the X chromosome of a single gene identified in 1993 known as Bruton's tyrosine kinase(BtK).



Ogden Bruton first described the disease in 1952.

The gene BtK plays an essential role in the maturation of B cells in the bone marrow and when mutated immature pre-B lymphocytes are unable to develop into mature B cells that leave the bone marrow into the blood stream. The disorder is X linked (on X chromosome) and almost entirely limited to the sons of asymtomatic female carriers.This is because males have only one copy of the chromosome while females have two copies, one normal copy of an X chromosome can compensate for mutations in the other X chromosome, so they are less likely to be symptomatic. Female carriers have a 50% chance of giving birth to a male child with XLA. An XLA patient will pass on the gene and all of his daughters will be XLA carriers meaning that any male grandchildren from an XLA patients daughters have a 50% chance of inheriting XLA. A female XLA patient can only arise as the child of an XLA patient and as carrier mother.



Diagnosis:XLA diagnosis usually begins due to a history of recurrent infections mostly in the respiratory tract through childhood. The diagnosis is probable when blood tests show the complete lack of circulating B cells as well as low levels of all antibody classes.
Treatment: The most common treatment for XLA is an intravenous infusion of immunoglobulin (IVI g, human IgG) every 3-4 weeks for life which however does not cure XLA but increases the patient's life span.