

# Lesch-Nyhan Syndrome

Lesch-Nyhan syndrome is an X-linked recessive disorder caused by a deficiency of the enzyme hypoxanthine-guanine phosphoribosyltransferase (HGPRT). HGPRT is a transferase enzyme that catalyzes the conversion of hypoxanthine to inosine monophosphate (IMP) and guanine to guanosine monophosphate (GMP). This enzyme plays a key role in the purine salvage pathway, and a deficiency causes a buildup of uric acid in the body. Therefore, individuals with Lesch-Nyhan syndrome suffer from severe gout and display neurological signs, including moderate intellectual disability. A particularly notable feature of Lesch-Nyhan syndrome is self-mutilation, commonly manifested by lip and finger biting. Other neurological symptoms include choreoathetosis and facial grimacing.



**PLAY PICMONIC** 

# **ETIOLOGY**

#### X-linked Recessive

X-suit with Recessive-chocolate

This disease is inherited in an X-linked recessive pattern.

#### **Pathophysiology**

## Absence of HGPRT

Anti-sign on HGPRT-curtain

HGPRT is a transferase enzyme that catalyzes the conversion of hypoxanthine to inosine monophosphate (IMP) and guanine to guanosine monophosphate (GMP). This enzyme plays a key role in the purine salvage pathway.

#### Hypoxanthine to IMP

Hippo-xylophone Connected to IMP

HGPRT is a transferase enzyme that catalyzes the conversion of hypoxanthine to inosine monophosphate (IMP) in the purine salvage pathway.

## Guanine to GMP

Guano to GruMP

HGPRT is a transferase enzyme that catalyzes the conversion of guanine to guanosine monophosphate (GMP) in the purine salvage pathway.

# PRPP is Increased

PRePPy-boy

Phosphoribosyl pyrophosphate (PRPP) accumulates due to defective HGPRT and stimulates the de novo purine synthesis pathway.

# **Excess Uric Acid**

Unicorn Acidic-lemon

Because the purine salvage pathway is defective, cell breakdown products cannot be reused and are instead degraded into uric acid.

#### Signs & Symptoms

#### Gout

Gout-goat

Gout is caused by excess uric acid, leading to the deposition of urate crystals in joints, causing inflammation and pain. It is commonly seen in Lesch-Nyhan syndrome.



## **Intellectual Disability**

Book Covered in Tar

Individuals with Lesch-Nyhan syndrome exhibit severe cognitive impairment, often with deficits in adaptive behaviors such as communication and social skills. These deficits contribute to developmental delay.

#### **Self-mutilation**

Self-hitting

A hallmark feature of Lesch-Nyhan syndrome is self-mutilation, commonly manifested by lip and finger biting.

## Choreoathetosis

Korean-Thor

Choreoatheotosis presents involuntary movements with features of chorea, which are irregular, dance-like movements, and athetosis, which is characterized by a twisting and writhing motion.

#### **Treatment**

# Allopurinol

Aloe-piranha

Allopurinol is a medication that inhibits xanthine oxidase. Because this enzyme is involved in uric acid production, allopurinol helps to manage hyperuricemia by decreasing uric acid.

## Febuxostat

Fat-boxer

Febuxostat is a xanthine oxidase inhibitor. Blocking xanthine oxidase reduces uric acid production. It serves as an alternative to allopurinol in managing hyperuricemia associated with Lesch-Nyhan syndrome.