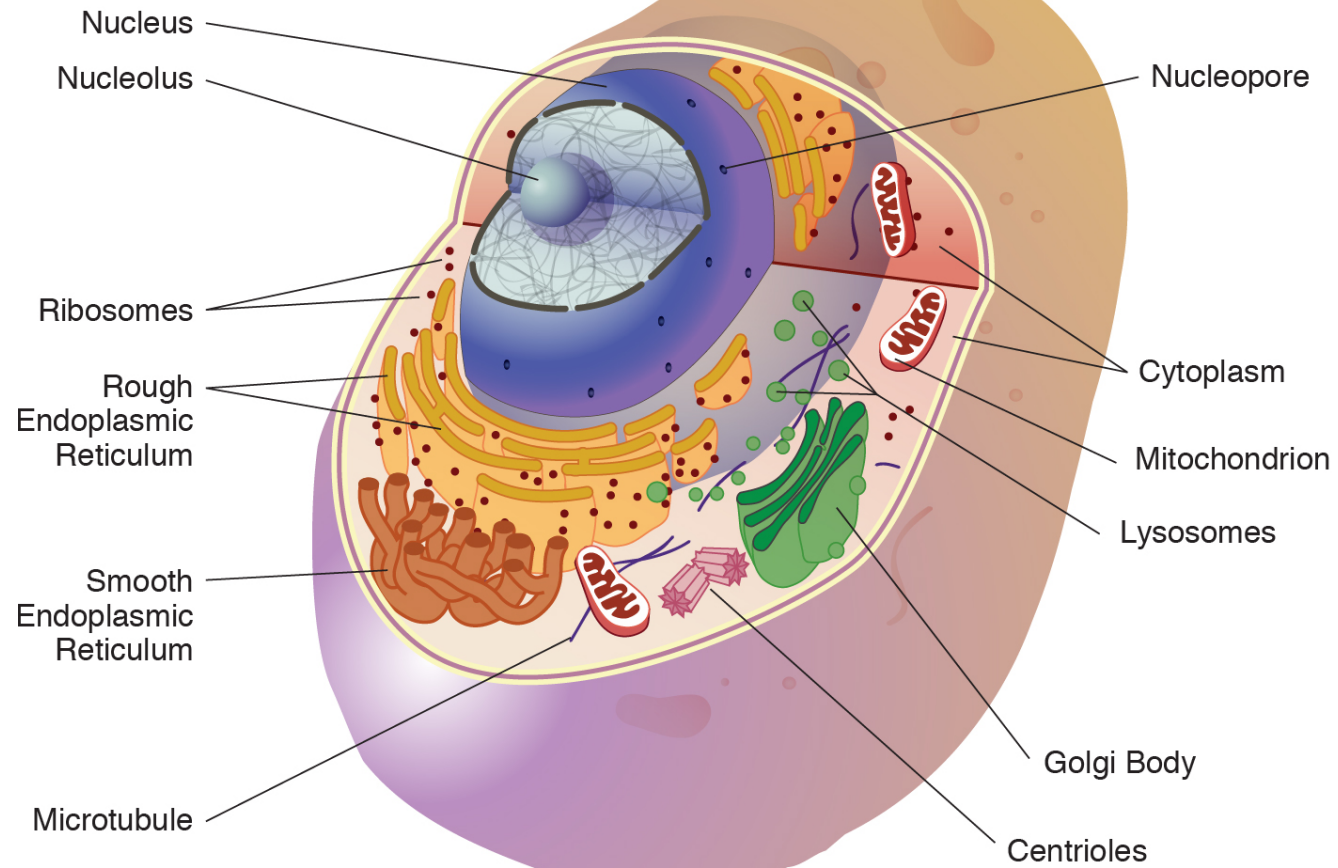
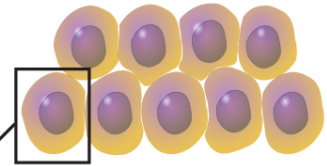


وبینار رویکرد چند تخصصی در تشخیص و مدیریت
بیماری‌های ذخیره‌ای لیزوزومی

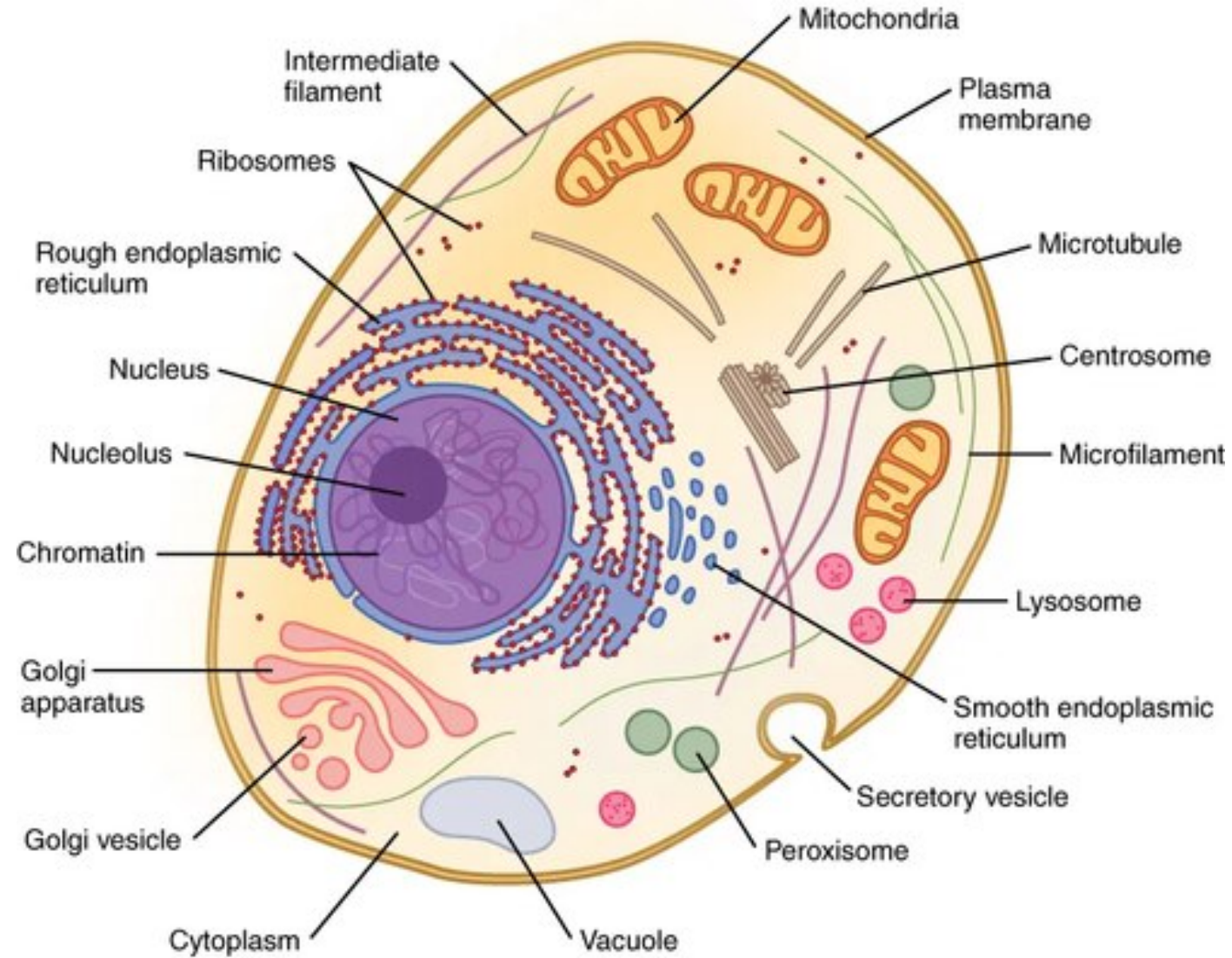
انجمن پزشکان کودکان ایران

Ali Rabbani; M.D
Pediatric Endocrinologist

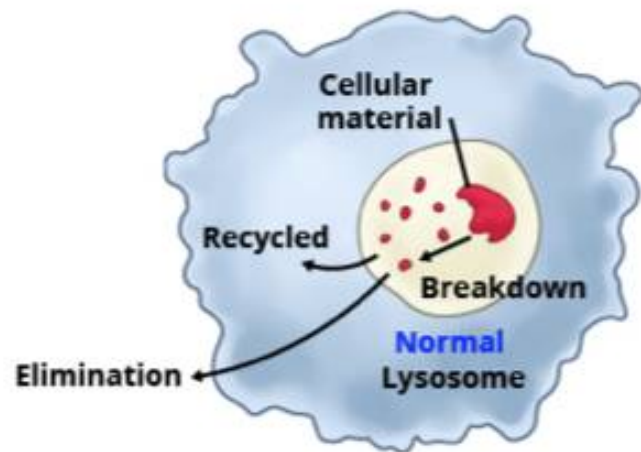
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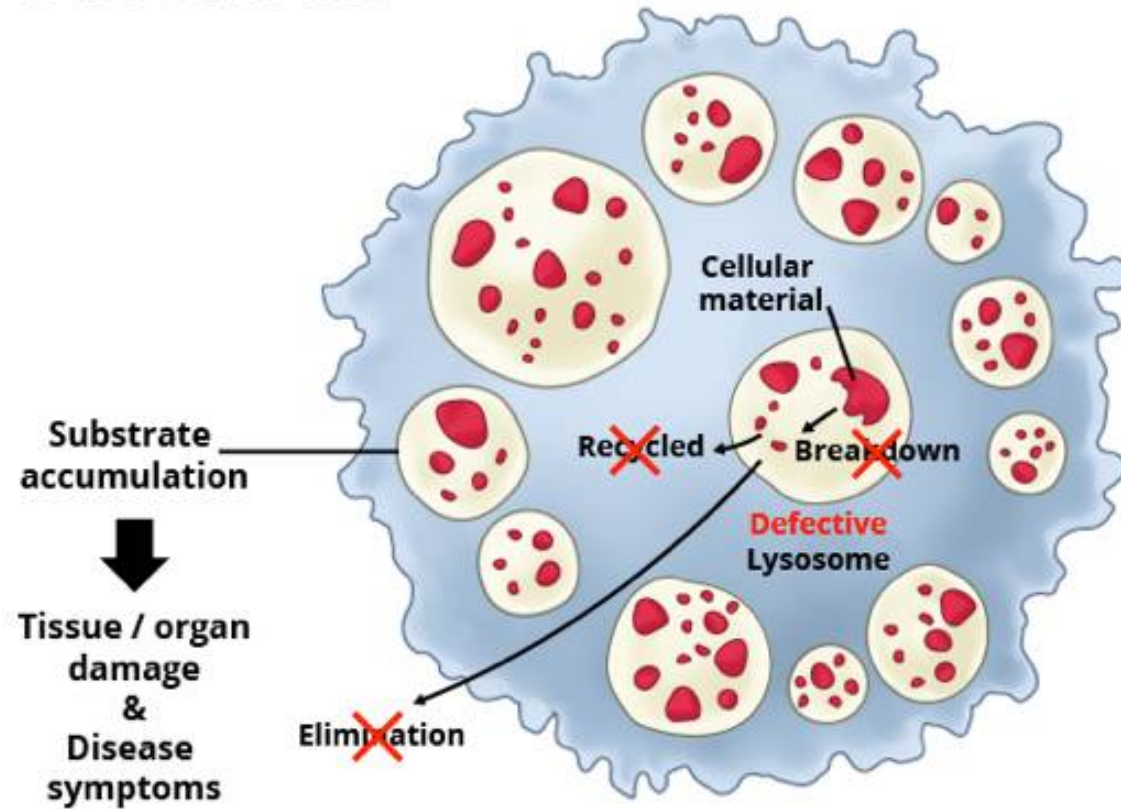
Animal cell

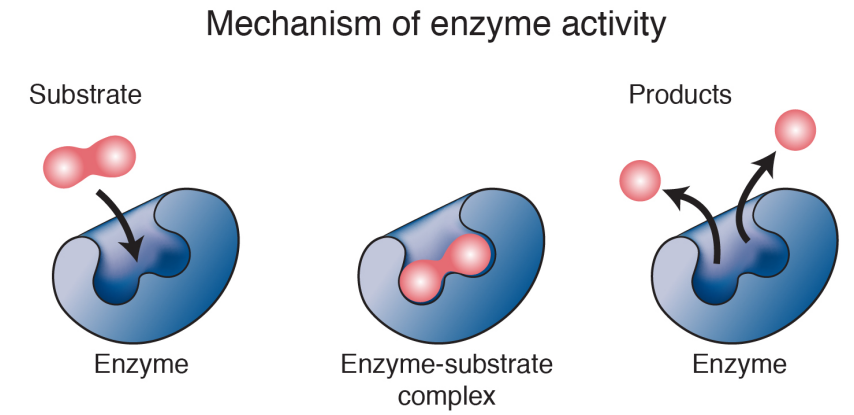
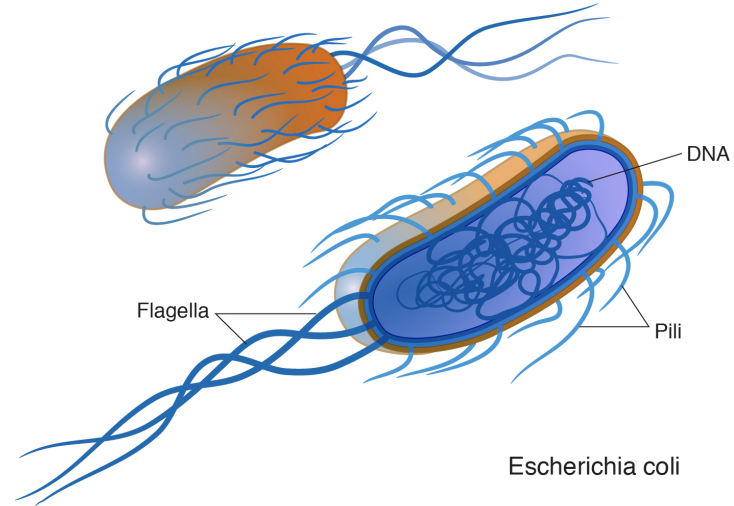
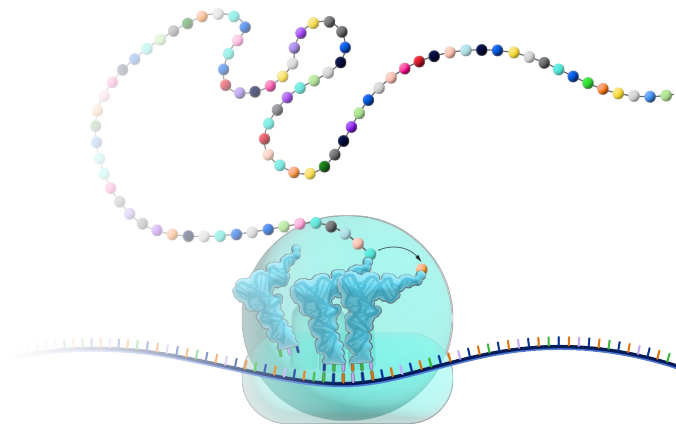


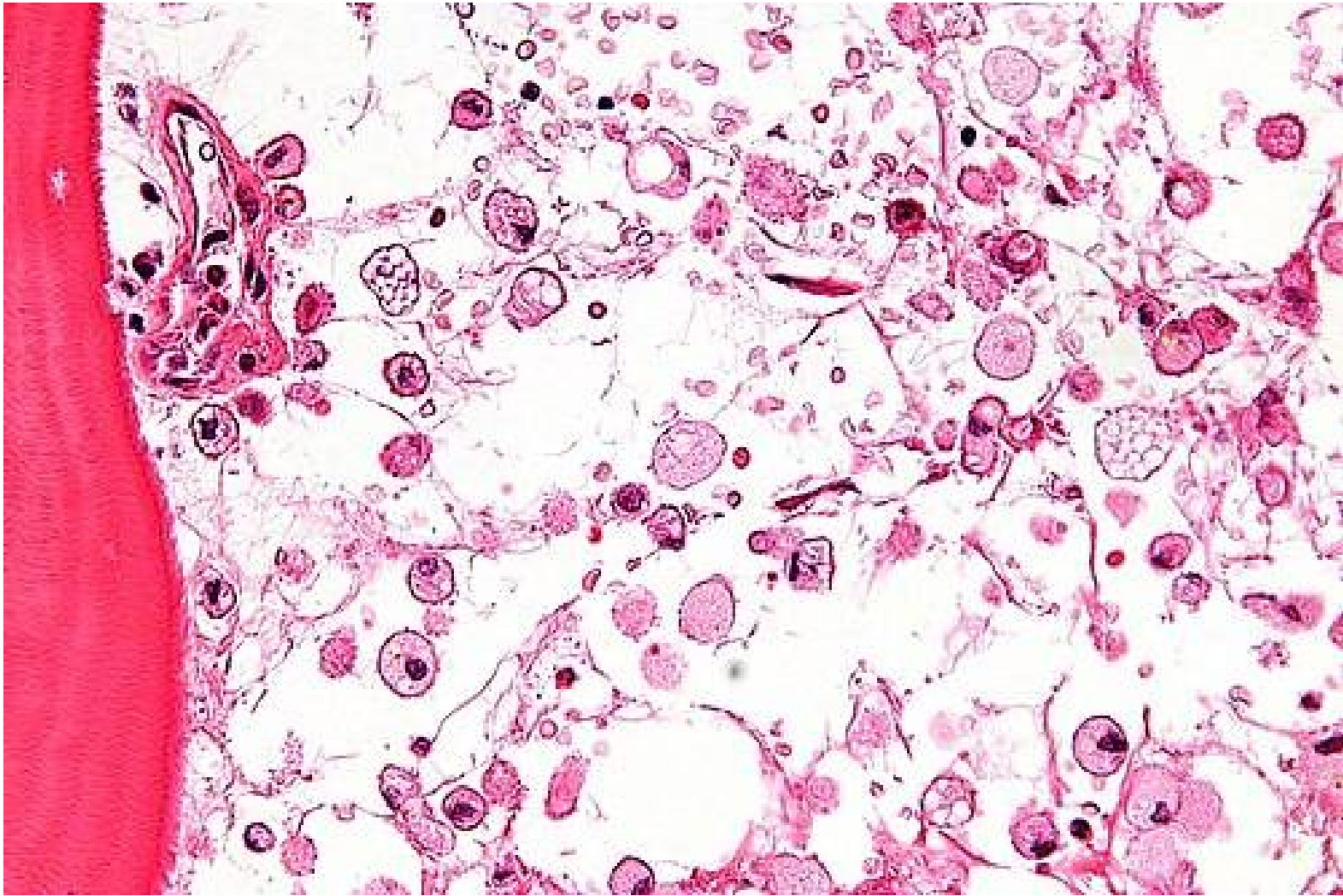
Normal



Diseased







Lysosomal storage diseases

(LSDs; /ˌlaɪsə'soʊməl/) are a group of over 70 rare inherited metabolic disorders that result from defects in lysosomal function.[1][2] Lysosomes are sacs of enzymes within cells that digest large molecules and pass the fragments on to other parts of the cell for recycling. This process requires several critical enzymes. If one of these enzymes is defective due to a mutation, the large molecules accumulate within the cell, eventually killing it.[3]

Lysosomal storage disease

Micrograph of Gaucher disease, with cells that have the characteristic crumpled tissue paper-like cytoplasm. H&E stain. Specialty Endocrinology

Lysosomal storage disorders are caused by lysosomal dysfunction as a consequence of deficiency of a single enzyme required for the metabolism of lipids, glycoproteins (sugar-containing proteins), or mucopolysaccharides. Individually, lysosomal storage diseases occur with incidences of less than 1:100,000; however, as a group, the incidence is about 1:5,000 – 1:10,000. Most of these disorders are autosomal recessively inherited such as Niemann–Pick disease, type C, but a few are X-linked inherited, such as Fabry disease and Hunter syndrome (MPS II).

Gaucher disease

Glucocerebroside structure and β -glucocerebrosidase defect

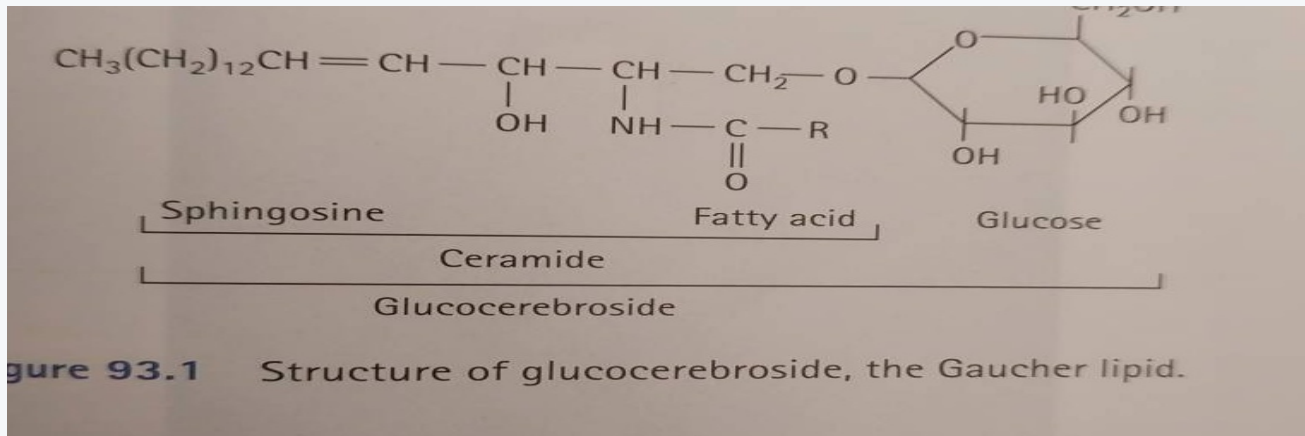


Figure 93.1 Structure of glucocerebroside, the Gaucher lipid.

Glucocerebroside (Gaucher lipid)

β -Glucocerebrosidase cleaves glucocerebroside to ceramide + glucose.
In Gaucher disease, this lysosomal enzyme defect causes accumulation of glucocerebroside.

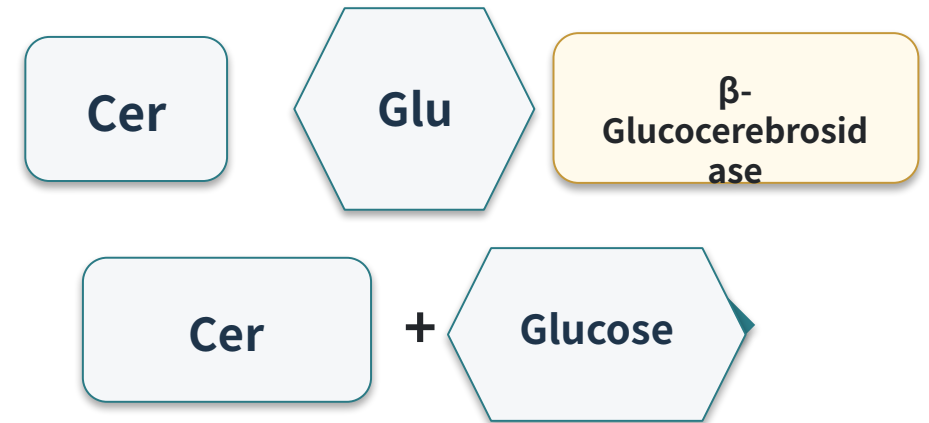


Figure 60.4 — AMS

Clinical image + editable caption and key findings



α -glucosidase activity: 3% of control

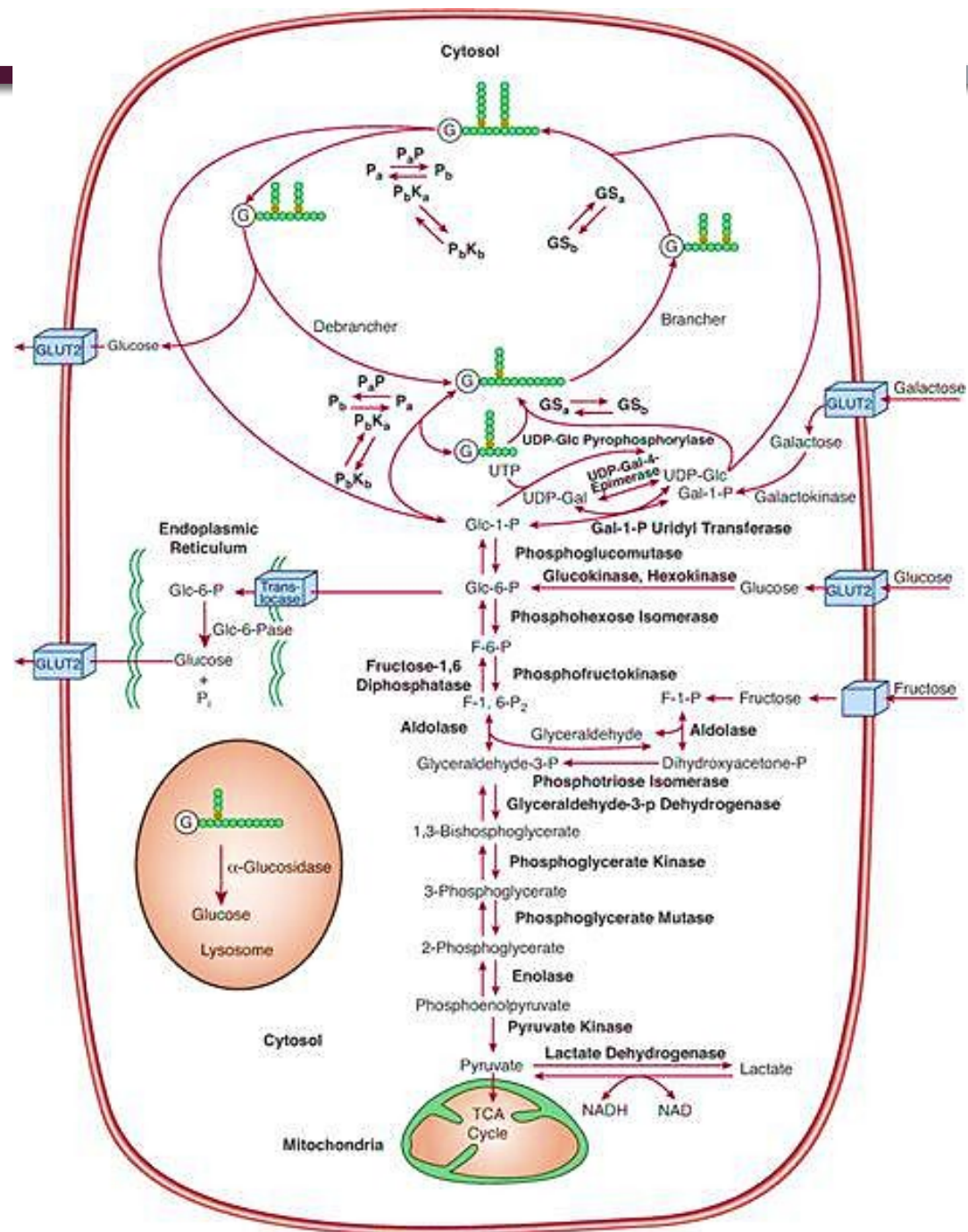
Vmax in muscle: markedly reduced

The lips were thick and the tongue appeared large.

The level of activity of α -glucosidase in fibroblasts was 3 percent of control.

The Vmax in muscle was markedly reduced.

Key biochemical clue: markedly deficient lysosomal α -glucosidase



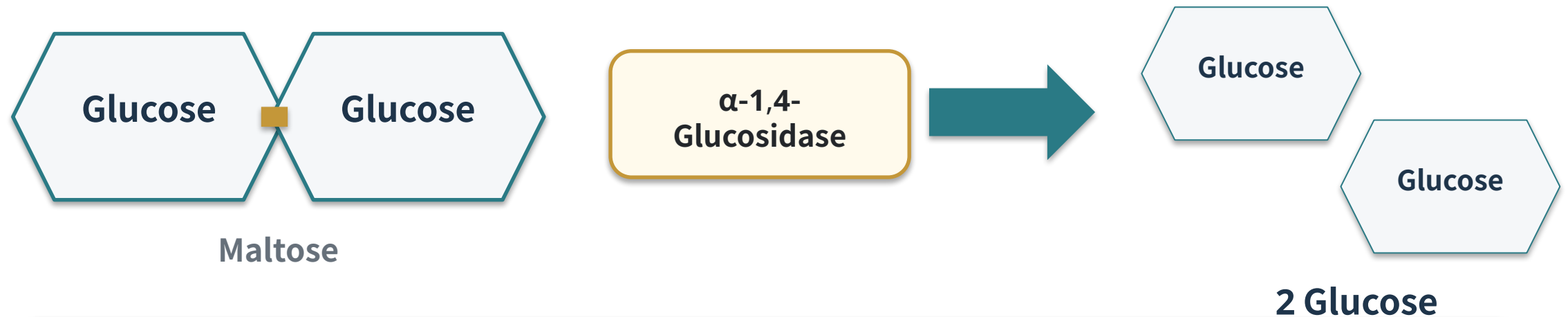
Pompe Disease

Medically Reviewed. Last updated on 09/27/2023.

Pompe disease is a genetic condition in which a complex sugar called glycogen builds up in the lysosomes of your body's cells. The disease occurs when you lack a specific digestive enzyme called acid alpha-glucosidase (GAA). The condition causes severe muscle weakness and wasting. Without early detection and treatment, the disease can be fatal.

α -1,4-Glucosidase

Editable reaction scheme



Reaction: Maltose $\xrightarrow{(\alpha\text{-1,4-glucosidase})}$ 2 Glucose

What is Pompe disease?

Pompe disease is a type of glycogen storage disease, a genetic condition in which a complex sugar called glycogen builds up in your body's cells. The disease results from the deficiency of a digestive enzyme called acid alpha-glucosidase (GAA). GAA normally breaks down complex sugars in your body.

Other names for the condition include:

- Pompe's disease.
- Acid maltase deficiency.
- Glycogen storage disease type II (GSD2).

Providers also refer to Pompe disease (pronounced “pom-pay”) as a lysosomal storage disease. Lysosomes are small compartments inside your cells that hold and recycle certain substances. Enzymes such as GAA (or acid maltase, hence the name acid maltase deficiency) help break down these substances.

A lack of this enzyme causes glycogen to build up within the lysosomes. This buildup occurs in the cells of your organs and tissues, especially your heart and skeletal muscles, causing them to break down.

Types of this condition

Researchers have described two main types of Pompe disease. They differ based on your age of onset and the severity of your symptoms.

Infantile-onset

People who develop Pompe disease as infants are typically the most severely affected. A complete lack of, or very little, acid alpha-glucosidase enzyme causes this type of Pompe disease. Your baby may not have any signs of the condition at birth, but symptoms start within the first year of life, most often around 4 months of age.

Symptoms include severe muscle weakness, an enlarged liver and an enlarged heart due to cardiomyopathy. The progression of the disease will happen quickly. Without treatment, babies usually die of heart or respiratory failure between 1 and 2 years of age.

Late-onset (juvenile or adult-onset)

Symptoms of late-onset Pompe disease can appear at any age — before 1 year of age but without an enlarged heart (which distinguishes it from infantile-onset), later in a child's life, during adolescence or in adulthood. People with late-onset type have a reduced amount of acid alpha-glucosidase. This type is usually milder, and progression happens at a slower pace. But it depends on the age of onset. Children who develop symptoms are usually more severely affected.

Symptoms include muscle weakness (myopathy) that can lead to breathing issues, but the disease is unlikely to affect your heart. Without treatment, people usually die of respiratory complications.

