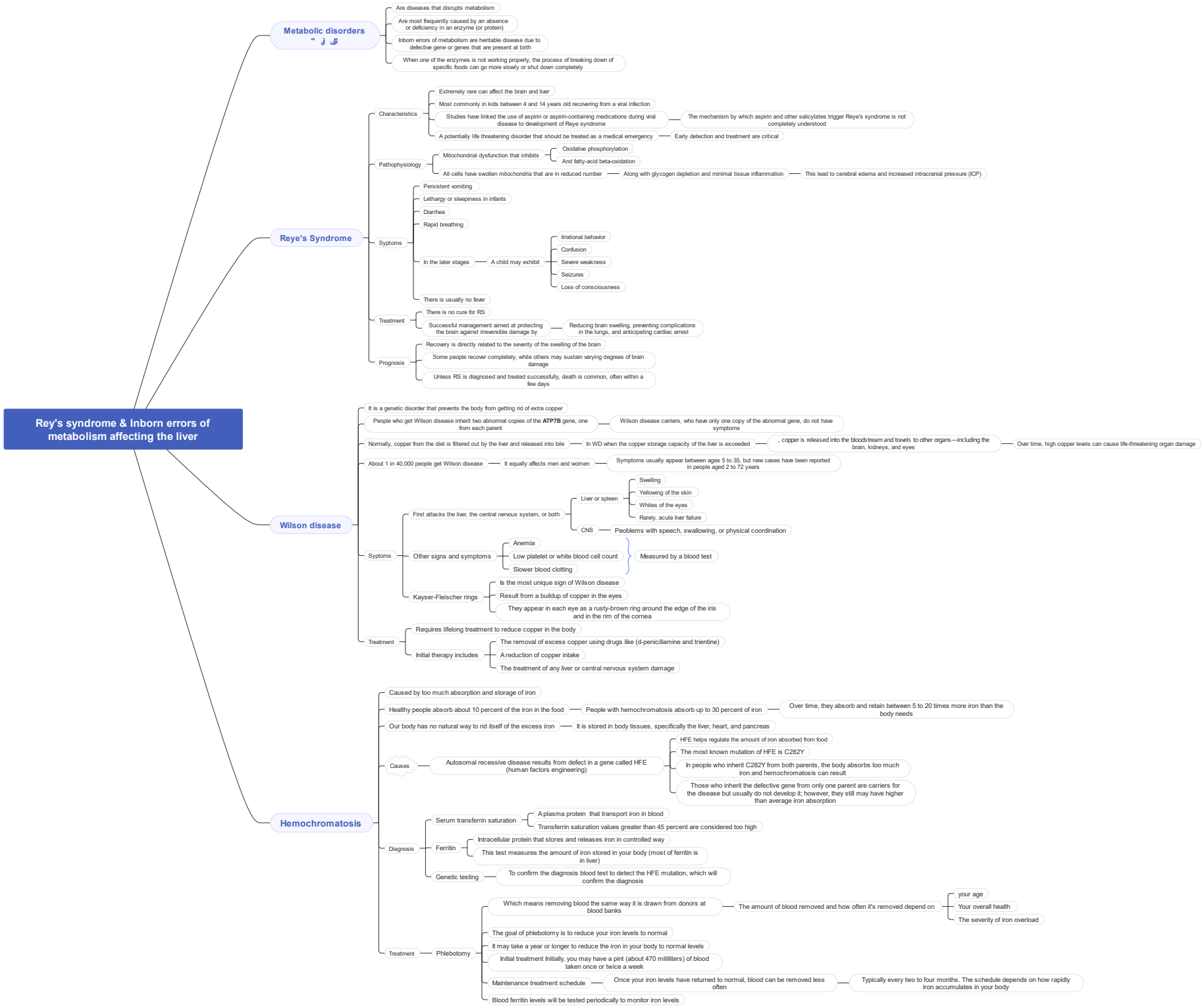
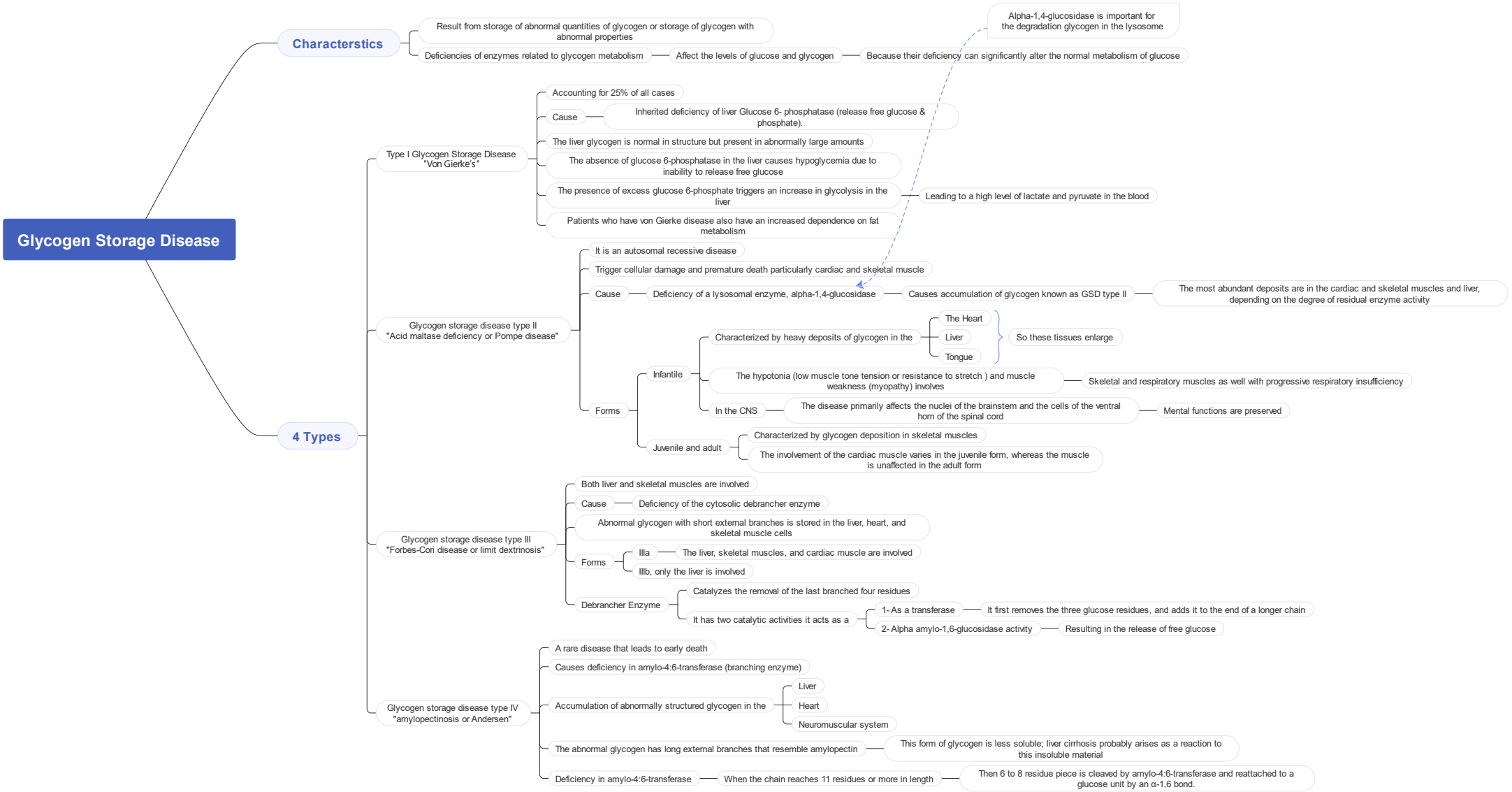

Rey's syndrome & Inborn errors of metabolism affecting the liver
Metabolic disorders
Are diseases that disrupts metabolism
Are most frequently caused by an absence or deficiency in an enzyme (or protein)
Inborn errors of metabolism are heritable disease due to defective gene or genes that are present at birth
When one of the enzymes is not working properly, the process of breaking down of specific foods can go more slowly or shut down completely
Reye's Syndrome
Characteristics
Extremely rare can affect the brain and liver
Most commonly in kids between 4 and 14 years old recovering from a viral infection
Studies have linked the use of aspirin or aspirin-containing medications during viral disease to development of Reye syndrome
The mechanism by which aspirin and other salicylates trigger Reye's syndrome is not completely understood
A potentially life threatening disorder that should be treated as a medical emergency
Early detection and treatment are critical
Pathophysiology
Mitochondrial dysfunction that inhibits
Oxidative phosphorylation
And fatty-acid beta-oxidation
All cells have swollen mitochondria that are in reduced number
Along with glycogen depletion and minimal tissue inflammation
This lead to cerebral edema and increased intracranial pressure (ICP)
Symptoms
Persistent vomiting
Lethargy or sleepiness in infants
Diarrhea
Rapid breathing
In the later stages
A child may exhibit
Irrational behavior
Confusion
Severe weakness
Seizures
Loss of consciousness
There is usually no fever
Treatment
There is no cure for RS
Successful management aimed at protecting the brain against irreversible damage by
Reducing brain swelling, preventing complications in the lungs, and anticipating cardiac arrest
Prognosis
Recovery is directly related to the severity of the swelling of the brain
Some people recover completely, while others may sustain varying degrees of brain damage
Unless RS is diagnosed and treated successfully, death is common, often within a few days
Wilson disease
It is a genetic disorder that prevents the body from getting rid of extra copper
People who get Wilson disease inherit two abnormal copies of the ATP7B gene, one from each parent
Wilson disease carriers, who have only one copy of the abnormal gene, do not have symptoms
Normally, copper from the diet is filtered out by the liver and released into bile
In WD when the copper storage capacity of the liver is exceeded
, copper is released into the bloodstream and travels to other organs—including the brain, kidneys, and eyes
Over time, high copper levels can cause life-threatening organ damage
About 1 in 40,000 people get Wilson disease
It equally affects men and women
Symptoms usually appear between ages 5 to 35, but new cases have been reported in people aged 2 to 72 years
Symptoms
First attacks the liver, the central nervous system, or both
Liver or spleen
Swelling
Yellowing of the skin
Whites of the eyes
Rarely, acute liver failure
CNS
Peoblems with speech, swallowing, or physical coordination
Other signs and symptoms
Anemia
Low platelet or white blood cell count
Slower blood clotting
Measured by a blood test
Kayser-Fleischer rings
Is the most unique sign of Wilson disease
Result from a buildup of copper in the eyes
They appear in each eye as a rusty-brown ring around the edge of the iris and in the rim of the cornea
Treatment
Requires lifelong treatment to reduce copper in the body
Initial therapy includes
The removal of excess copper using drugs like (d-penicillamine and trientine)
A reduction of copper intake
The treatment of any liver or central nervous system damage
Hemochromatosis
Caused by too much absorption and storage of iron
Healthy people absorb about 10 percent of the iron in the food
People with hemochromatosis absorb up to 30 percent of iron
Over time, they absorb and retain between 5 to 20 times more iron than the body needs
Our body has no natural way to rid itself of the excess iron
It is stored in body tissues, specifically the liver, heart, and pancreas
Causes
Autosomal recessive disease results from defect in a gene called HFE (human factors engineering)
HFE helps regulate the amount of iron absorbed from food
The most known mutation of HFE is C282Y
In people who inherit C282Y from both parents, the body absorbs too much iron and hemochromatosis can result
Those who inherit the defective gene from only one parent are carriers for the disease but usually do not develop it; however, they still may have higher than average iron absorption
Diagnosis
Serum transferrin saturation
A plasma protein that transport iron in blood
Transferrin saturation values greater than 45 percent are considered too high
Ferritin
Intracellular protein that stores and releases iron in controlled way
This test measures the amount of iron stored in your body (most of ferritin is in liver)
Genetic testing
To confirm the diagnosis blood test to detect the HFE mutation, which will confirm the diagnosis
Treatment
Phlebotomy
Which means removing blood the same way it is drawn from donors at blood banks
The amount of blood removed and how often it's removed depend on
your age
Your overall health
The severity of iron overload
The goal of phlebotomy is to reduce your iron levels to normal
It may take a year or longer to reduce the iron in your body to normal levels
Initial treatment Initially, you may have a pint (about 470 milliliters) of blood taken once or twice a week
Maintenance treatment schedule
Once your iron levels have returned to normal, blood can be removed less often
Typically every two to four months. The schedule depends on how rapidly iron accumulates in your body
Blood ferritin levels will be tested periodically to monitor iron levels


Glycogen Storage Disease
Characterstics
Result from storage of abnormal quantities of glycogen or storage of glycogen with abnormal properties
Deficiencies of enzymes related to glycogen metabolism
Affect the levels of glucose and glycogen
Because their deficiency can significantly alter the normal metabolism of glucose
Alpha-1,4-glucosidase is important for the degradation glycogen in the lysosome
4 Types
Type I Glycogen Storage Disease "Von Gierke's"
Accounting for 25% of all cases
Cause
Inherited deficiency of liver Glucose 6- phosphatase (release free glucose & phosphate).
The liver glycogen is normal in structure but present in abnormally large amounts
The absence of glucose 6-phosphatase in the liver causes hypoglycemia due to inability to release free glucose
The presence of excess glucose 6-phosphate triggers an increase in glycolysis in the liver
Leading to a high level of lactate and pyruvate in the blood
Patients who have von Gierke disease also have an increased dependence on fat metabolism
Glycogen storage disease type II "Acid maltase deficiency or Pompe disease"
It is an autosomal recessive disease
Trigger cellular damage and premature death particularly cardiac and skeletal muscle
Cause
Deficiency of a lysosomal enzyme, alpha-1,4-glucosidase
Causes accumulation of glycogen known as GSD type II
The most abundant deposits are in the cardiac and skeletal muscles and liver, depending on the degree of residual enzyme activity
Forms
Infantile
Characterized by heavy deposits of glycogen in the
The Heart
Liver
Tongue
So these tissues enlarge
The hypotonia (low muscle tone tension or resistance to stretch ) and muscle weakness (myopathy) involves
Skeletal and respiratory muscles as well with progressive respiratory insufficiency
In the CNS
The disease primarily affects the nuclei of the brainstem and the cells of the ventral horn of the spinal cord
Mental functions are preserved
Juvenile and adult
Characterized by glycogen deposition in skeletal muscles
The involvement of the cardiac muscle varies in the juvenile form, whereas the muscle is unaffected in the adult form
Glycogen storage disease type III "Forbes-Cori disease or limit dextrinosis"
Both liver and skeletal muscles are involved
Cause
Deficiency of the cytosolic debrancher enzyme
Abnormal glycogen with short external branches is stored in the liver, heart, and skeletal muscle cells
Forms
IIIa
The liver, skeletal muscles, and cardiac muscle are involved
IIIb, only the liver is involved
Debrancher Enzyme
Catalyzes the removal of the last branched four residues
It has two catalytic activities it acts as a
1- As a transferase
It first removes the three glucose residues, and adds it to the end of a longer chain
2- Alpha amylo-1,6-glucosidase activity
Resulting in the release of free glucose
Glycogen storage disease type IV "amylopectinosis or Andersen"
A rare disease that leads to early death
Causes deficiency in amylo-4:6-transferase (branching enzyme)
Accumulation of abnormally structured glycogen in the
Liver
Heart
Neuromuscular system
The abnormal glycogen has long external branches that resemble amylopectin
This form of glycogen is less soluble; liver cirrhosis probably arises as a reaction to this insoluble material
Deficiency in amylo-4:6-transferase
When the chain reaches 11 residues or more in length
Then 6 to 8 residue piece is cleaved by amylo-4:6-transferase and reattached to a glucose unit by an α-1,6 bond.