Fructose Metabolism

Fructose is converted by the enzyme fructokinase into fructose-1-phosphate. Absence of fructokinase leads to the condition essential fructosuria, a benign condition. This is because the fructose doesn't build up but instead gets shunted into the urine. Remember that urine tests must be specific for fructose. Fructose-1-phosphate is then broken down by the enzyme aldolase B. Lack of aldolase B causes the condition fructose intolerance, due to a buildup of fructose-1-phosphate which causes phosphate trapping. In healthy individuals, aldolase B converts to fructose-1-phosphate into both DHAP and glyceraldehyde, which both ultimately become glyceraldehyde-3-phosphate in the glycolysis pathways.

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Liver Fructose Metabolism

Fructose
Fruit-toast
Fructose is a ketogenic monosaccharide that is broken down to form components for gluconeogenesis or glycolysis.

Fructokinase
Fruit-toast-kite-ace
Fructokinase is an enzyme that causes the reaction of fructose into fructose-1-phosphate. Lack of fructokinase leads to developing the benign condition essential fructosuria.

Fructose-1-Phosphate
Fruit-toast Electrified with Fonz-fairy
Fructose is metabolized by fructokinase into fructose-1-phosphate (F1P). F1P is degraded by aldolase B into dihydroxyacetone phosphate (DHAP) as well as glyceraldehyde. Deficiency of aldolase B causes the condition fructose intolerance due to phosphate trapping due to increased amounts of fructose-1-phosphate.

Aldolase B
Aldo-in-lace (B) Bee
There are three forms of the enzyme aldolase; aldolase A is expressed in muscle and brain, aldolase B in the liver and kidney, with and aldolase C in brain. Those with a deficiency of aldolase B have a disorder called hereditary fructose intolerance. In fructose metabolism, aldolase B facilitates the conversion of fructose-1-phosphate into dihydroxyacetone phosphate (DHAP) and glyceraldehyde. Within glycolysis, comparatively, aldolase converts fructose-1,6-bisphosphate into glyceraldehyde-3-P (G3P) and dihydroxyacetone phosphate (DHAP).

DHAP
Dhapper Dog-in-hat
Fructose-1-phosphate is degraded by aldolase B into dihydroxyacetone phosphate (DHAP) and glyceraldehyde. A deficiency of aldolase B results in the accumulation of fructose-1-phosphate in cells.

Glyceraldehyde
Glitter-Aldo-pie
Aldolase B catalyzes the formation of glyceraldehyde and DHAP.

Glyceraldehyde-3-Phosphate
Glitter-Pie (3)-Tree Fonz-Fairy
DHAP and glyceraldehyde can both be converted into glyceraldehyde-3-phosphate, or G3P. G3P then enters the glycolysis pathway. Dihydroxyacetone phosphate (DHAP) is converted to G3P by triose phosphate isomerase and glyceraldehyde by triose kinase.

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