

**EtOH:** ethanol

**ADH:** alcohol dehydrogenase; genetic polymorphisms lower response to EtOH

**NAD<sup>+</sup>/NADH:** nicotinamide adenine dinucleotide

**CAT:** catalase

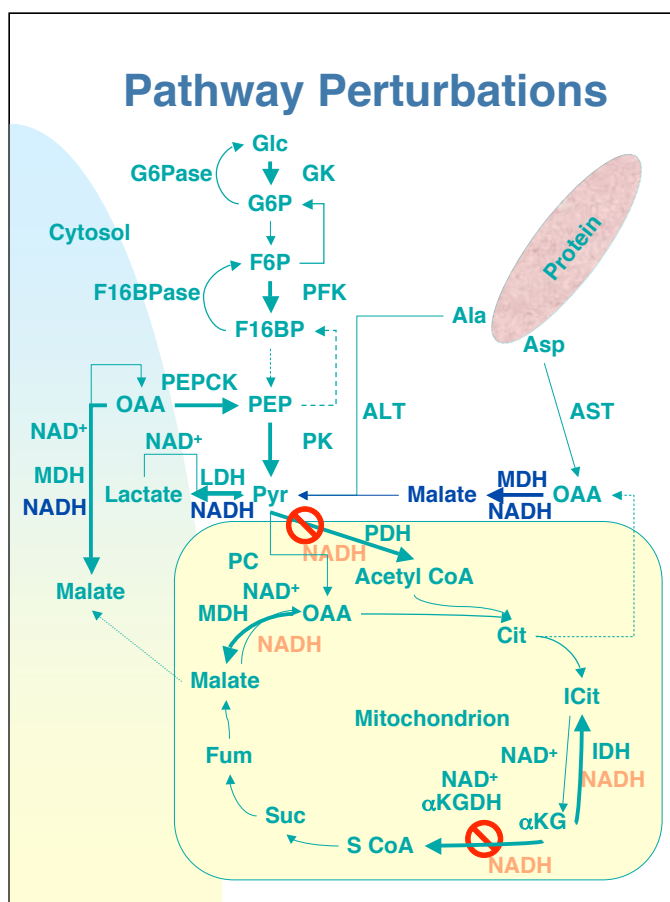
**MEOS:** microsomal ethanol-oxidizing system

**P450:** cytochrome P450

**NADP<sup>+</sup>/NADPH:** nicotinamide adenine dinucleotide phosphate

**ALDH:** aldehyde dehydrogenase; ~50% ethnic Chinese lack gene

Thiamine is consumed during hepatic metabolism of EtOH, hypothalamus responds to thiamine deficiency by ordering increase in hepatic ADH activity that gives enhanced EtOH degradation.



**Glc:** glucose

**G6P:** glucose-6-phosphate

**PFK:** phosphofructokinase

**PEP:** phosphoenolpyruvate

**Pyr:** pyruvate

**Cit:** citrate

**IDH:** isocitrate dehydrogenase

**NAD<sup>+</sup>/NADH:** nicotinamide adenine dinucleotide

**αKGDH:** α-ketoglutarate dehydrogenase

**S CoA:** succinyl coenzyme A

**Fum:** fumarate

**OAA:** oxaloacetate

**LDH:** lactate dehydrogenase

**PEPCK:** phosphoenolpyruvate carboxykinase

**F16BPase:** fructose-1,6-bisphosphatase

**G6Pase:** glucose-6-phosphatase

**Asp:** aspartate

**AST:** aspartate transaminase

**GK:** glucokinase

**F6P:** fructose-6-phosphate

**F16BP:** fructose-1,6-bisphosphate

**PK:** pyruvate kinase

**PDH:** pyruvate dehydrogenase

**ICit:** isocitrate

**αKG:** α-ketoglutarate

**Suc:** succinate

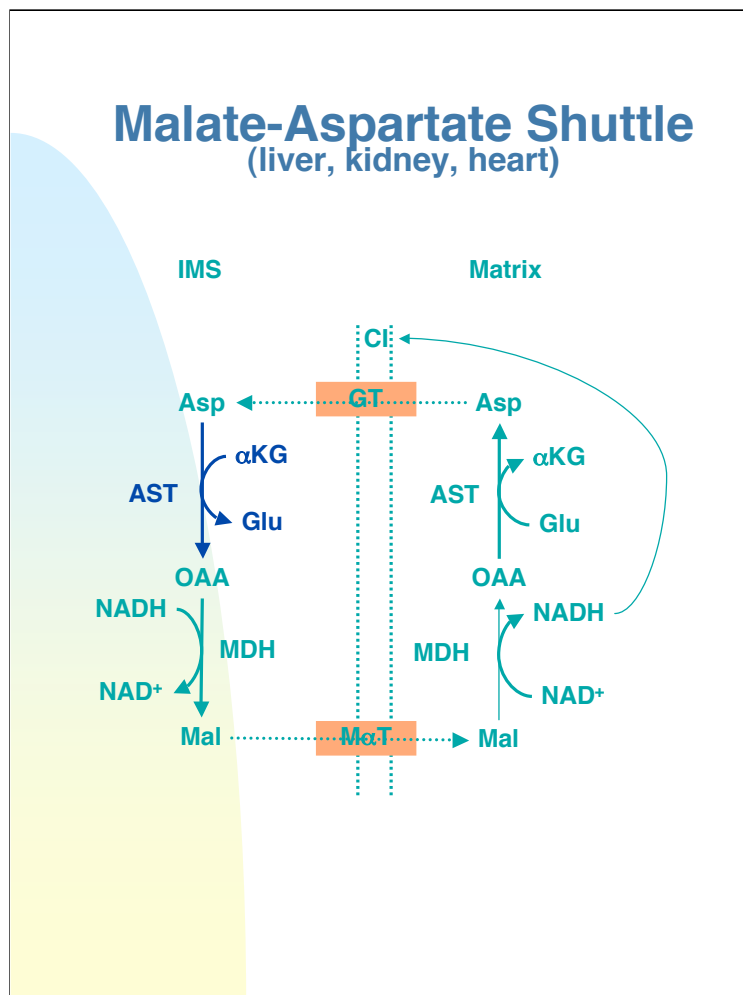
**MDH:** malate dehydrogenase

**PC:** pyruvate carboxylase

**Ala:** alanine

**ALT:** alanine transaminase

Recall NADH/NAD<sup>+</sup> controls PDH activity also through action of PDH kinase and phosphatase; PDH inhibition leads to increased [lactate], [pyruvate], [alanine].



**IMS:** inner membrane space; pores in outer mitochondrial membrane allow passage of many molecules from cytosol

**OAA:** oxaloacetate

**NAD<sup>+</sup>/NADH:** nicotinamide adenine dinucleotide

**MDH:** malate dehydrogenase

**Mal:** malate

**MaT:** malate- $\alpha$ -ketoglutarate transporter, dicarboxylate carrier

**CI:** complex I

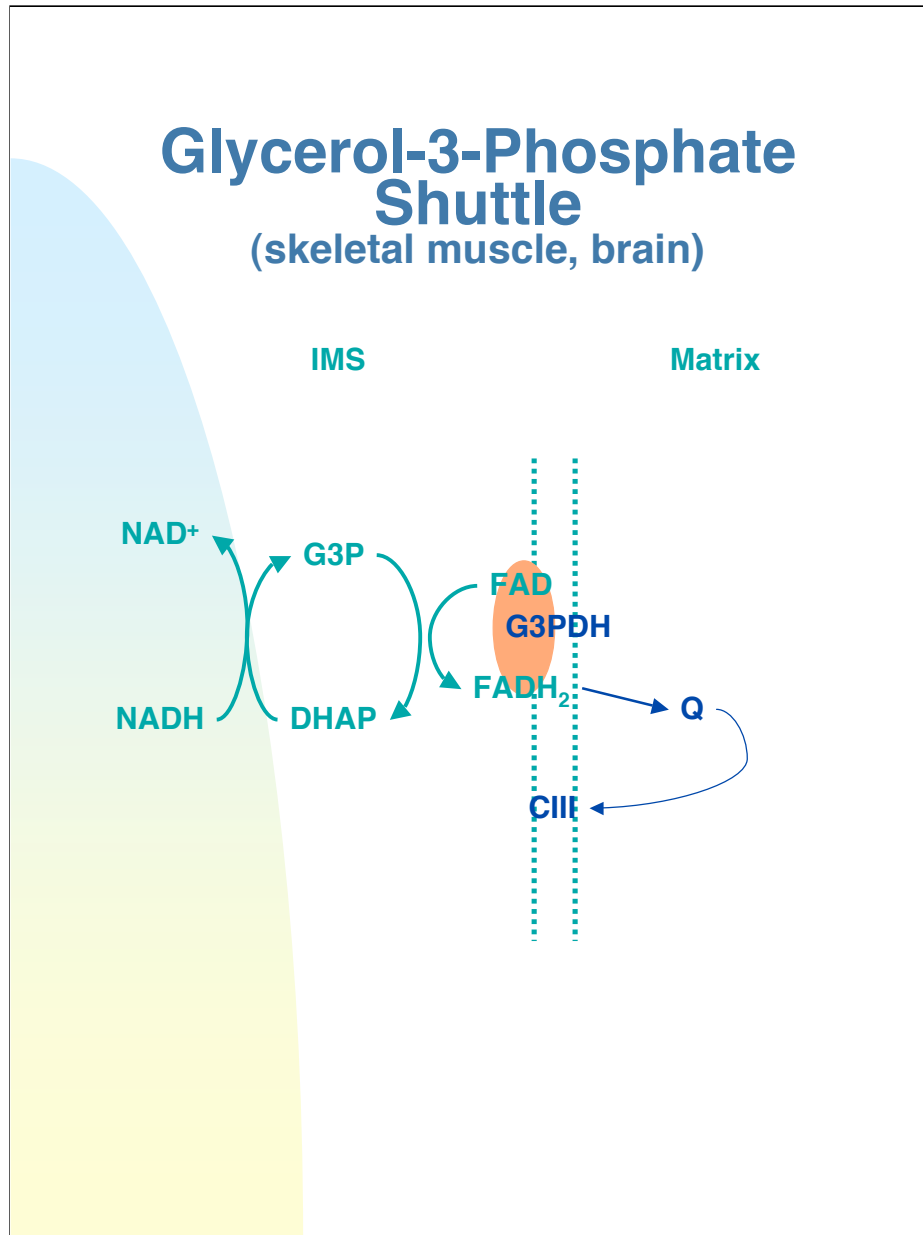
**Glu:** glutamate

**AST:** aspartate transaminase

**$\alpha$ KG:**  $\alpha$ -ketoglutarate

**Asp:** aspartate

**GT:** glutamate transporter, glutamate-aspartate carrier



**IMS:** inner membrane space; pores in outer mitochondrial membrane allow passage of many molecules from cytosol

**G3PDH:** glycerol-3-phosphate dehydrogenase

**$\text{NAD}^+/\text{NADH}$ :** nicotinamide adenine dinucleotide

**DHAP:** dihydroxyacetone phosphate

**$\text{FAD}/\text{FADH}_2$ :** flavin adenine dinucleotide

**Q:** ubiquinone

**CIII:** complex III

# Review Questions

- **How is ethanol detoxified (enzymes, cofactors, products, location)?**
- **Which metabolic pathways are affected by alcohol-derived NADH (enzymes, metabolites)?**
- **How does the cell process NADH?**