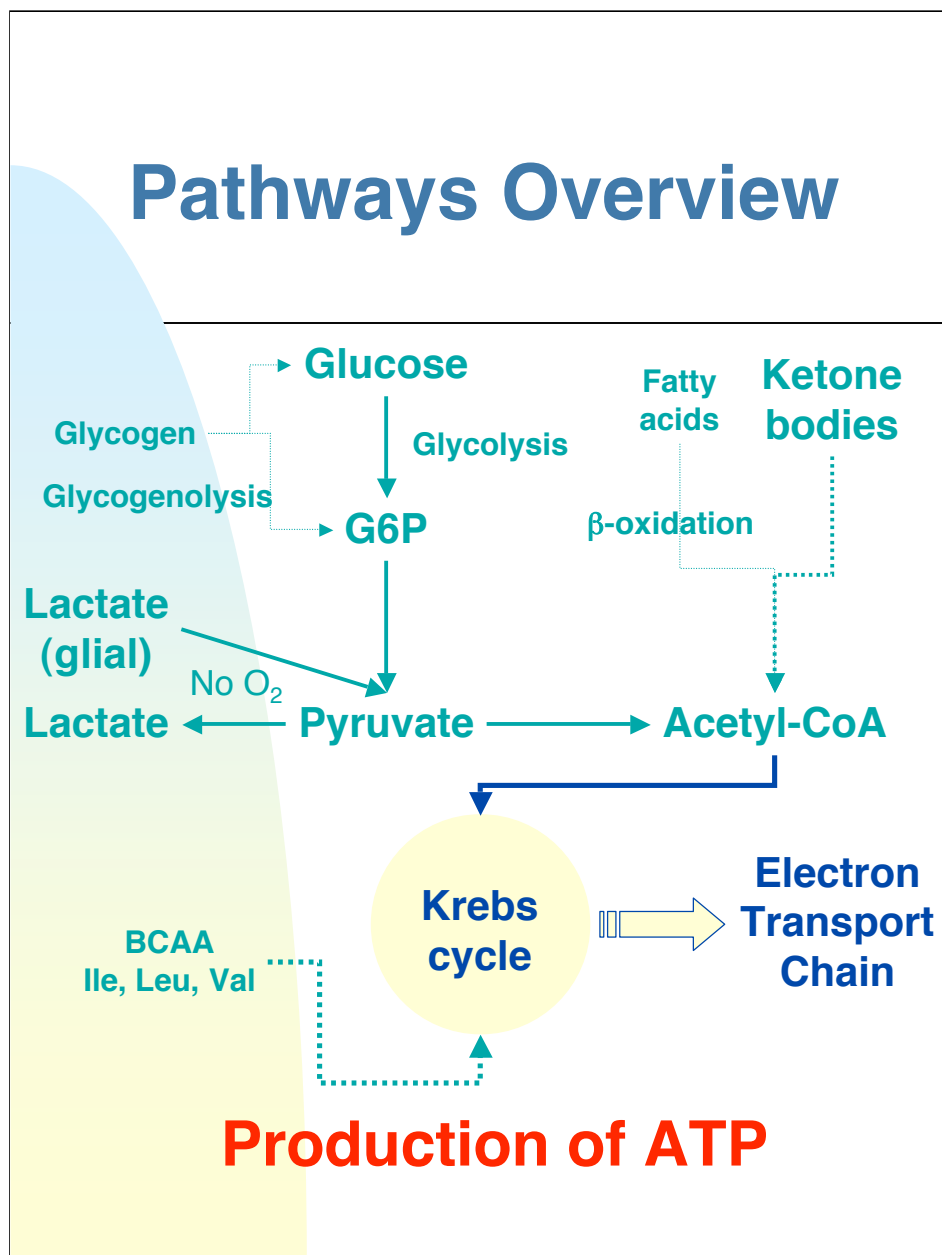


# Metabolism in Nervous Tissue

- **Glycolysis**
- **Glycogenolysis (stress)**
- **$\beta$ -oxidation (ketone bodies)**
- **Krebs (tricarboxylic acid) cycle**
- **Branched-chain amino acids**
- **Electron transport chain**

Eric Niederhoffer  
SIU-SOM



**G6P:** glucose-6-phosphate

**BCAA:** branched-chain amino acids

**Ile:** isoleucine & **Val:** valine (enter as succinyl CoA); **Leu:** leucine (enters as acetyl CoA)

**ATP:** adenosine triphosphate

Ketone bodies come from from liver

Maple syrup urine disease results from defect in branched chain  $\alpha$ -keto acid dehydrogenase complex; special diet needed; 4 children in St. Louis.

GLUT1, GLUT3 in nervous tissue

Brain accounts for 25% total body Glc utilization

Energy - 80% from Glc, up to 20% from ketone bodies, 5% from glycogen (main stores are astrocytes)

Astrocytes make lactate or pyruvate, which does not cross blood brain barrier

Unsaturated fatty acids can go through BBB (astrocytes do  $\beta$ -oxidation, mitochondrial and peroxisomal)

# Review Questions

- **How does nervous tissue (neurons and glial cells) produce ATP (carbohydrates, fatty acids, ketone bodies, branched-chain amino acids)?**
- **How do glial cells (astrocytes) assist neurons?**