For all pathways: know the substrates, products and enzymes where ATP/ADP, GTP/GDP, NADH NAD^+, FADH2/FAD are used or produced.

Allosteric signals of **high** energy: glucose, G-6-P, Acetyl CoA, Succinyl CoA, ATP, GTP, NADH

Allosteric signals of **low** energy: AMP, ADP

Glycolysis: during times of high blood glucose levels, the Fed state; convert glucose, galactose, fructose, mannose into pyruvate.

P_i, NAD^+, NADH and the GA-3-P → 1,3-BPG reaction

Substrate level phosphorylation (Hexokinase, PFK, PGK, PK).

Understand energy production. (use 2 ATP, produce 4 ATP)

The fate of Pyruvate: Aerobic vs Anaerobic.

PDH: the link between glycolysis and the citric acid cycle

Pyruvate + CoASH + NAD^+ → Acetyl CoA + NADH + CO_2

Citric Acid Cycle: produces NADH, FADH2 and GTP → ENERGY!

Produces electron carriers which leads to production of ATP.

Electron Transport: Takes electrons from NADH and $FADH_2$ bouncing them down the chain producing H^+ which drives the potential across the membrane so that the ATPase Pump produces ATP.

PPP:

1. Produce NADPH, used in reductive synthesis and to keep glutathione reduced so that it can scavenge H_2O_2.
2. Produce Ribose-5-P for nucleic acid synthesis.
3. Interconvert different sized sugars.

Gluconeogenesis: during times of low blood glucose levels, the Fasted state; produce G-6-P.

Precursors: pyruvate, PEP, lactate, alanine, glycerol

The pathway requires energy in the form of ATP.

F-1,6-BPase vs. PFK

G-6-Pase vs. Glucokinase

Glycogenolysis: during times of low blood glucose, break down glycogen to produce G-6-P.

Glycogen Phosphorylase: glycogen → G-1-P

Activated by: AMP

Inhibited by: ATP, Glucose, G-6-P

PGM: G-1-P → G-6-P

Glycogenesis: during times of high blood glucose, store some of the glucose as glycogen

Hexokinase: Glycogen → G-6-P

PGM: G-6-P → G-1-P

G-1-P Uridyltransferase: G-1-P → UDP-Glucose

Gycogen Synthase: UDP-Glucose → Glycogen

Activated by: G-6-P