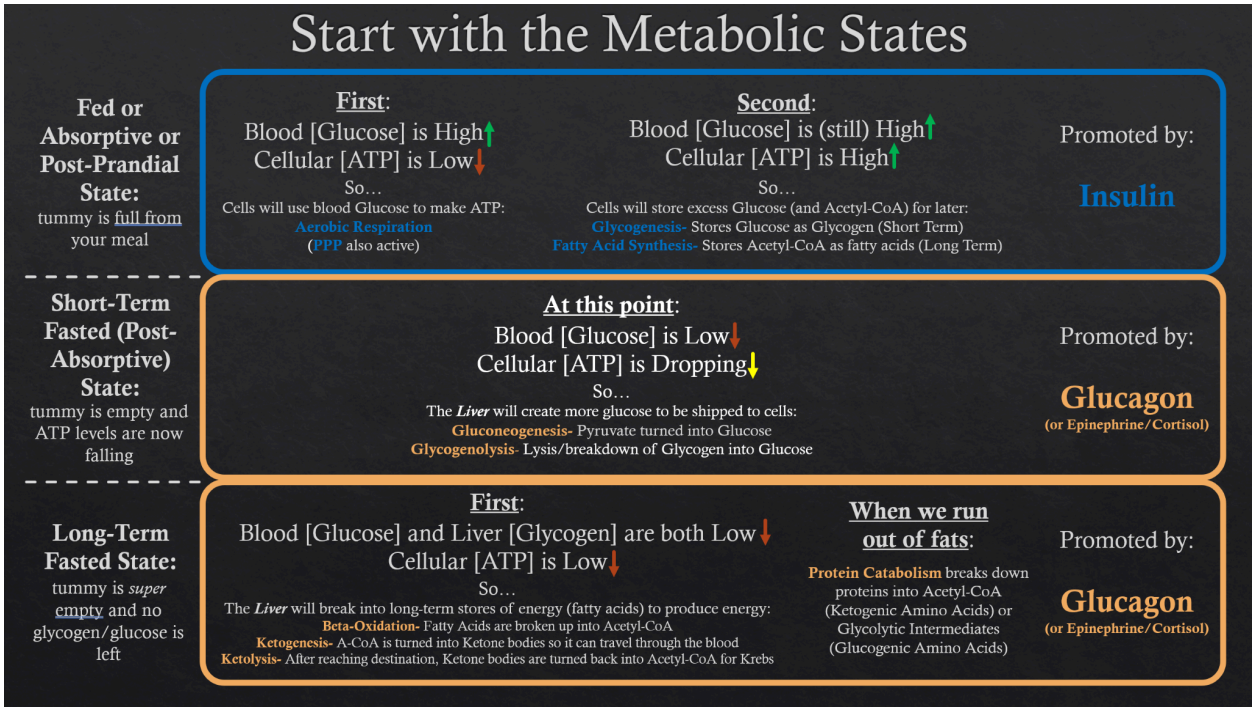
Make Metabolism Easier- MCATalyst Video Support Notes

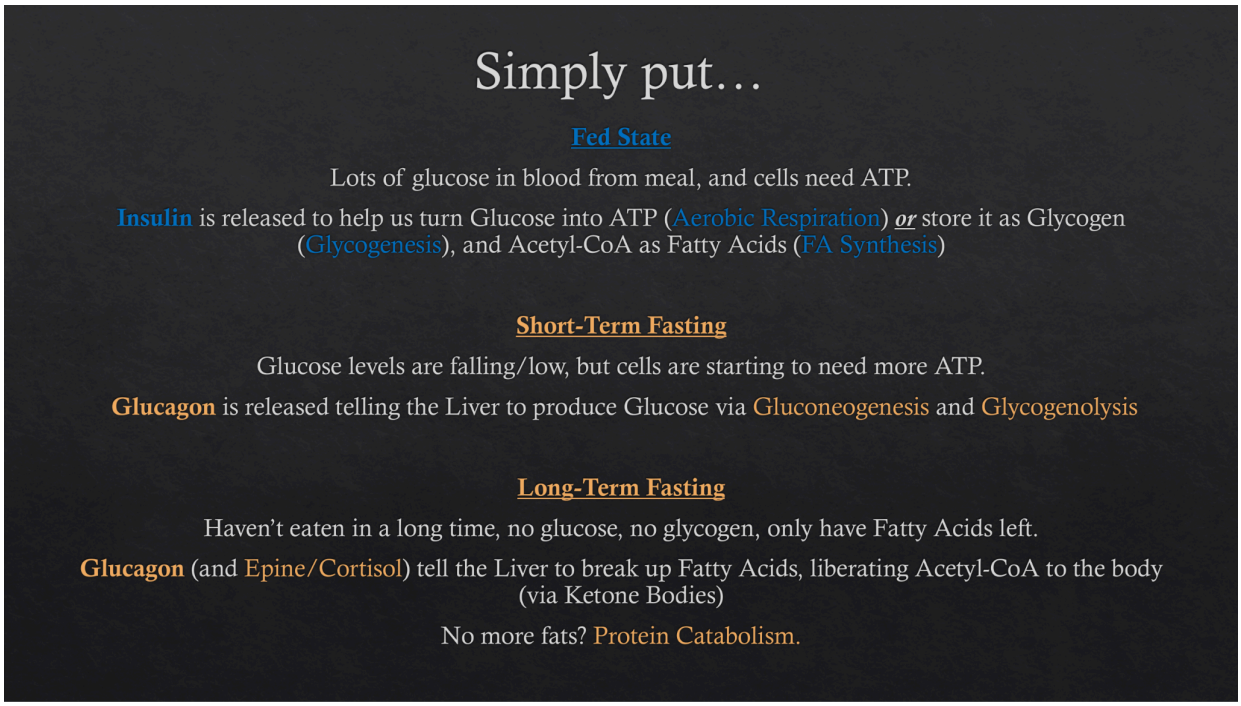
My Website

Metabolic States Overview of Metabolism

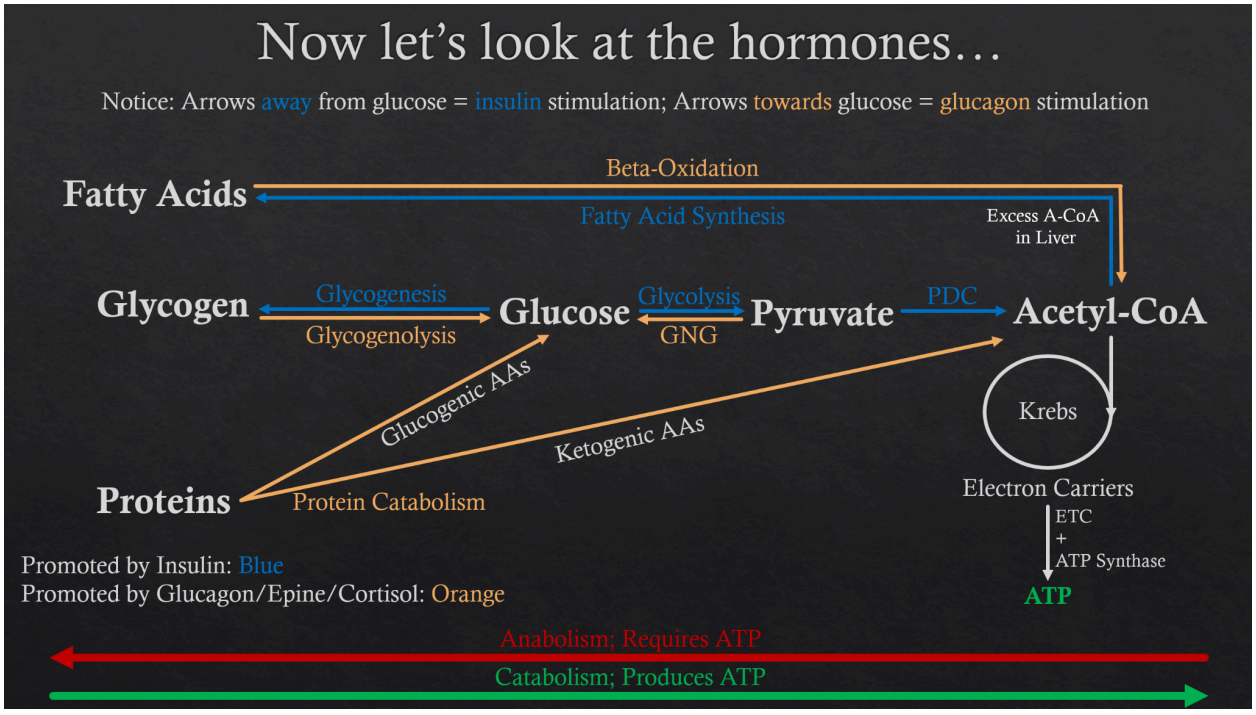


- Fed State: Use glucose in any way, either turning it into ATP via aerobic respiration or into glycogen via glycogenesis. Insulin is the signal to do so.
- Short-Term Fasted State: Since we haven't eaten in a while, we'll need to produce glucose for the tissues around the body, so the liver does GNG and glycogenesis to liberate to the body. Glucagon is the signal to do so.
- Long-Term Fasted State: We've now starved for so long that we've run out of pyruvate and glycogen to turn into glucose, so we have to resort to Fatty-Acids to produce acetyl-CoA which is sent around the body via ketone bodies. If we run out of fats, proteins are broken down. Glucagon (and epinephrine and cortisol) all can stimulate any of these processes.

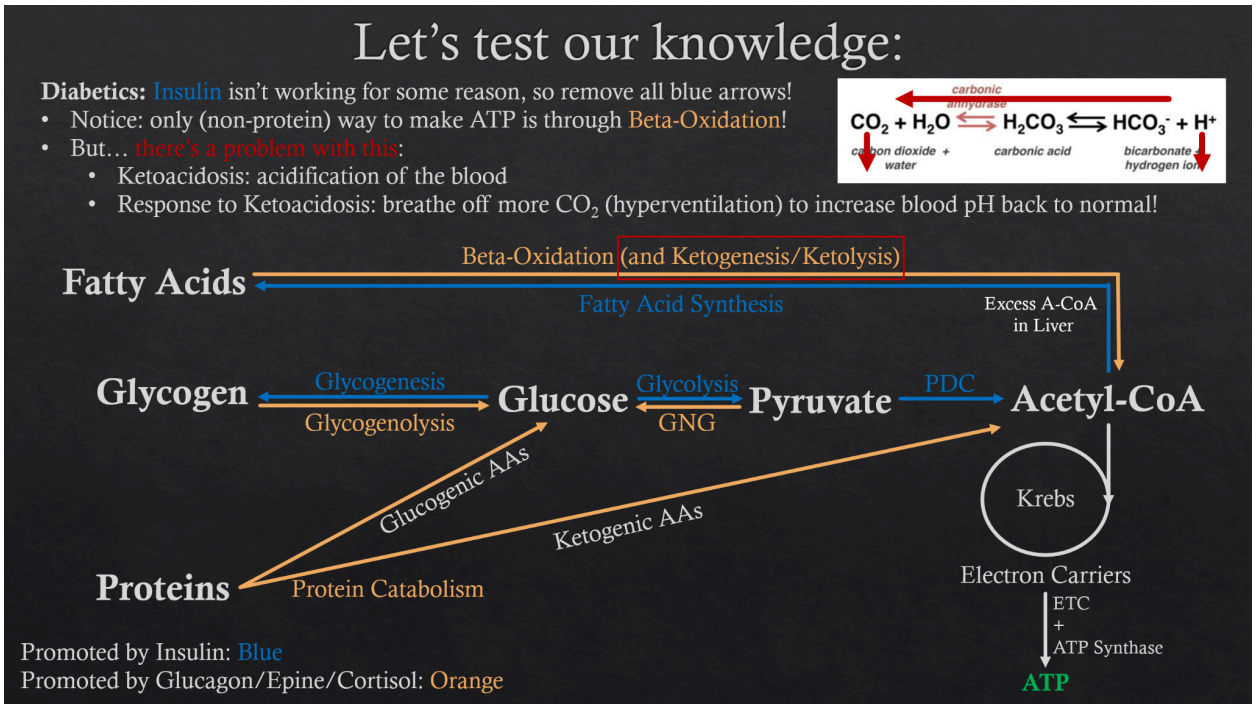
Simple Explanation of The Metabolic States



Hormonal Control of Metabolism



Diabetes



- Diabetics don't have functioning insulin, so all blue arrows disappear.
    - Main way to produce ATP is via Beta Oxidation and Acetyl CoA
- Beta Oxidation → Produces acetyl CoA → must be turned into ketone bodies to travel through the blood → decreases pH of the blood since they are acidic → ketoacidosis
- Ketoacidosis → acidification of the blood, results in hyperventilation which causes the breathing off/removal of more CO_2 from the blood, which will cause the bicarbonate buffer system to shift left, decreasing how much hydrogen ion is in the blood and raising blood pH back to normal
    - A symptom of diabetics is hyperventilation, which all results due to their inability to utilize insulin!

Insulin and Glucagon Summaries