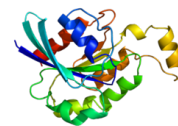




Chem 332 Biochemistry

Krebs Cycle

Learning Objectives, Study Guides



Learning Objectives

- Understand how the TCA captures energy using the redox reactions of metabolism (glycolysis, fatty acid beta oxidation...).
- Without memorizing, describe how the "reducing equivalents" from glycolysis are used in the mitochondria.
- Relate the TCA as a "cycle" and know how OAA is found in the mitochondria in "catalytic amounts" yet, the TCA is very active during oxidative respiration.
- Explain HOW transporting citrate or other TCA intermediates for the production of glucose is not biochemically possible? Differentiate this from the "filling up" / amphibolic nature of the TCA to produce glucose.
- Describe the five enzymes required for the PDH reaction and the importance of how the PDH complex functions.
- Explain the benefit of substrate channeling/metabolons.
- Describe the basic reaction and, in general, the mechanism of the enzymes involved in the TCA.
- Understand how the acetyl-Co Enzyme A (A-CoA) hydrolysis results in an exergonic reaction, near that of ATP hydrolysis. And explain how this is used to couple MDH to CS for the function of the TCA
- Because the enzymes of the TCA act as a functional unit that keeps pace with the metabolic demands of the cell. Know how the TCA is regulated by the redox state (NAD⁺/NADH ratio). Which steps of the TCA is regulated (activated and inhibited).
- Relate the objective above with how the TCA is "coupled" to the ETS and OxPhos.

Study Notes from Dr P: *This is not about memorizing the pathway! Especially not the shuttles bringing reducing equivalents in and out of the mitochondria. Instead understand the concepts described in the LOs listed above. If you can answer these concepts, then you will be ok. I like regulation and integration questions. Not memorizing each step type of questions. This is how learning is best done.*