

Biochemistry Study Guide Exam 4

Fatty Acid Catabolism

Beta oxidation of even-numbered, saturated fatty acids.
Know all of the reactions in structural detail.
Know what happens to the products of this pathway.

Mitochondrial structure

TCA Cycle

What goes in (acetyl-CoA), what comes out (NADH, FADH₂, GTP), what is regenerated.
Role of CoA in first reaction.
What happens to designated methyl and carbonyl carbons in reactions 2-5.
Be able to follow oxidation states of these carbons.
Role of Fe/S center in Isocitrate Dehydrogenase reaction.
Mechanism of Alpha-ketoglutarate dehydrogenase
Mechanism of Succinyl-CoA Synthetase.
Role of active-site histidine in above mechanism.
Fate of methyl and carbonyl carbons throughout TCA cycles.
Regulation of TCA by NADH and ATP.
Connection of SDH and FH enzymes and cancer.

Electron Transport

Calculate ΔG° of redox reactions from reduction potentials of redox couples.
Overall pathway of electrons from NADH and FADH₂ to O₂.
Electron carriers in the pathway (FMN, Fe, Cu)
Mobile electron carriers.
O₂ Reduction in Complex IV.
Role of proteins in electron transport.
How ATP synthetase works.
Uncoupling electron transport and ATP synthesis in "brown" fat.
Drugs/toxins that affect electron transport pathway.

Connections between metabolism and cancer.