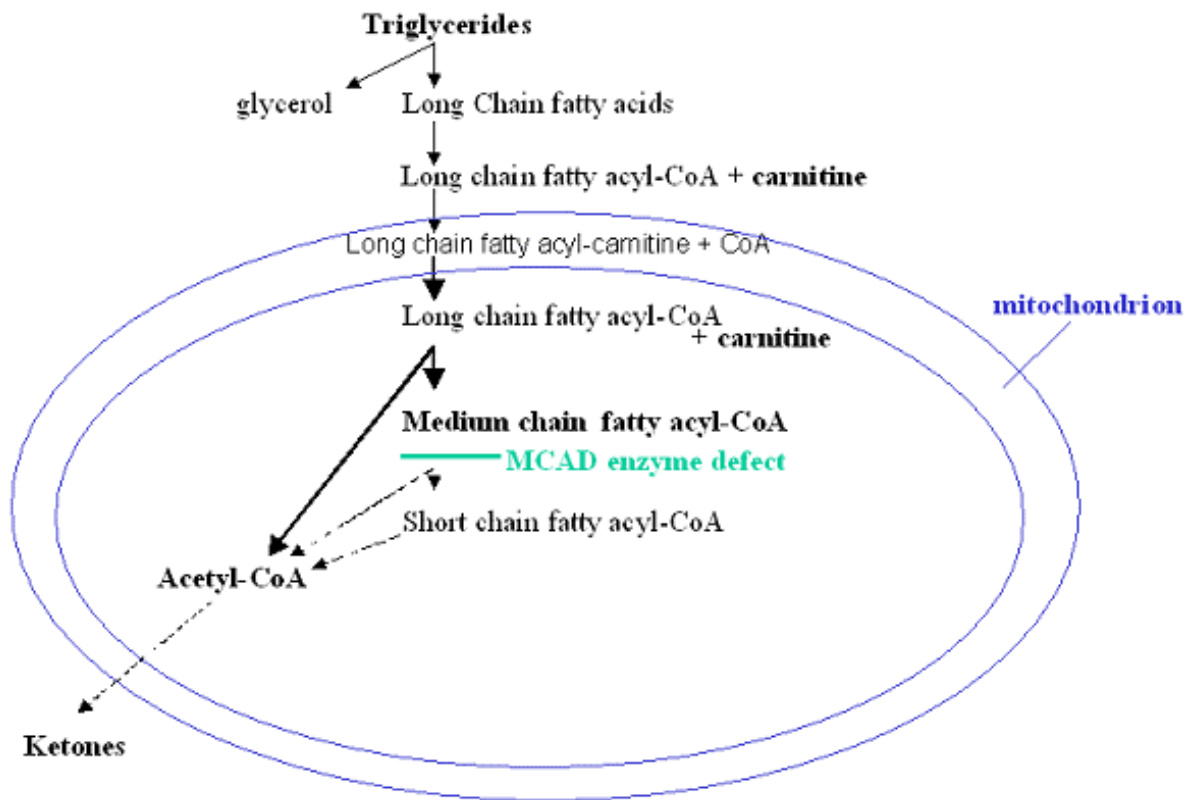


ACUTE ILLNESS PROTOCOL
FATTY ACID OXIDATION DISORDERS
MEDIUM CHAIN Acyl-CoA DEHYDROGENASE (MCAD) DEFICIENCY

PATHOPHYSIOLOGY

Below is the fatty acid β -oxidation metabolic pathway indicating the MCADD block.

Medium chain acyl Co-A dehydrogenase deficiency (MCADD)



The pathophysiological process begins with reduced glucose intake as a result of a fasting state or increased energy needs from a catabolic state (infection, stress, fever, etc...) not sufficiently provided for by caloric intake. The resulting hypoglycemia leads to mobilization of free fatty acids (FFAs) from adipose tissue which enters the mitochondria via the carnitine cycle. In the mitochondria, as shown in the diagram above, the fatty acids in the acyl-CoA form are normally oxidized to acetyl-CoA which is used to produce the ketones that can supply the energy needs to compensate for the lack of adequate glucose. The block at MCAD prevents oxidation of medium chain CoA to short chain CoA, thereby markedly reducing the production of ketones. This block also results in the accumulation of fatty acid intermediates that inhibit gluconeogenesis (thus preventing endogenous glucose production), have a toxic effect on the liver and produce metabolic acidosis.