

Answer on Question #46406, Chemistry, Other

Question: Describe the process of biosynthesis of fatty acid catalyzed by fatty acid synthase.

Answer: The process of fatty acids biosynthesis has 5 main steps:

1. The carboxylation of molecule of acetyl-CoA catalyzed by acetyl-CoA-carboxylase with formation of malonyl-CoA.
2. Condensation of an activated acetyl and malonyl groups to form an acetoacetyl groups bound to an ACP (acyl carrier protein). This reaction is catalyzed by β -ketoacyl-ACP synthase.
3. Reduction of the carbonyl groups with formation of D- β -hydroxybutyryl-ACP. This reaction is catalyzed by 3-ketoacyl-ACP-reductase.
4. The elements of water are removed from C-2 and C-3 of D- β -hydroxybutyryl-ACP with formation of trans- Δ^2 -butenoyl-ACP. The enzyme that catalyzes this reaction is β -hydroxyacyl-ACP-dehydratase.
5. The double bond of trans- Δ^2 -butenoyl-ACP is reduced (saturated) to form butyryl-ACP with an action of enoyl-ACP-reductase.