26/10/2023.

# KETONE BODIES. ESSAY 8 marks

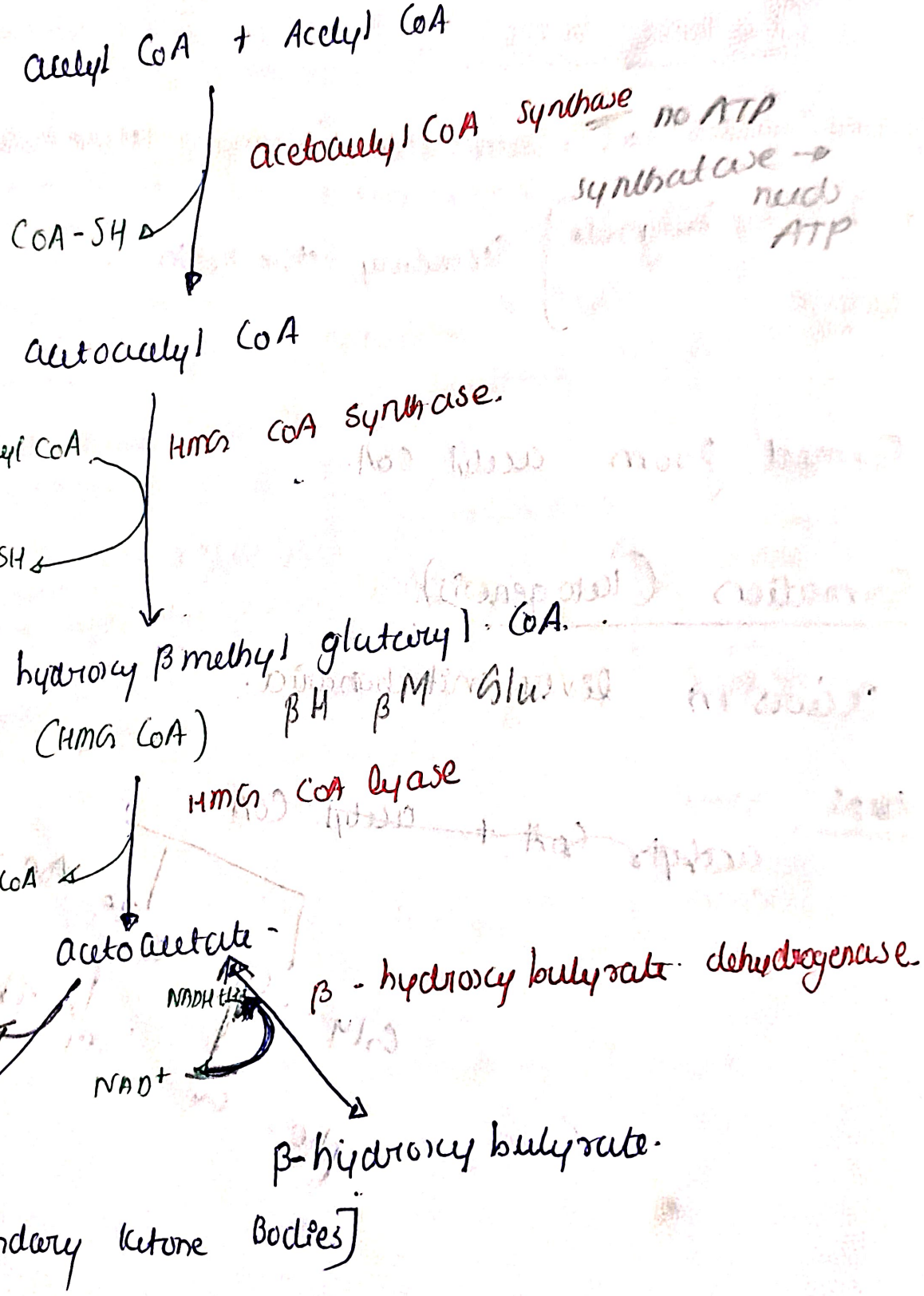
- Ketone bodies are acetoacetate (primary ketone body)
- β-hydroxy butyrate } Secondary ketone bodies (doesn't have a ketone body)
  acetone

Formed from acetyl CoA.

## Formation (ketogenesis).

Occurs in liver mitochondria.

## STEPS.




[secondary ketone Bodies]

## Regulation

Ketogenesis depends on

(a) availability of acetyl CoA.

(b) activity of TCA cycle.

### (a) Availability of acetyl CoA.

Insulin Inhibits HSL.

↓

↓ β oxidation

↓

↓ acetyl CoA

↓

↓ ketogenesis

Glucagon activates HSL

↓

↑ β oxidation

↓

↑ acetyl CoA

↓

↑ ketogenesis

- Malonyl CoA formed during fatty acid synthesis inhibits CAT - I activity.

(b) Activity of TCA cycle.

Acetyl CoA is normally Oxidised in TCA cycle of TCA cycle is Inhibited more acetyl CoA is diverted to ketogenesis.

Utilization [Ketolysis] ← physiological relation

Occurs in Extrahepatic tissues.

→ All tissues except Liver & RBC can utilize ketone bodies as fuel.

- Cardiac muscle & Renal Cortex prefer ketone bodies to glucose as fuel.
- Skeletal muscle & Brain utilize ketone bodies if glucose is not available.

Acetoacetate + Succinyl CoA

↓ Thiophorase.

Acetoacetyl CoA + Succinate.

↓

β-oxidation. {produce energy}.

## CLINICAL SIGNIFICANCE

- KETOSIS.
  - starvation
  - Diabetes.
  - hyperemesis gravida.

**Insulin overdose**

- non Ketotic hypoglycemia.

more dangerous. as otherwise brain can utilize Ketone bodies.

- von Gierke disease.