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Semester 2nd

Department BS (Radiology)

paper Biochemistry

Exame Final term

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Q1: Write down the four step invole in beta oxidation?

Ans: **Beta oxidation:**

Beta oxidation is a metabolic process involving multiple step by which fatty acid molecules are broken down to produce energy. More especifically, beta oxidation

consist in breaking down long fatty acid that have been converted to acyl-CoA chain. into progressively smaller fatty acyl-CoA chains.

Beta oxidation step:-

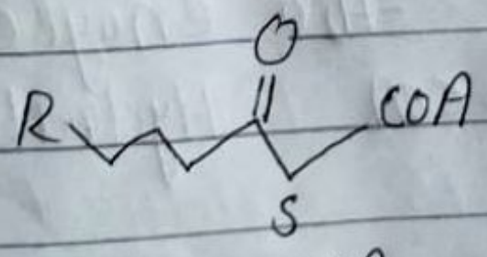
Beta oxidation takes place in four step.

① Dehydrogenation
② hydration
③ oxidation
④ Thyolisis

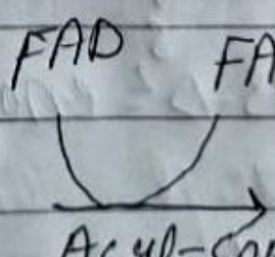
① Dehydrogenation:-

in this step, acyl-CoA is oxidized by the enzyme acyl CoA dehydrogenase. A double bond is formed between the 2nd and 3rd carbons (C2 and C3) of acyl-CoA chain entering the

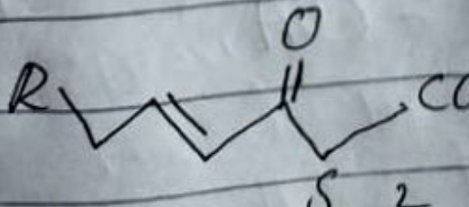
Beta oxidation cycle. the end product of this reaction is trans - Δ^2 enoyl - CoA (trans - delta2 - enoyl CoA) this step uses FAD and produce $FADH_2$ which will enter the citric acid cycle and from ATP to be used as energy.
Notice in the following fig that carbon count starts on the right side. the right most carbon below the oxygen atom is C_1 then C_2 on the left forming a double bond with C_3 and so on)



Acyl-CoA



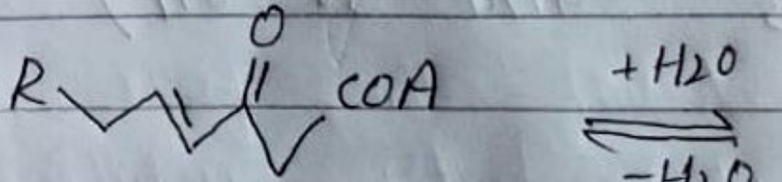
Acyl-CoA Dehydrogenation



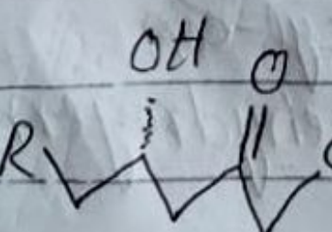
trans-Δ^2-Enoyl-CoA

Hydration:

in the 2nd step, the double bouble bond between C_2 and C_3 of trans Δ^2- enoyle- coA is hydrated forming the end product L-β- hydrated, forming hydroxyacl coA which has hydroxyacl group (OH) in C_2 in place of double bond. This reaction is catalyzed omather enzyme. enoyl coA hydratedase. this step requires water.



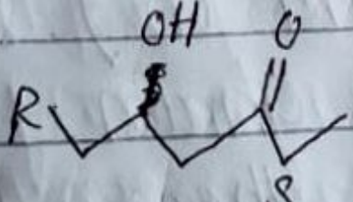
trans-Δ^2-enoyl-CoA enoyl CoA Hydrates



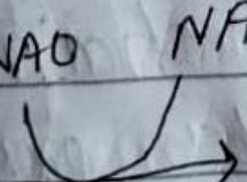
L-3 hydroxyacyl - CoA

(3) oxidation :

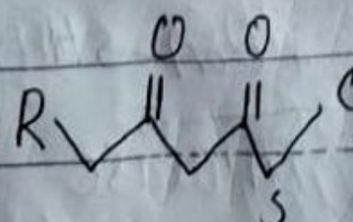
In this step the hydroxyl group in C2 of L-β- hydroxyacl CoA is oxidized by NAD+ in a reaction that is catalyzed by 3- hydroxyacl-CoA dehydrog-enes. the end products are β-ketoacyl CoA and NADH + H. NADH will enter the citric acid cycle and produce ATP that will be used as energy.



L3- Hydroxyacyl-CoA.



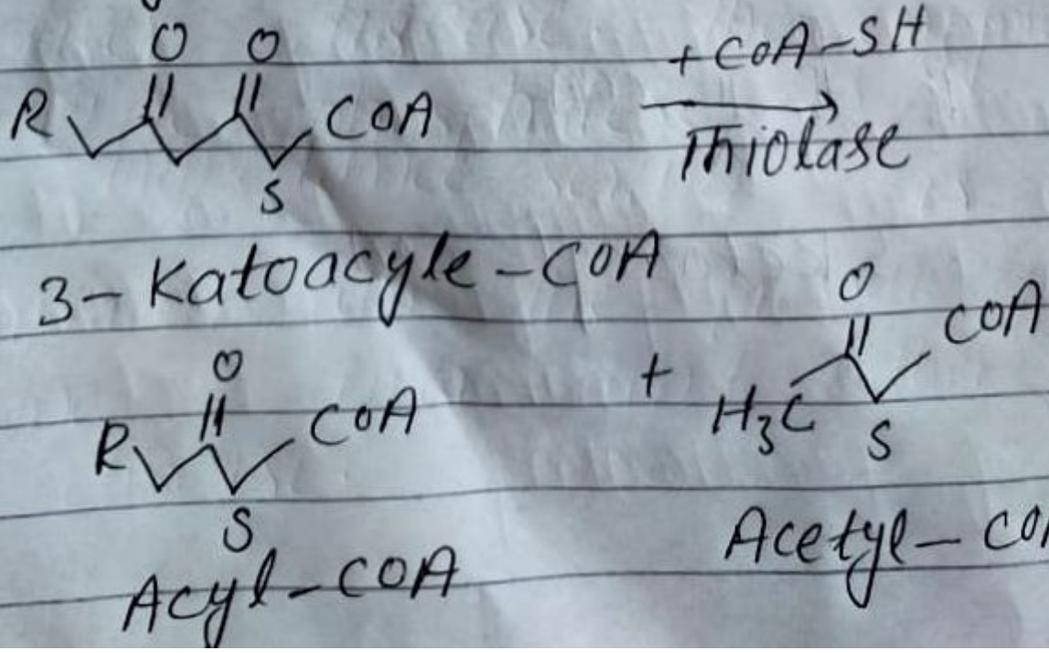
Hydroxyacyl-CoA



3 Ketoacyl-CoA

④ Thiolysis :

Finally, in the 4th step β-katoacyle CoA is cleaved by the thiol group (SH) of another CoA molecule (CoA-SH) the enzyme that catalyzes this reaction is β-ketothioles. The cleavage take place between C_2 and C_3 there fore the end products are an acetyl-CoA molecule with original two frist carbons (C_1 and C_2) and an acyl-CoA chain two carbons shorter then the original acyl-CoA chain that entered the beta oxidation cycle.



Q2: write down clinical significance of the following enzymes. a Alkaline phosphatese
(b) creatine kinase
(c) gamma-glutamyl transferase?

Ans: **Clinical Significance:**

Emily began mental health therapy with a number of symptoms including insomnia, intense sadness and fatigue. Emily has been feeling this way for a few months. simply stated, clinical significance in the ability for the treatment or research exprioment to help a client or patient so much functioning from dysfunctional state. in our example because it moved Emily from a disturbed state to normal level of functioning.

① Alkaline phosphatase :-

The clinical use of alkaline phosphatase enzymes the analysis of isoenzymes of alkaline phosphate is an aid in diagnosing liver and bone disease, especially the high moleculer weight isoenzyme that appear in cholestatic liver disease. the analysis of the iso → enzyme of alkaline phosphates is an aid in diagnosing liver or bone diagnosing liver especially the high molecular weight isoenzyme that appear in cholestatic liver disease. the enzyme alkaline phosphatese is an importance serum is correlated with the pressure of bone liver and other disease.

(B) Creatine kinase :-

This is important enzyme in such tissues. Clinically, creatine kinase is assayed in blood test as marker of demage of CK-rich tissue such as in myocardail infraction rhabdomyolysis and acute kidney injury. Creatine kinase also knocwn as creatine phosphatkinas or phosphorcreative kinase is an expressed by variis tissue and cell types. CK catalyses the conversion of creatine and use adenosine triphoste (ADP) this CK enzyme reaction is reversible and thus ATP can be genarated from pcr and ADP.

⑥ Gamma-glutamamyl transferase:

The gamma-glutamyl transferase test may be used to determine the cause of evelted alkaline phosphatase (ALP) will be elevated in bone disease. gamma-glutamyltransferase is primarily present in kidney liver and pancrate cells. small amounts are present in other tissue. even though renal tissue has the highest level of GGT, the enzyme present in serum appears to originate primarily from from hepatobillary system present in the serum appears to originate primarily from hepatabillary system and GGT activaty is elevated in any and all in case of intra or prosthepatic. marmol valves

are observed in various muscle diseases and the renal failure. Normal values are also seen in case of skeletal diesese children older then one year and healthy pregnant woman condition in which ALP is elevated.

Q3: what is the starting point and normal range in the body ?

Ans3: Uric acid is a chemical created when the body breaks down substances called purines. purines are normally produce in the body and are also found in some food and drinks. food with high content of purines includes liver, anchovies mackerel dried beans and peas, and beer the formation of uric acid

is through the enzyme xanthine oxidese which oxidizes which oxidize oxypurines. normally a small amount of uric acid is present in the body, but when there is an excess amount in the blood, called hyperumia this can lead to gout and formation of kidney stone.

uric acid is a heterocyclic compound of carbon nitrogen, oxygen and hydrogen with the formola $C_5H_4N_4O_3$. High blood concentration of uric acid can lead to gout and are associated with other medical conditions, including diabetes and formation of ammonium acid urate kidney stone.

(B) Normal rang of Uric Acid :-

Normal Uric acid levels are 2.4 to 6.0 mg/dL (female) and 3.4 to 7.0 mg/dL (male) Normal values will vary from laboratry to Laboratry. Also important to blood Uric acid levels are purines. Most of it is excreted in your urine or pass through your intestimes to regulate normal "levels" normal Uric acid levels are 2.4 to 6.0 mg/dL (female) and 3.4 to 7 mg/dL.

Q4: How many protien invole in electron transport chain and how do electron move in the electron transport chain?

Ans **Four protein :-**

There are four protein complexes

(abeled I-IV) in the electron transport chain which are involved in moving electrons transport chain which are involved in moving electrons from NADH and $FADH_2$ +0 molecular oxygen. Complex estobolish the nytrogen on gradient by pumping four hydrogen ions across the membane from matrix into the intermembrane space:

Now electron move in electran transport chain:
the electran transport chain is a series of complexes that transfer electron from acceptors via redox reaction and oxidation reaction and couples this electron transfer with the transfer of protans accross a

membrane. the electron transport chain is untill up to peptide enzyme and other molecules.

Q5: write down step involve in uric acid formation?

Ans: uric acid:

uric acid is waste product found in blood. it is created when the body breaks down chemical called purines. Most uric acid dissolves in blood, passes through the kidney and leave the body in urine. food and drinks high in purine also increase the level of uric acid these include:

seafood, salmon, shrimp lobster and sardines

Red meat.

organ meats like liver

Food and drinks with high fructose corn, syrup and alcohal, beer, including non-alcohalic beer

if too much uric acid stay in the body, a condition called hypericemia will occour.

hypercimia can couse crystals of uric acid can settle in the joints and couse gout, a form of arthritis that can be very painful. they can also settle in the kidney and form the kidney stones.

purines perform may important function in the cell, being the formation of monomeric pecrousers of nucliC acid DNA and RNA the most relvent one purine which also contribute to modulate energy metabolism

All cell requires a belence quantity of purines of growth, proliferation and survival. under physiological conditions the enzyme involeved in the purine metabolism maintain in cell a belence ratio between in uric acid.

All the mamals possess the enzyme urices that convert uric acid to allantoin that is easily eliminated through urine. overproduction of uric acid generated from the metabolism of purines. This reviwed describes the enzymatic pathway involes the degardation of purines getting into their strutures and biochemistry untill the uric acid formation.

"The End"