

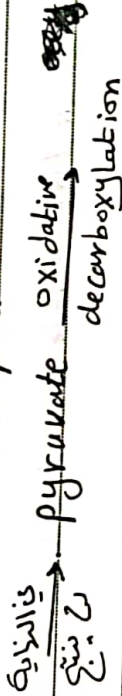
* Cardiac muscle is the most highly oxidative cell (based on oxidative phosphorylation for producing energy).

Glycolysis

↓
Aerobic

↓
anaerobic

- more energy produced,
because glycolysis will not be the end point
produce only 2 molecule of ATP + lactic acid



→ acetyl-CoA → Citric acid cycle.

* Cardiac muscle is in continuous contraction, huge amount of ATP must be available.

* Fatty acid oxidation should be under aerobic condition, because all the reactions of β -oxidation that producing energy take place in mitochondria.

* oxidative doesn't mean only oxygen we should have

Oxygen + mitochondria

example: RBC: anaerobic → mitochondria

Skeletal muscle: aerobic + anaerobic → The muscle divided into 2 compartment central & peripheral, during contraction

The central part performing anaerobic glycolysis? because blood vessels are compressed → O₂ supply to skeletal muscle will be insufficient, but in the periphery there's good blood supply

Cardiac muscle: 1) Under physiological conditions → impossible to perform anaerobic glycolysis

2) in Ischemia (not all the part of the heart) → anaerobic

* Cardiac muscle should have a balance between what sim is doing to do & what amount of energy to be produce

* The 3 components of biochemical reaction:

□ obtaining the primary supply (fuel)

□ biochemical reaction to produce common intermediate (Acetyl CoA)

To join TCA cycle → $NADH, FADH_2$ → transfer the electron to electron transport chain. reducing equivalents

□ sources: Creatine phosphate



shortage of ATP → shortage of ATP , (storage form of energy) *

Glucose supply of F.A supply

للزيتون في وسط تاني للالانفة حابا في جوف خلية

↳ important source of energy under high demand conditions

* Cardiomyocyte لا يصنع hepatocyte → لا تظهر في الكبد mitochondria

* Oxidative state during contraction: 80-90%

↳ = ↳ rest: 15-25%

hydrolysis of ATP to supply energy في خلايا خلية

for contraction is the cardiac muscle, 95% of ATP energy

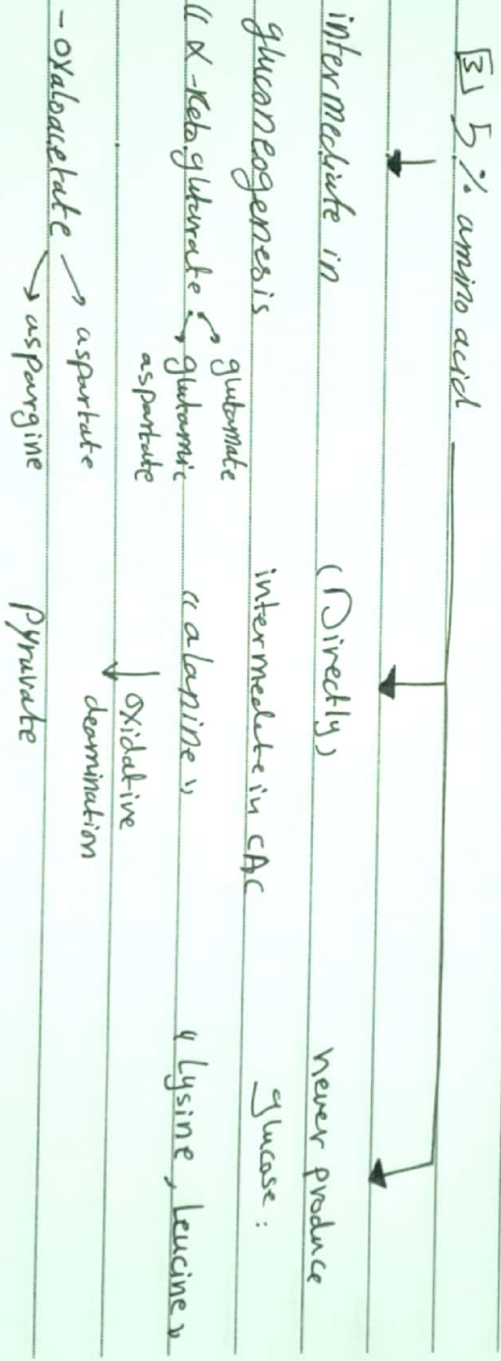
second hydrolysis to produce energy

11 * First line of energy production is fatty acid 60%

"main source" ←
 come from outside
 ("free fatty acid")
 - chylomicron + VLDL
 Triacylglycerol
 (10-30%) of fatty acid can be
 uptake by c.m will convert to ATP

to uptake c.m \leftarrow esterified Fatty acid in s.c.m *
 Fatty acid for β -oxidation in the plasma

12 35% carbohydrates: glucose, glycogen
 * Pool of glycogen in c.m = $\frac{1}{5}$ glycogen in skeletal muscle



lactate } → directly: $\frac{\text{lactate}}{\text{dehydrogenase}}$ → pyruvate → Acetyl CoA → c.m
 } → indirectly: Cori cycle (pass by macrocarboxylate - turns out
 → liver → glucose

* Transamination
 Transamination } → pyruvate → alanine
 } → glutamate → α-keto glutrate

* carbohydrate metabolism

Glut-4, synthesis & located in cytosol of c.m, when need to uptake glucose, it migrate from cytosol to cell membrane (insuline dependent)

* In patient with uncontrolled DM => transp. isle of glut-4 to cell membrane => P dependence of fatty acid (Fat-consuming) => hypertrophy

* glucose-transporter 1 => playing accessory role

* Key steps in glycolytic pathway: - "Irreversible"

1 -> Hexokinase

10 -> Pyruvate kinase

3 -> Phosphofruktokinase 1

6 -> glyceraldehyde - 3 - phosphate dehydrogenase

دو سٹیج: 1) 1, 3 bisphosphate glycerate + NADH

activate by lactate dehydrogenase enzyme

NADPH + H⁺ سے

shifting of pH to more acidic from 6.9 -> 6.8

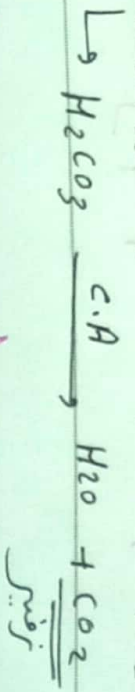
stop the activity of most of enzymes of cardiomyocytes => Death

* ischemia اور اس کی حالت

(lactate) سے زیادہ تیار کرنے کے لیے: H⁺ سے زیادہ تیار کرنے کے لیے

2 * Na⁺-H⁺ exchanger channel: keep H⁺ in suitable amount to not affect pH -> (not to inhibit enzyme)

(amine exchanger) سے زیادہ HCO₃⁻ اور H⁺ سے زیادہ Na⁺ سے زیادہ



سازگار اور تیز سے زیادہ