* We have 2 types of Lipoproteins ((chylomicrons + VLDL))
another ~~source~~ Source : free fatty acid ماشين بال Albumin

((general carrier))

mainly carrier ← (FAT) بيدخلوا عبر

(FABP) او

activation to active form قبل لا يدخل الـ

* ماعنا مركب بيدخل لأي تفاعل قبل لا يتحول ل active form ??

مثلاً : الـ glucose لازم يتحول بالأول ل g-6-p ؟؟

1) active form to participate in different metabolic pathways

2) Trapping glucose inside the cell

المهم : بعد مايصير activation وبعدها بيشبك على acyl-CoA

بيتحول ل ← Fatty acyl-CoA

الجزء الأكبر ← اما ← او

Libogenesis — synthesis of fatty acid

β-oxidation — produce energy

((This process should be under control))

* CD36 : integral glycoprotein highly expressed in Cardiomyocytes

كلما زاد ← uptake of F.As ← lipotoxicity ← ((This is very dangerous & may cause H.F))

* بشكل عام : لما تقل نسبة carbohydrates in diet ← pushing adipose tissue تطلع محتوياتها Triacylglycerol وكذلك الـ free. FAs

→ ↑ concentration of FAs in Plasma → push الـ cells (including liver)

→ ↑ uptake F.As → fatty liver / lipotoxicity

+ the building unite of cholesterol & Keton bodies (acetyl-CoA producing from β-oxidation of FAs) ↑ ⟹ - Ketogensis

- hypercholesterolemia

(↑ cholesterol)

70 - 90% of free FAs uptaken → will be subjected for β-oxidation by 3 enzymes in mitochondreal membrane + enzyme inside mitoclondria

① CPT-I → fatty acyl-carnitine ← carnitine + FAs يحول

② CAT → from outer to inner membrane نقل

③ CPT-II → fatty acyl CoA يرجع لـ ↓ β-oxidation

هاد بجيب الـ Long & medium chain

* malony-coA - Key physiological regulator of FA oxidation in heart لـ بعلاقة inhibition لأنه elongation factor in FA biosynthesis (العلاقة عكسية).

* أي تفاعل carboxylation بيحتاج :

1) CO_2 from bicarbonate
2) Mn (manganese)
3) ATP
4) biotine
5) enzyme

* البيض النيء فيه avidine protein بتفاعل مع الـ biotine يلغي عملية كل تفاعلات الـ carboxylation reaction مثل (الـ fatty.A biosynthesis, gluconegensis)

* malonyL-coA is the carboxlated form of Acety-CoA

← إلي جاي من الـ (citrate) بتفرز لـ citrate shuttle ←

← الـ citrate بيطلع برا بيوخذ P + enzyme كمان (ATP citrate lyase, enzyme)

↓ يفكه إلى

acetyl CoA + oxaloacetate

↓ ACC (بمساعدة العوامل الـ 4 إلي بيحتاجهم)

malonyl-CoA

تفاعل carboxylation

* معدل ال Synthesis of F.A in Cardiomyocyte is too little ← وهو الي خلاها تاخذ ال FA الي جاي من برا بسبب انه

* ACC enzyme under tough control by phosphorylation, dephosphorlation reaction , الصورة الأكتف منه هي ال dephosphorlation ، لو حركنا إذا أخذ ال (phosphate)

* by AMPK → ((ACC will inhibited))

* relationship between Carbohydrate & fat metabolism in Cardiomyocyte

* الي بتحكم بال (glucose uptake & its oxidation) (activity of pyruvate dehydrogenase multi enzyme complex) هو ال FA oxidation

* PDH is one of the enzyme that produce energy → أحب صورة عليها الطاقة بتعلة inhibition ، بسبب ما نكون ال inhibition صار عن ال PDH ، بكون through activation of PDH Kinase ، لأنه بضيف phosphate group)

وال (PDH) ← is also under phosphorylation dephosphorylation reaction ← لو أضفنا ال (P) group

← بصير له inhibition

activated
PDH Kinase is ~~stimulated~~ by high form of energ

ratio
الصورتين من الطاقة موجودين بس ال ~~ration~~ بيتهم تختلف لما تكون

- $\frac{ATP}{ADP}$ low → ADP العالي

(مهم للامتحان)

- Co. A / ~~acyl~~ Acetyl-coA ration is high معناها Acetyl coA قليل لهيك لازم يصير (activation of all enzymes)

* 2 lactate molecule → 15 ATP
1 glucose = 30 ATP

* β- oxidation of FA generates more lipid (peroxide)
تتكون لما يتحول phospholipid in cell membrane الى عن ال
← ~~rigi~~ rigid molecule ← into fluidity & flexibility ←
↓ decrease in transportation of lipid & ions across membrane of cardiomyocyte

* brain unable to utilize of FA:
1). increase incident of oxidative distress
②. oxidation تطلع الية طاقة هائلة جدا من
40% منها ستهدر لإنتاج ATP

* Liver is produce ketone bodies to be used by other organ, is unable to utilize it as a source of energy

* الـ physiological و الـ adaptive
ketogenesis can lead to acidosis
* only in pathological condition: (uncontrolled DM, chronic alcoholism, Von gierke's disease "deficiency of glucose-6-P)), pyruvate carboxylase deficiency, toxemia of pregnancy, phosphorylase kinase deficiency))
هاي الحالات اللي بصير فيها acidosis
* in prolonged anasthesia → acidosis ممكن يصير

* In the case of starvation which hormone will be ~~prodominant~~ prodominant?
→ glucagon, growth hormon, epinephrine, Cortisol ((anti-insuline hormon))
تتوقف تفاعلات (glycolysis, lipogenesis, glycogenesis, oxidative decarboxlation ...)