LIPID, PG, UG

MICELLE, PHOSPHOLIPID, CHOLESTEROL AND BILE SALTS

IMAGE | SEPTEMBER 19, 2014 | HODBIOCHEMISTRY | 1 COMMENT

We were discussing what happens to micelle at the membrane.

Let us see how micelle is formed in bile. Probably absorption of micelle content is a "reverse" of it.

The ABC are ATP binding cassette protein involved in non-specific lipid and lipid soluble drug transport across membrane. This property make tumor expressing them resistant to multiple chemotheraputic agents.

Let us study their function.

It is a dimer (each with 6 TMH=Trans membrane helix)

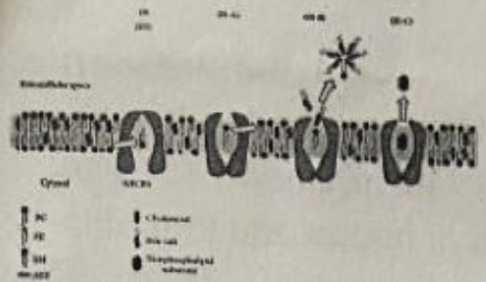
1. Somehow a phopshatidyl choline can SLIP through these alpha-helix to reach inside of the ABC. (See arrow)

2. ATP bind and hydrolyse to change protein conformation

a. Phospholipid SLIP out to membrane (flip-flop of phospholipids) (See arrow)

b. PL bind with BS/micelle and form mixed micelle

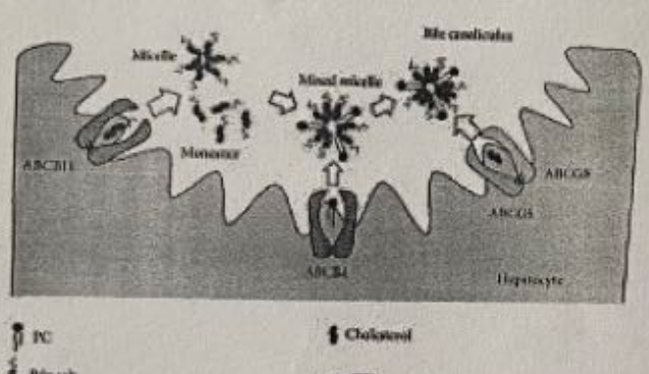
c. May go in to water if somewhat soluble(e.g drugs)



As shown in figure below

Bile salt themselves are secreted in bile by ABC

Cholesterol is also secreted in bile by ABC with help of micelle



Thus, lipids, bile salts etc. donot cross membrane “without any help”, “without any difficult”, “very easily”. They have complex mechanism to cross membrane helped by variety of proteins.

Imagine reverse happening in intestine, where first cholesterol, MAG and FA are taken up. Then Lastly bile salts are taken up. (?)

We will discuss it in lab.

ONE THOUGHT ON “MICELLE, PHOSPHOLIPID, CHOLESTEROL AND BILE SALTS”

0 hodbiochemistry

NOVEMBER 15, 2014 AT 5:31 AM

NPC1L1 (Niemann-Pick C1-Like 1) is also one of the protein involved in chleterol absorption in intestine. Ezetimibe is its inhibitor

↓

cholesterol absorption Inhibitor.

Nitrate → NO_2
Nitaite → NO_3

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PG, PHARMACOLOGY, PROTEIN STRUCTURE

METHEMOGLOBIN AND IRON

DECEMBER 18, 2014 | HODBIOCHEMISTRY | LEAVE A COMMENT

Following are ways to produce MetHb in Lab. Note difference in both methods. Interestingly both are used in medical treatment.

1)

NO2- 2H+ Fe2+ —> NO Fe3+ H2O (Production of Methemoglobin)

Nitoglycerine,amyl nitrate release NO3-which are reduced to NO2- and NO by body

2)

$[Fe(CN)_5NO]^{2-}$ Fe2+ —> 5CN- Fe3+ Fe2+ NO (Production of Methemoglobin)

NO2- O2 H2O <— NO3- H2O2 (Xanthine Oxidase have nitrate reductase activity)

NO2- 1/2(O2) —> NO3- Spontaneous

Both are vasodilators due to NO, used in angina and hypertention

MetHb can not bind O2, but increase affinity of other globins (Hypoxia more severe than shown by ordinary oximeter, special nanometer wavelenght oximeter is required to differentiate)

CO-Hb also causes similar phenomena

Fe2+ O2 –> Fe3+ O2- [Fast as Fe2+, Heme. Very slow as Hb, role of globin]

O2- O2- 2H+ –> H2O2 O2 (Dismutase)

2H2O2 –> 2H2O O2 (Catalase)

H2O2 + 2H –> 2H2O (Reductase, Glutathione peroxidase)

H2O2 Fe2+ –> **OH- OH.** Fe3+ (Fenton)

OH. Fe2+ –> Fe3+ OH-

==========

H2O2 2Fe2+ –> 2OH- 2Fe3+ (Sum of above two reactions)

H2O2 O2- –> O2 **OH- OH.** (Haber-Weiss)

Iron have possibility of six coordination bonds.

In HB, When it is in Fe3+ form, its affinity to CO and O2 is decreased. Affinity to CN- and H2O is increased.

Thus, Fe3+ in MetHb is bound to H2O. Why? Still can not explain.

Lewis structure of O2 and CO shows why they differ in their binding to Heme

A Strategy For Constructing Lewis Structures. Example with Carbon Monoxide, CO

1. How are the atoms connected?

C—O

- only two atoms
- must be connected to each other

2. How many electrons are there?

C—O 2 electrons in a bond

- C has 4 e⁻; O has 6 e⁻; total of 10 e⁻
- used 2 e⁻ in bond
- have 8 e⁻ left (4 pairs)

3. Fill in electrons

:C—O:

- used 10 e⁻
- have 0 e⁻ left
- have no octet on carbon or oxygen

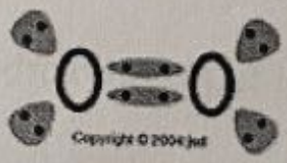
4. Rearrange electrons to fill octets on each atom

:C—O: :C≡O:

- have octet on oxygen
- have no octet on carbon

:C≡O:

- octets complete
- this is a reasonable structure



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HYPOXIA AND 2-3 BPG

OCTOBER 17, 2014 | HODBIOCHEMISTRY | LEAVE A COMMENT

HIF=Hypoxia inducible factor

1) HIF-prolyl-hydroxylase use O2 for hydroxylation of HIF

HIF-Prl + O2 —-> HIF-Prl-OH (Enz is HIF-Prl-Hydroxylase)

2) HIF-Prl-OH is ubiqutinylated, but HIF-Prl is not

3) Ubiqutinylated proteins are distroied by proteosome

Anoxia -> low Hydroxylation of HIF -> HIF not degraded –> HIF increased

HIF bind HIF response element(HRE) and induce of erythropoietin, Glycolytic enzymes, VEGF

Thus anoxia cause increased EP, increased angiogenesis and increased glycolysis(leading to increased anerobic glycolysis due to anoxia)

There is no regulation of BPG-Mutase enzyme. More Glycolysis–> more 2-3 BPG?? Mutase brings equlibrium between 1-3 and 2-3???

High altitude Anoxia –> hyperventilation –> Alkalosis –> High pH decrease 2-3 BPG phosphatase activity, thereby increasing 2-3 BPG in RBC

4'C Blood, 2-3 BPG phosphatase is active, but mutase/other enz are inhibited —> low 2-3 BPG in stored Blood

2-3 BPG is also produced in placenta, where it help excess O2 delivery to fetus.

Acetazolamide->Acidosis->respiratory stimulation-> improved hypoxia by counteracting over-ventilation alkalosis.

http://jap.physiology.org/content/jap/102/4/1313/F1.large.jpg?width=800&height=600

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GERHARDT'S TEST

SEPTEMBER 19, 2014 | HODBIOCHEMISTRY | LEAVE A COMMENT

Gerhardt's test

FeCl3 + Acetoacetate/ethyacetoacetate -> Fe3+ – 3(AA) coordination complex formed -> purple color, diacetate(one keto one + carboxylic acid)

Only Acetoacetate give the test. Not acetone, beta-OH-butyrate

Co-ordination complex: pair of electron donated by same atom is shared between two

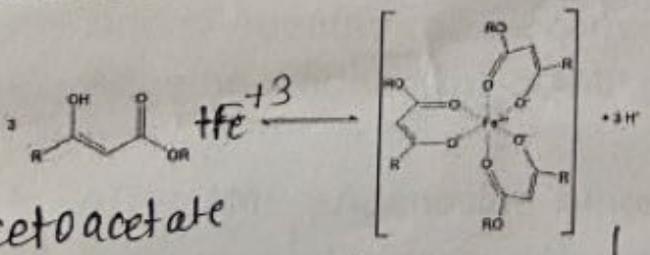
1. Salicylate(bluiesh),
2. phenylpyruvic acid(green) – phenylketonuria

phenols, phenothiazine drugs also give same test } False +ve test

boil urine: acetoacetate in to acetone -> test negative → so don't Boil.

1.0ml of 10% FECl3 solution to 5 ml of urine. A reddish color is formed after the mixture.

Do not



acetoacetate

Co-ordination complex

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CPDA AND RBC

OCTOBER 17, 2014 | HODBIOCHEMISTRY | 1 COMMENT

Citrate = Anticoagulent

Phosphate = Good buffer at 7.4 pH (pK=6.86)

Dextrose= Nutrition

Adenine = replacement to loss of adenine to RBC-ADA as hypoxanthine

ONE THOUGHT ON "CPDA AND RBC"

0 hodbiochemistry

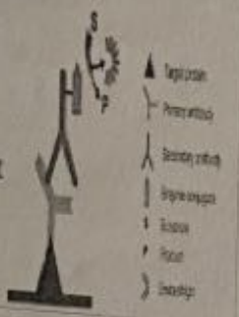
OCTOBER 17, 2014 AT 5:10 PM

Added Adenine can be converted in to AMP/ADP/ATP in RBC
Adenine->adenosine->AMP possible in RBC

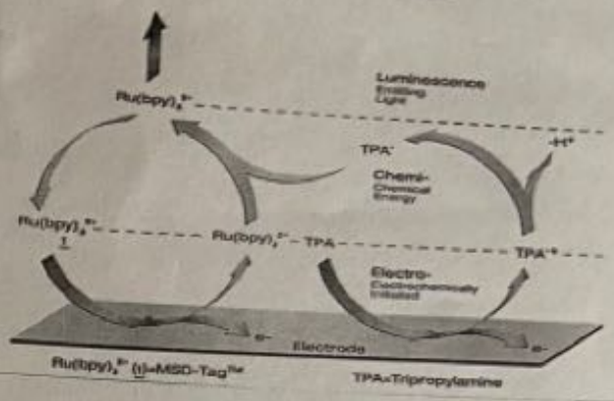
ATP->AMP->Adenosine->Inosine->Hypoxanthine done naturally in RBC. This is counteracted by addition of Adenosine

Chemilluminescent assay
Basic principles , Instrumentation and clinical utility

By
Herat soni
2nd Year Resident
Biochemistry



- **Electrochemiluminescence**



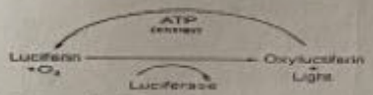
- **Luminescence**

  X*---------->X+hv(light)

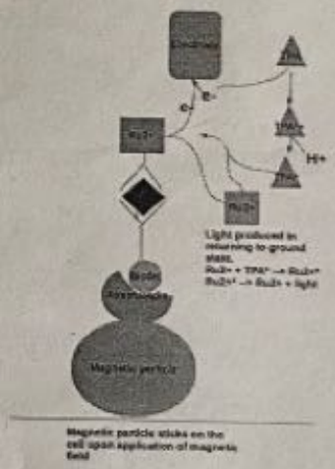
- **Chemiluminescence**

  Luminol + H2O2 ---> oxidised luminol* + H2O
  -----> oxidised Luminol + hv (light)

- **Bioluminescence**



seen in firefly



Magnetic particle sticks on the cell upon application of magnetic field

- **Enhanced chemiluminescence**

  -In presence of HRP
  Iodophenol(R-OH) + H2O2 +luminol

  ↓

  RO*(phenolate radical) +H2O +luminol

  ↓

  Hydroxyquinone +oxidised luminol*

  ↓

  Oxidised luminol + hv(Light)

Principle of CLIA