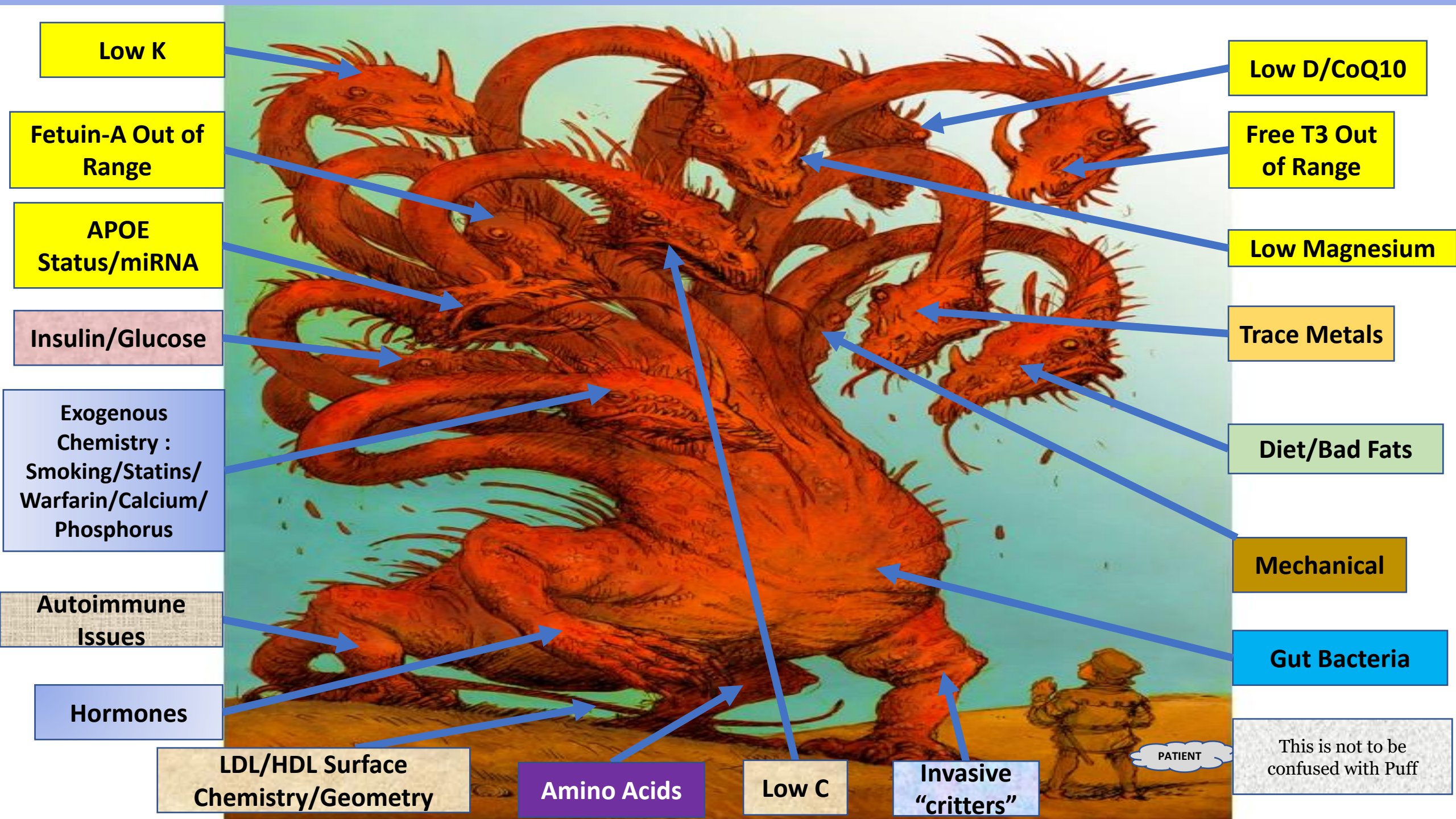
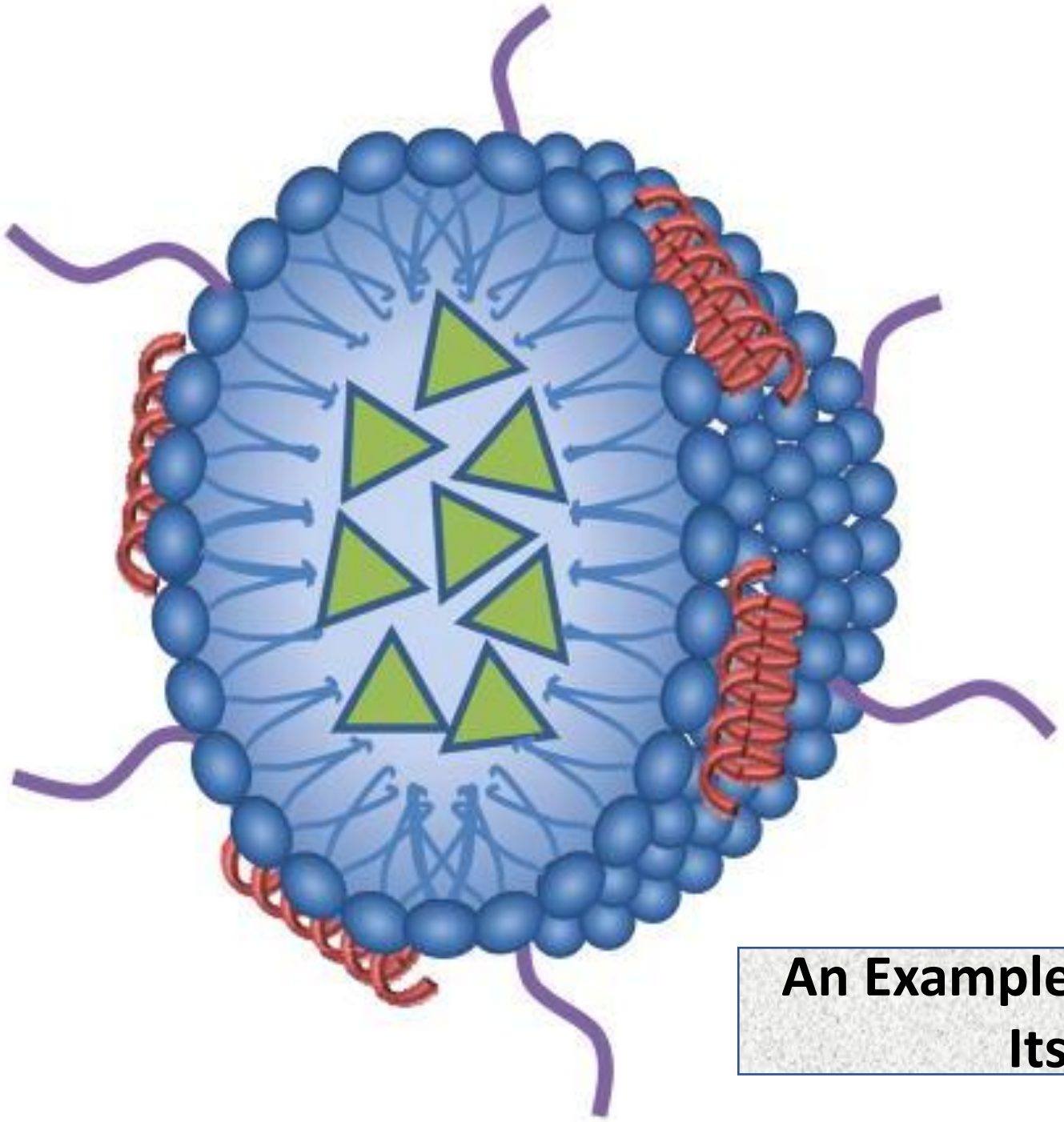

Low K
Fetuin-A Out of Range
APOE Status/miRNA
Insulin/Glucose
Exogenous Chemistry : Smoking/Statins/ Warfarin/Calcium/ Phosphorus
Autoimmune Issues
Hormones
LDL/HDL Surface Chemistry/Geometry
Amino Acids
Low C
Invasive "critters"
Low D/CoQ10
Free T3 Out of Range
Low Magnesium
Trace Metals
Diet/Bad Fats
Mechanical
Gut Bacteria
This is not to be confused with Puff
PATIENT



Hydrophobic cargo

Hydrophilic cargo

Apolipoprotein/mimetic peptides

Phospholipid/Polymer

An Example of a Lipid & What is Hanging Off of it
Its kinda-sorta-likea-porcupine

At the biophysiological level - - - the following appears to happen "Readers Digest Version"

The foam cell or macrophage or VSMC or the like gives off a warning chemical such as TNF-a and the like

These "fire alarm" chemicals are basically the body's version of "hey there is a problem here and I need help **NOW**" aka inflammation

Here is the internal fire department sans the Dalmatians:

First, is there is sufficient D in the system?

Second, are the LDL, VLDL, and HDL are properly coated with the appropriate K & E & Q-10 in sufficient amounts?

Third, did the Fetuin-A show up in sufficient amounts but not too much or too little?

Fourth, the Free T3, is it in the proper range - - - not too much or not too little?

Fifth, is there is sufficient Magnesium in the system?
(it "sloshes around in the serum")

Sixth, the APOE genotype does not express the "4" allele ?

Seventh, are the organic based antioxidants at the right level and available?

Eighth, is the calcium in the proper range - - - not too much or not too little?

The apparent sequence or "race to put out the fire":

ABCA-1/ABCG-1 is activated or up-regulated by FreeT3 (3.5 to 5.0)

"D" riding on its carrier protein shows up due to the activation of ABCA-1/ABCG-1

the "D" in turn up-regulates the dp-ucMGP on the Macrophage/Foam Cell surface

Beta-HDL shows up with MK-7 attached and the MK-7 then carboxylates the MGP

Carboxylated MGP then allows for the HDL to start sucking out the lipids
from the lipid core (reverse cholesterol transport) with help from CoQ-10 & miRNA

Carboxylated MGP then allows for Fetuin-A to go in and remove the Calcium from the area of the VSMC. Fetuin-A now carrying the Ca, has two options to deal with the Ca. The first is dropping off the Calcium onto the bone or going back to the liver to be reprocessed (it has a half life of between 1 and 2 days - - similar to HDL).

Carboxylated MGP then allows for VLDL and LDL to go in and "kill" the Foam Cell/Macrophages Via K-1/MK-(x) - - -following the "cancer model" - - - autoschizis - - - - possibly "D/C" are also involved

Magnesium then basically goes along for the ride "loosening up" the Calcium associated with the hydroxyapatite
Thus allowing for serum Calcium efflux

Eventually, the "dead" VSMCs and the other cellular trash are reabsorbed over time.

One hitch is your APOE status and the associated clearance rates of the VLDL, HDL, and LDL etc.

Vitamin K, the Omni Vitamin - - - - “a bio-chemical passion play”

Vitamin K and Triage Theory

- Nature ensures that at suboptimal supply, vitamins and minerals are primarily used for functions required for short-term survival. The best example is the RDA for K-1 and that is only for clotting. Also of note if one does not have enough K-1 but MK-7 is present, the MK-7 is substituted.
- K is not stored in any appreciable amount.
- Preferential distribution of phylloquinone et al to the liver is consistent with the triage theory proposed by McCann and Ames.
- Because carboxylation of the most essential Gla proteins is localized in the liver and that of the less essential Gla proteins in the extrahepatic tissues, a transport system has evolved ensuring preferential targeting to the liver to preserve coagulation when dietary vitamin K is inadequate. Only at hepatic vitamin K sufficiency, particularly the long-chain menaquinones, are transported to extra-hepatic tissues. **17 K dependent proteins that are known.**
- This is why the first signs of vitamin K insufficiency are seen as incomplete carboxylation of extra-hepatic Gla proteins. McCann and Ames concluded that long-term micronutrient insufficiencies are a risk factor for the development of a wide variety of age-related diseases, such as osteoporosis, cardiovascular disease (CVD), and cancer which are the result in part due to the incomplete or non-carboxylation of extra-hepatic Gla proteins aka Matrix Gla Proteins (MGP)
- **Note:** you cannot ever be fully Carboxylated
- The liver recycles “K” and has two pathways to do it, one could term it proactive sparing
- “MKs” in the intestine and liver appear to be made from other “anti-oxidants” aka precursors
- VK3 is remanufactured in the gut to other “Ks” **(lots of alternative pathways)**

Now, lets “drill down” in this “bio-chemical passion play”

Starting first with Vitamin K and its isoforms
K-1: Phylloquinone
MK(x): Menaquinone (4 to 14)

A. Cannot take too much but you have to take enough

B. When taking a combination of both K’s, lipid values will change dramatically and then stabilize as LDL will increase then stabilize and HDL will increase and then stabilize even on a statin

C. They are transported on the delivery trucks of the liver,
namely the VLDL, LDL, & Chylomicrons and Chylomicron ruminants
(note: HDL is the USPS truck of the liver and does double duty - - pickup and delivery)

D. K-1 deficiency is implicated in Alzheimer’s and K-1 is carried on LDL (G. Ferland)

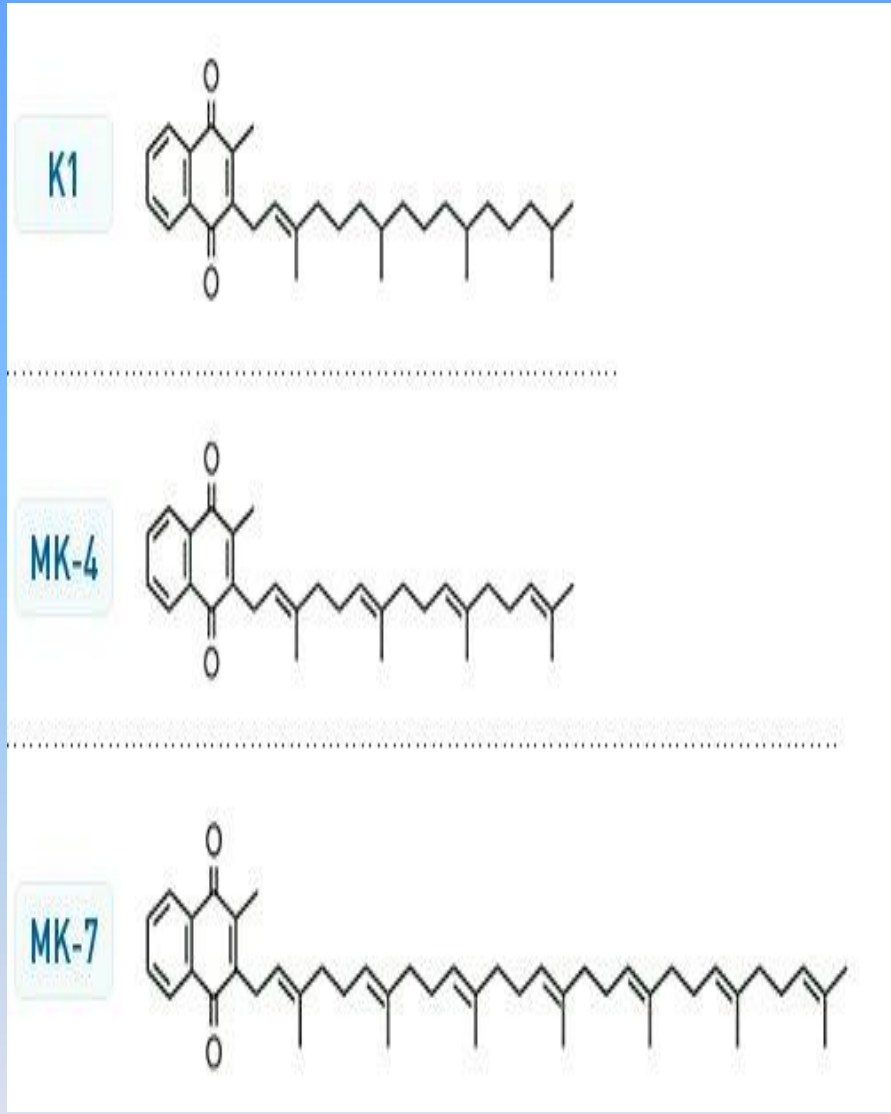
E. There are 17 vitamin k dependent proteins identified that without K
they basically “don’t work”. Which is not good. Read as shortens life incrementally

F. MK’s in all their forms carboxylate K dependent proteins. Which is good.

G. MKs range from MK-4 to MK-14 (made or liberated in liver and/or gut and/or diet)

H. Triage Physiology is how the body operates with not just “K”

I. K-vitamins.com is the clearing house for peer reviewed literature by subject associated with K and its isoforms



The "bio-chemical passion play" Continued:

I. The Liver appears to make A in ratio to D and K so keep your Beta-Carotene up

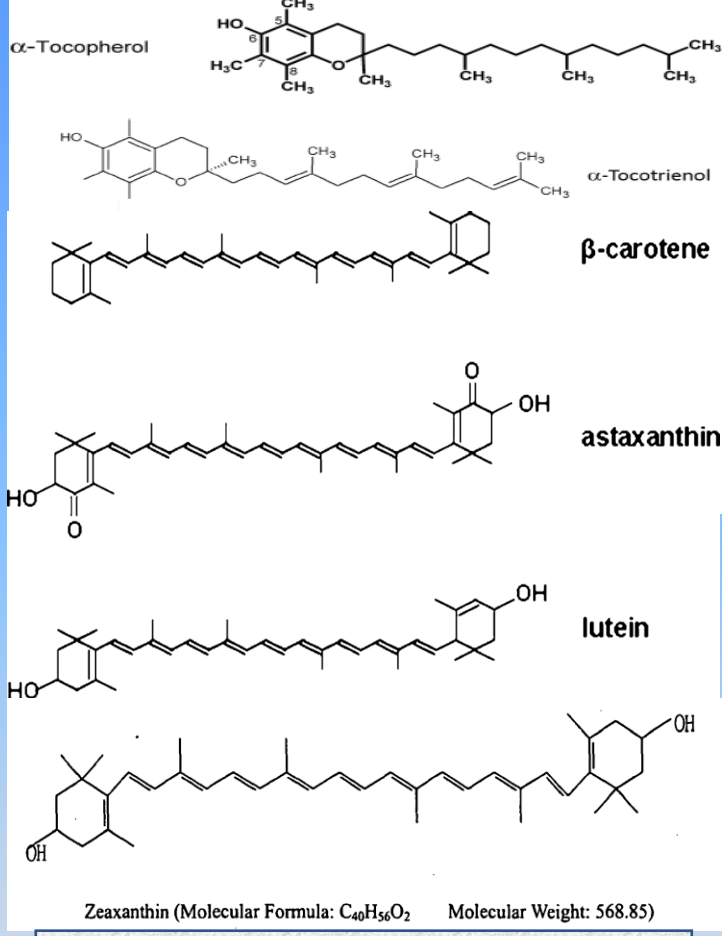
II. MK-7 Impacts Pulse Wave Velocity positively over time so make sure you have sufficient MK-7

III. Abnormalities in the *MGP* gene have been linked with **Keutel syndrome** a rare condition characterized by abnormal calcium deposition in cartilage, peripheral stenosis of the pulmonary artery. **Pseudoxanthoma elasticum** (PXE) is also "part of this genetic opportunity". PXE is a genetic disease that causes fragmentation and mineralization of elastic fibers in the skin and eyes due to reduced MGP and Fetuin-A

IV. Mice that lack *MGP* develop to term but die within two months as a result of arterial calcification which leads to blood-vessel rupture.

V. The isoprene units or phytyl units are hydrophobic thus stick onto or into the lipoprotein

VI. Autoschizis: is a term derived from Greek meaning "self","to split". Autoschizis can be initiated via in vivo treatment with vitamin C (VC), synthetic vitamin K (VK3) or, better, a combination of both. The process that appears to what "kills" Macrophages &/or Foam Cells.



What do these look like?
"K" Pre-cursors for starters

VII. Both phylloquinone and MKs may activate the steroid and xenobiotic receptor (SXR). SXR is a nuclear receptor involved in the transcriptional regulation of enzymes such as cytochrome P450 (in particular the CYP3A4 isoform). SXR and its murine ortholog, pregnane X receptor (PXR), are nuclear receptors that are expressed at high levels in the liver and the intestine.