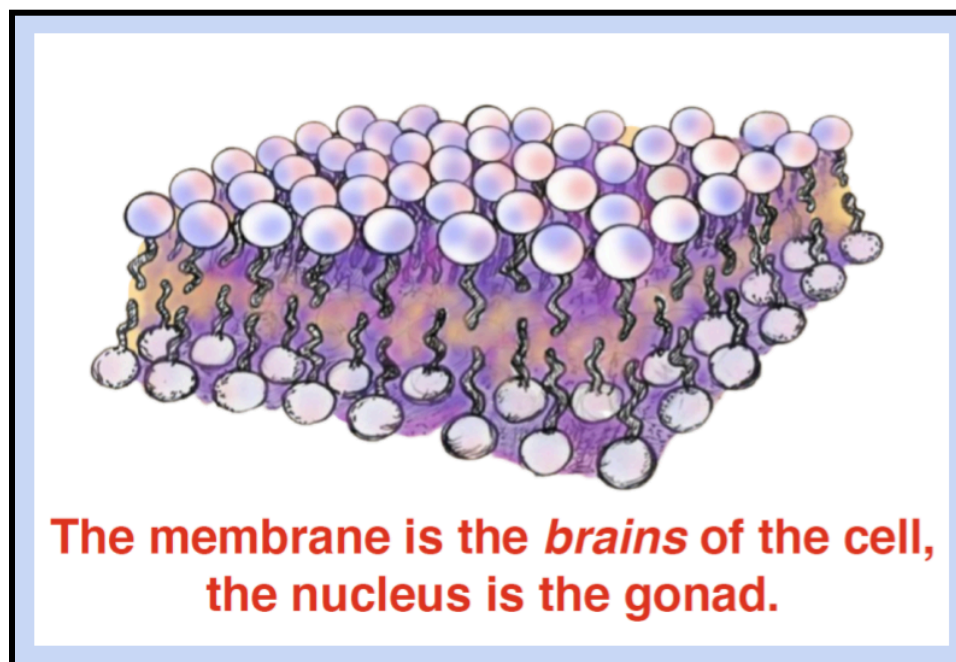
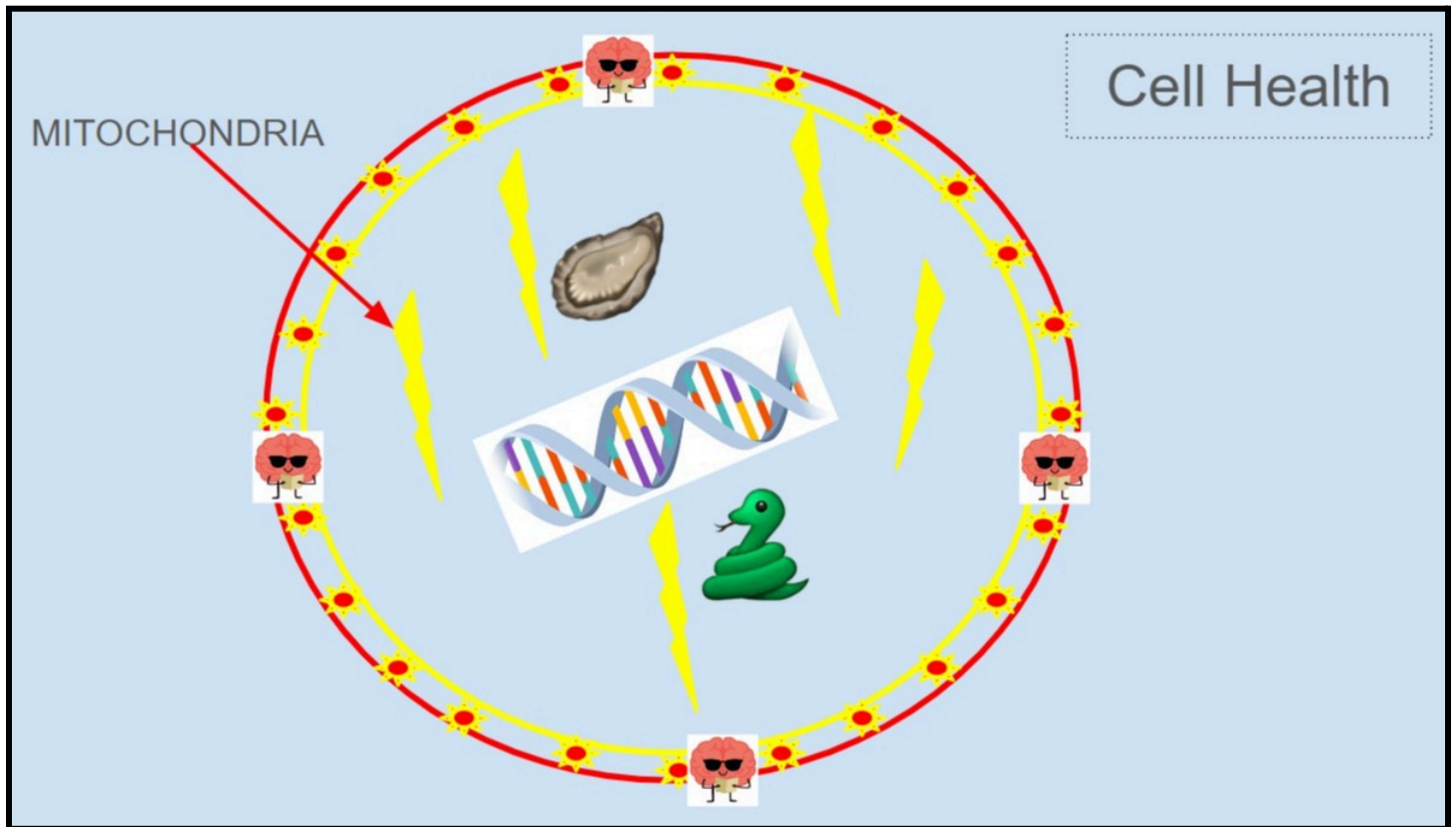


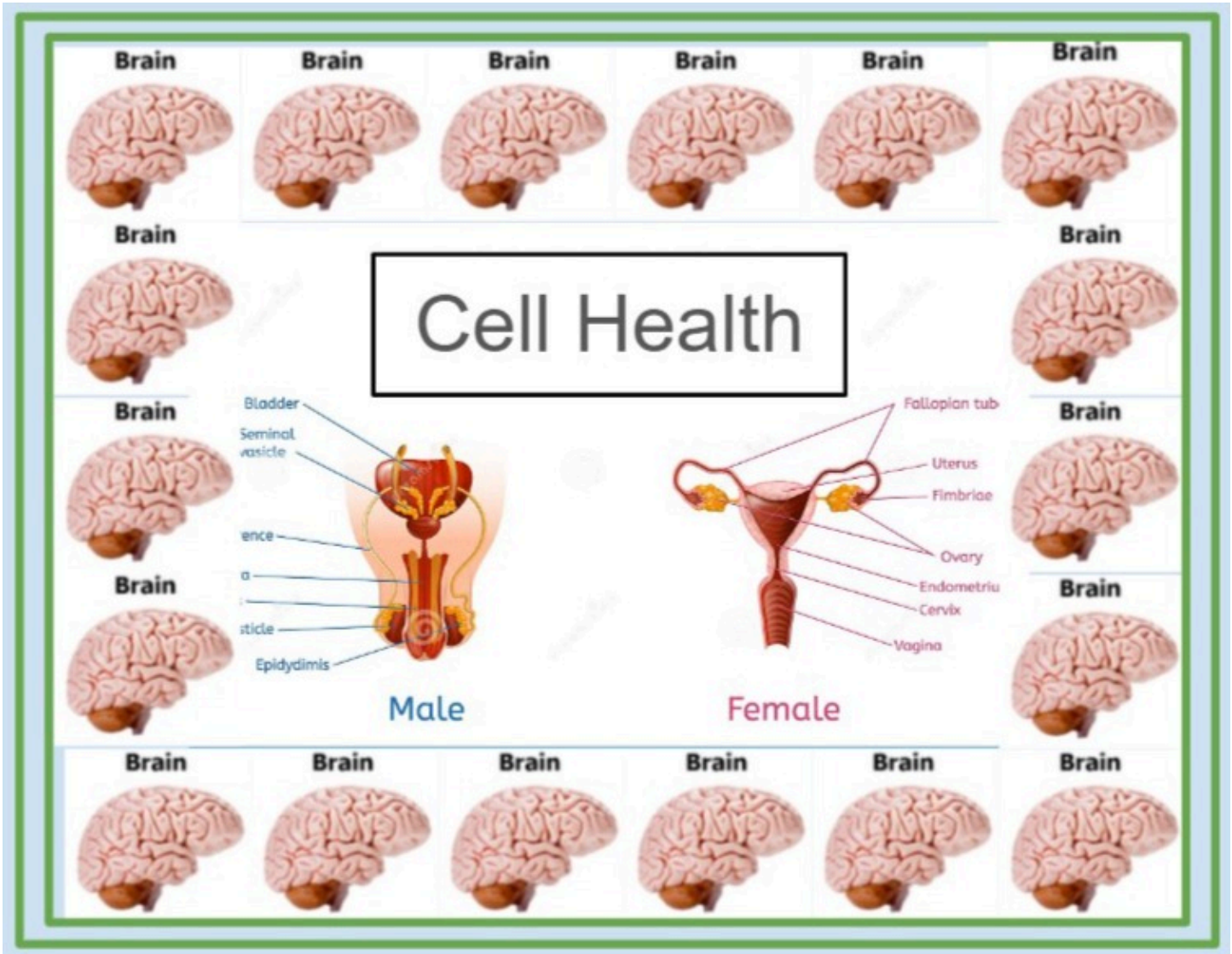
# Mitochondria Health - The Keys to Life, Energy, and Higher Consciousness?

[Carbon 60 – Supercharge your Mitochondria](#)

[Mitochondria RCP PDF link](#)

[Copper and Aging via Telomeres RCP slides](#)



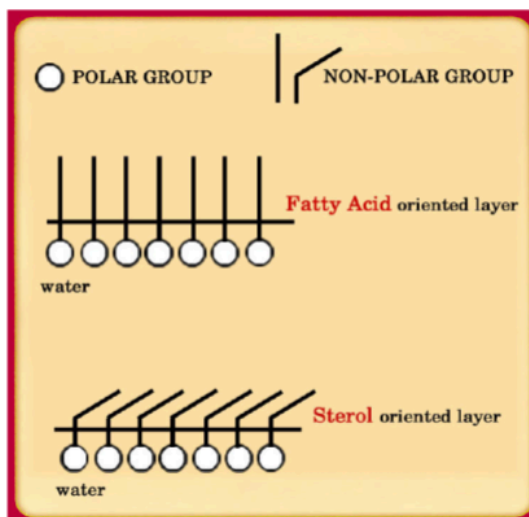


## MEMBRANE PERMEABILITY

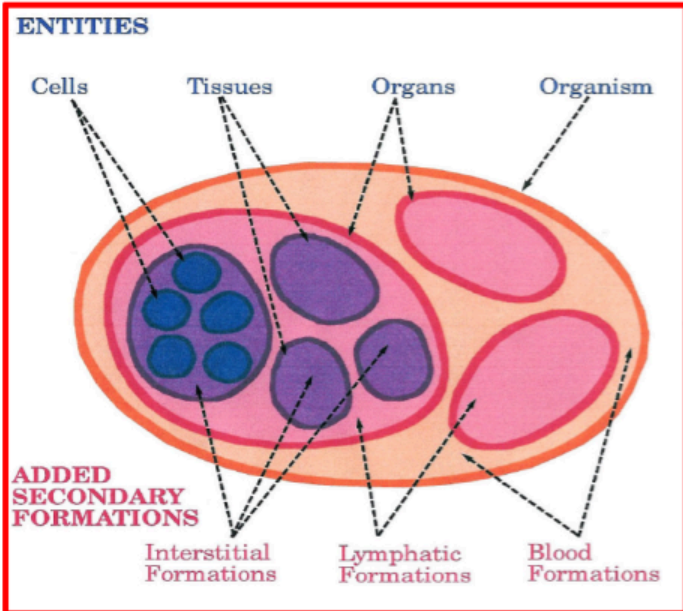
Fatty acids increase the permeability of semi-permeable membranes.

Sterols (cholesterol) decrease the permeability of semi-permeable membranes.

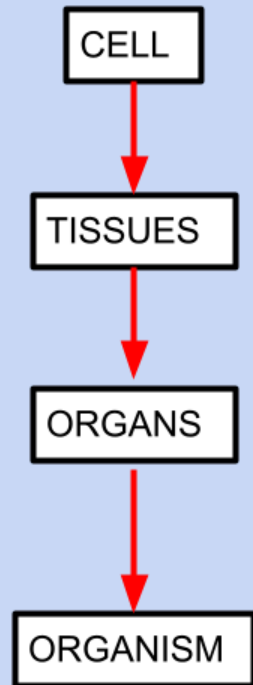
*Alterations in the fatty acid to sterol ratio in membranes decreases the charge on the membrane and hence membrane function!*



# Hierarchical Organization



Emanuel Revici, MD *Research in Physiopathology as Basis of Guided Chemotherapy* pg 20



Choices that promote:

## CATABOLISM

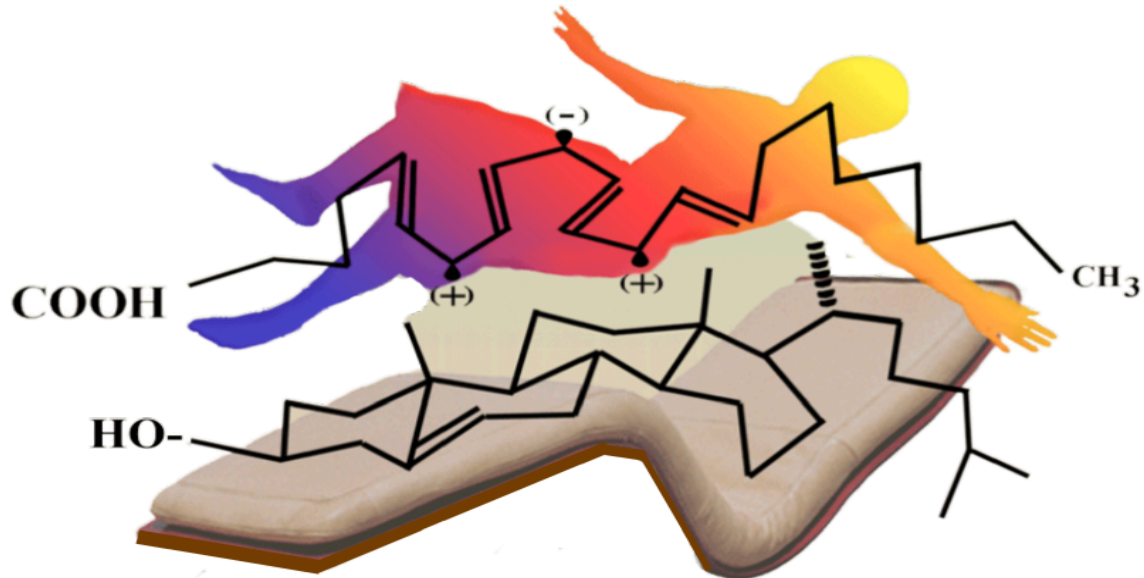
CARBOHYDRATES  
 CALCIUM & MAGNESIUM  
 FATTY ACIDS  
 PUFAs  
 EXCESS CAFFEINE  
 EXCESS ALCOHOL  
 SUN EXPOSURE (radiation)  
 COLD  
 NO OR EXCESS  
 ACTIVITY / EXERCISE  
 STRESS  
 OUT-BREATH

## ANABOLISM

PROTEINS  
 SALT  
 CHOLESTEROL  
 SATURATED FATS  
 MODERATE CAFFEINE  
 MODERATE ALCOHOL  
 HOT BATH, SAUNA  
 HEAT  
 WEIGHT LIFTING, MODERATE  
 AEROBIC EXERCISE  
 REST  
 IN-BREATH

# STEARIC COUPLING

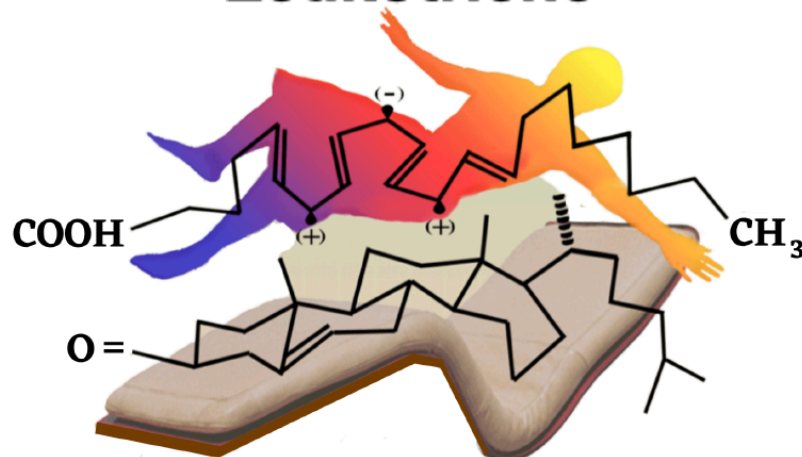
## Arachidonic Acid



## TISSUE Cholesterol

# Cortisol - ANTI-FATTY ACID

## Leukotriene



## Cortisol

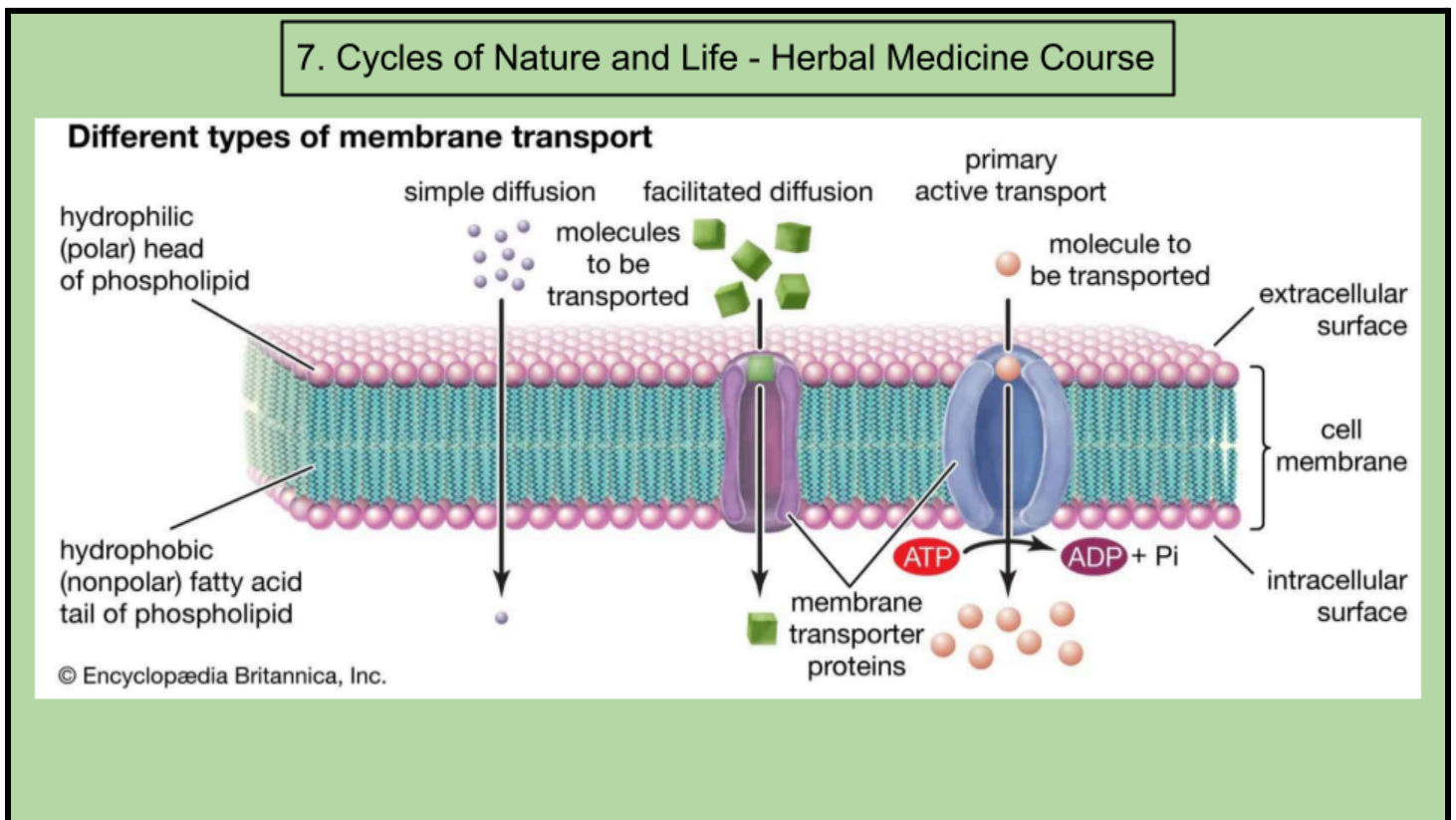
# Cells Are Mini - Me's and SMART!

[CDR - Cell Danger Response link](#)

Smart cells = smart immune system = smart person

Cell membranes mirrored in Gut lining and Blood Brain barrier?

**Bernard Jensen, "Phosphorus goes where our attention goes."**



**Phosphorus is the light bearer element**

[George Wiseman Brown's Gas link](#)

[Health Alkemy Compilation on Brown's Gas](#)

# Low level light therapy and cell health

Michael Gaeta

There are three types of light, in general, that are used therapeutically. We have the blue, which is the most superficial, and this is used for skin treatment, facial rejuvenation, acne, things like that. Then the red penetrates a little deeper, 6-8 millimeters, into the subcutaneous tissue through the skin, and this is sort of the general wellness mode so to speak, mode 2. Mode 1 is blue-dominant; mode 2 is red-dominant, and that is sort of general health wellness, healthy aging. And then, mode 3 is the most penetrating, which is infrared-dominant. It's interesting, all three modes provide all three types of light

So whatever mode dominant you are in, blue-dominant will still have red and infrared, just a lot less, and then the red-dominant will have the other two and so forth. So, you're getting all three all the time.

Now, how does this work? What is it doing at a cellular level? There's a couple of things. **The main mechanism of action is that there are chromophores in your cell membranes and in your mitochondria. These chromophores absorb the photons. When chromophores absorb photons, a few things happen. One thing is the mitochondria produce more ATP, so you actually have more cellular energy production.**

This is like metabolic improvement and this is the main thing they found with the astronauts that the mitochondria basically shut down. **Today, with autism and neurodegenerative disorders, cardiometabolic disorders and metabolic disorders, insulin resistance and diabetes, and Alzheimer's, we see mitochondrial dysfunction, so we are improving mitochondrial action with the supplementation and herbal therapy and to complement that, we use the light therapy.**

You get more ATP. This is like a law and this is what happens when you get this wavelength exposure, **you get more ATP**. It's not a theory. It's like a fact that if you do this, you get cause and effect. If you expose the membrane to the mitochondria to the light therapy, you get more ATP – it's just a law and it's just what happens.

**You also get more endothelial nitric oxide, which is amazing because you get that nutritionally with Betafood (beets).** Betafood supports nitric oxide production in

the endothelium, which causes the blood vessels to dilate, so **you get better circulation, better energy production at mitochondrial level and a better functioning mitochondria.** If you've been, like me, reading about mitochondrial dysfunction, the functional medicine thinking is that this is like a meta disease, mitochondrial disease, underlying so much of individual diseases we see, like cancer and heart disease and diabetes, all of that.

**So you get more ATP, more nitric oxide, more RNA, so you get more genetic machinery working, and you get more collagen synthesis, which is 25% of the body protein, the primary connective tissue protein.** It's the basis of our structural health, this collagen. The skin and the blood vessels are supported by collagen. All the tissues in the body from the bones to the blood vessels are supported by collagen, so this makes all of the structure of the body stronger and more resilient. And then you get that cellular nutrient uptake.

So light therapy is really safe, and our supplements – we use the best supplements in the world already and the cells take in that nutrition better with the light therapy. They also modulate cytokines, which can have an anti-inflammatory effect if there is cytokine-dominant inflammation.

**[LINK TO HOW HUMANS HARVEST SUNLIGHT](#)**

# Mitochondrial Health and Minerals (with a caveat!)



## Introduction to Health Class 8

Plants, Foods, Herbs, Supplements, Nutraceutical, Drugs Continuum

**“Vitamins and minerals are not functionally separable. They make each other work. Example: vitamin D is necessary for the body to absorb calcium. Copper is necessary for vitamin C activity. And so on. Mineral deficiencies can cause vitamin deficiencies, and vice versa. Epidemic mineral deficiency in America is a well-documented result of systematic soil depletion.**

**So that is the other prime difference between whole food vitamins and synthetics: whole food vitamins contain within them many essential trace minerals necessary for their synergistic operation. Synthetic vitamins contain no trace minerals, relying on, and depleting, the body's own mineral reserves. “**

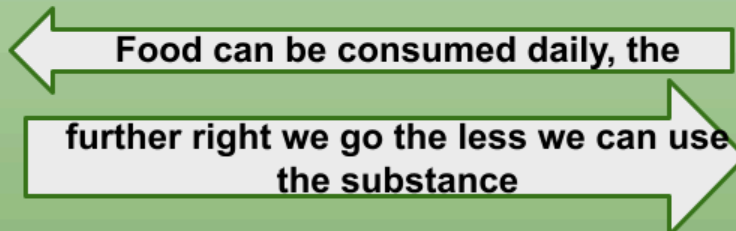


## Introduction to Health Class 8

Plants, Foods, Herbs, Supplements, Nutraceutical, Drugs Continuum



San Pedro, a psychoactive cactus.



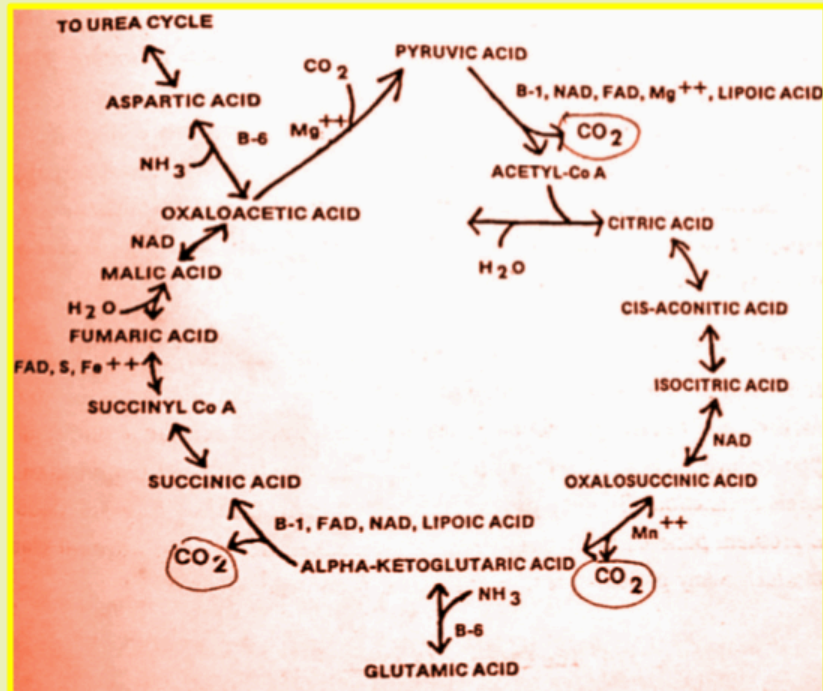
## Personal Alkemy - Micro - Level (cell) Nutrition



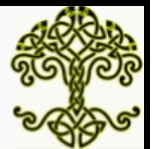
The Citric Acid or  
Kreb's Cycle

MOST IMPORTANT  
RATE LIMITING  
NUTRIENTS FOR THE  
CAC:

Thiamin B1  
Riboflavin B2  
Niacin B3  
Pantothenic Acid B5  
Lipoic Acid  
Manganese  
B factors  
G factors



## Personal Alkemy - Micro - Level (cell) Nutrition

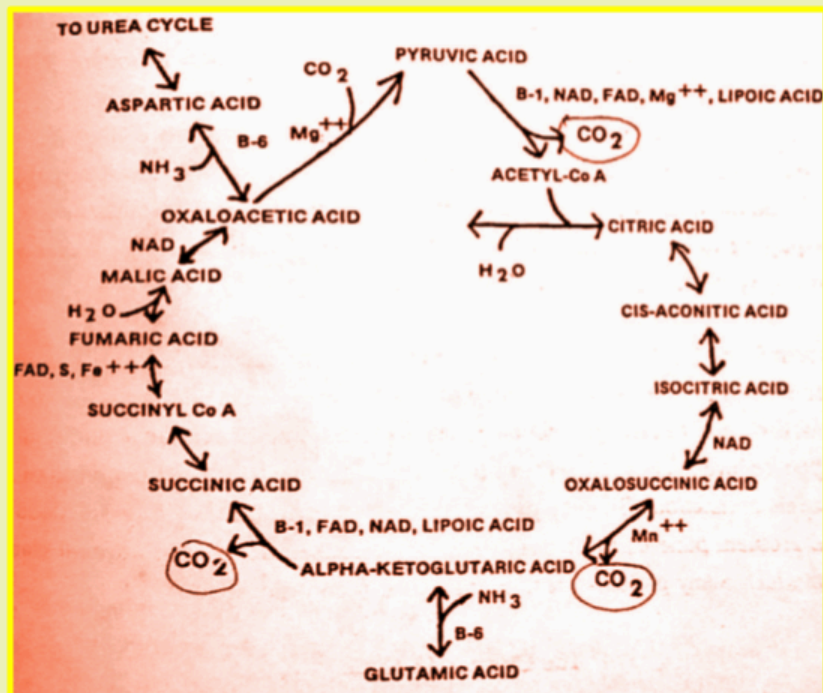


The Citric Acid or  
Kreb's Cycle

CAC Factors of  
lesser importance:

Biotin  
+++Magnesium+++  
Iron  
Sulfur  
Phosphorus  
+++Copper +++

+++ = especially  
important in RBC  
metabolism



# Personal Alkemy - Micro - Level (cell) Nutrition



## The Citric Acid or Kreb's Cycle

### CAC Factors: CO2 Metabolism

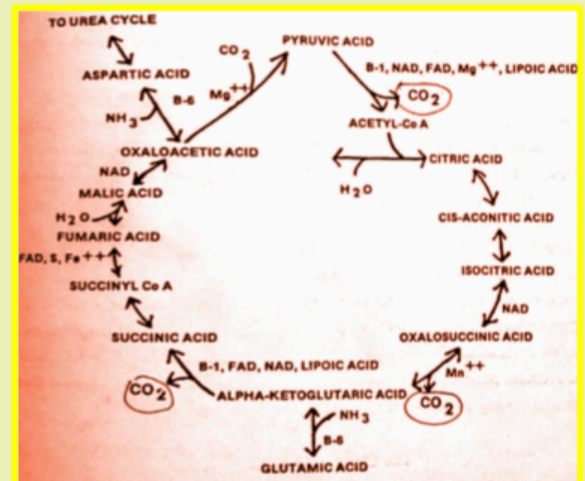
#### A major source of CO2 for the body

CO2 is essential to combine with Ammonia for the Urea Cycle.

Breathe 8-10 breaths into a paper bag and if you tested weak via AK, or Muscle Testing and improve then you might need B6 or your CAC not working properly or you cannot recycle CO2 well.

Or hold breath out 0 if cannot do for minimum 29-25 seconds you cannot recycle CO2 well

Hold breath in minimum is about 40-55 seconds then your CO2 and internal systems need some examination



How do the Macro Nutritional elements fit into cell health?

Hydrogen? - hydrates

Carbon?

Oxygen? - see following pages, [AND THIS LINK](#)

Nitrogen - DNA and structure, Ammonia/Urea

Sulfur?

Cell Membrane Dynamics? Sodium <> Potassium?

Cell Dynamics of Calcium <> Magnesium?

Cell Dynamics of Copper <> Zinc? Iron?



The  
“Organizing  
Paradigm” of  
the RCP...

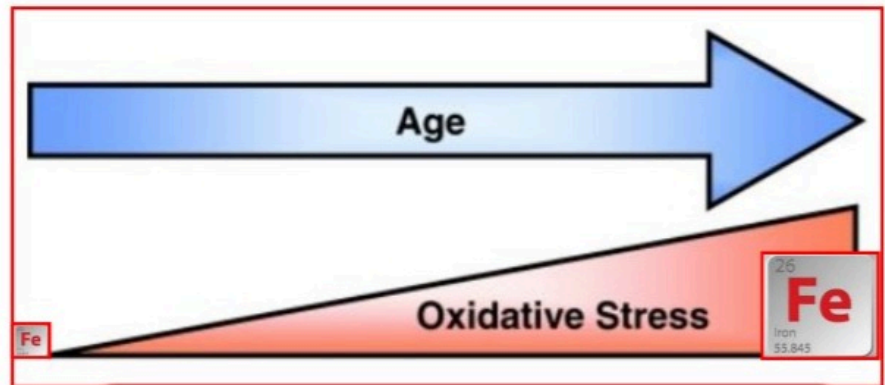
- Iron CARRIES Oxygen, but ONLY Copper HARNESSSES Oxygen (O<sub>2</sub>)...
- When Copper <> Iron get dysregulated, Oxygen can no longer be “metabolized” properly – *the very ORIGIN of Oxidative Stress...*
- Neurotransmitters, Catecholamines, Glucocorticoids, & Steroid Hormones are all “messengers” that the body is under “Stress!”
- Rising & Unchecked Oxidative Stress CAUSES Enzymes to STOP working...

=> **SYMPTOMS!**

*“Life is the interplay between structure and energy, yet the role of **energy deficiency** in human disease has been poorly explored by modern medicine.”*

*-- Douglas C. Wallace, PhD (2005)  
Geneticist at U of Penn; CHOP  
Pioneering Expert on Mitochondrial DNA*

*Aging is a  
lifelong losing  
battle with  
oxygen*



Harman, D, 1956-Apr, "Aging: A Theory Based on Free Radicals & Radiation Chemistry" Jrl Gerontol 11: 298-300

Harman, D, 1972-Apr, "The Biologic Clock: The Mitochondria?" Jrl Am Geriatrics Society 20(4): 145-147

Beckman KB & Ames BN, 1998-Apr, "The Free Radical Theory of Aging Matures" Physiol Reviews 78(2): 548-581

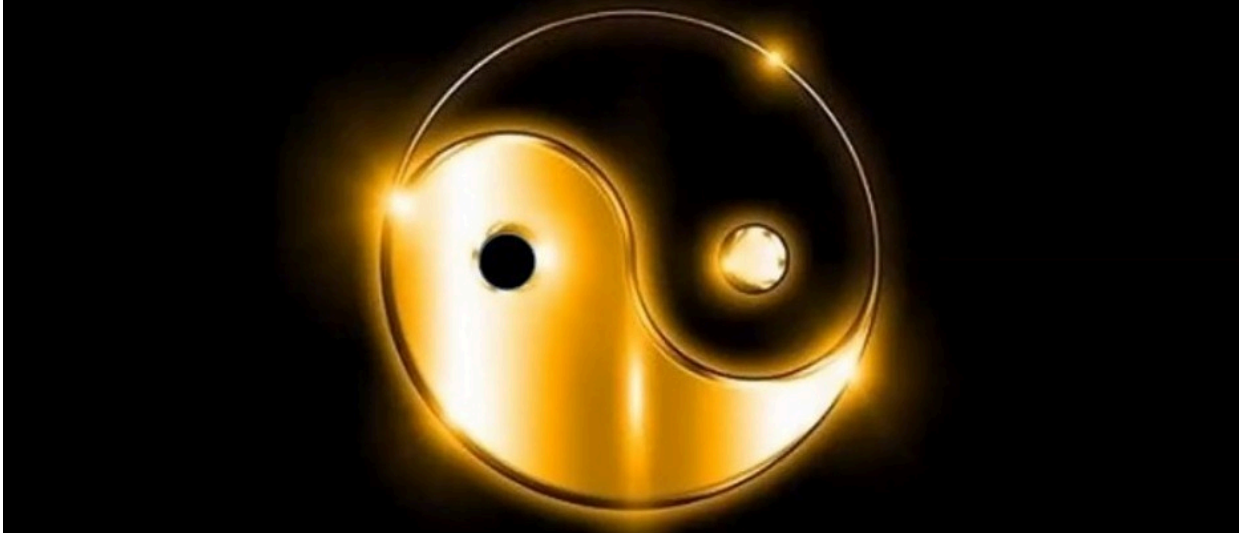
Harman, D, 2006-May, "Free Radical Theory Based of Aging: An Update" Annals NY AcadSci 1067(1): 1354

**Can't live  
without  
oxygen...**

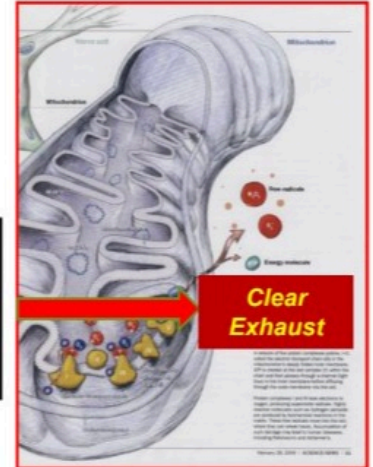
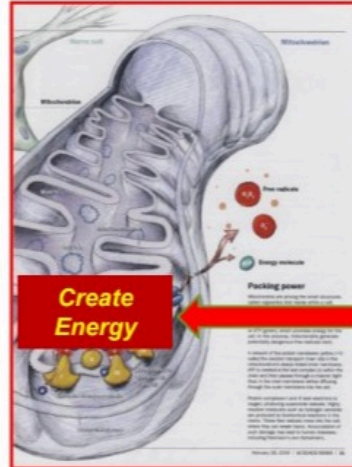


**Can't age  
without  
oxidants...**

*The TRUE relationship of Copper with Iron*



Priorities of our salvation  
—  
Fate of O<sub>2</sub>

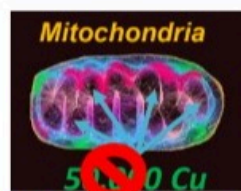


90%

90%

Agents to DEplete Copper

- Loss of Animal Fertilizers
- Refining of Food
- Use of NPK
- "Einkorn" >> "Modern" Wheat
- Addition of Sugars
- Addition of Iron (9 forms)
- Addition of Synthetic B's
- HFCS/Corn Sugars
- Use of Citric Acid
- Use of Ascorbic Acid
- Use of Glyphosate
- Use of Rx Meds
  - ABX
  - BCP
  - HRT
  - NSAIDS
  - Pain Meds
  - Anesthesia
  - Anxiolytics
  - Others...



(Cobine et al, 2004; 2006)

RBCs	"0"
Avg Cell	~100
Liver Cell	1-2,000
Heart Cell	~5,000
Egg Cell	600,000
SN Cell	2,000,000

KEY Functions of Mitochondria

- Produce Energy
  - Glycolysis vs ETC
- Regulate Cell Cycle
  - Signal via ROS
  - Signal for Apoptosis
- Regulate Differentiation vs Proliferation
- Iron (Fe<sup>++</sup>) REcycling & Homeostasis
  - Heme Synthesis
  - [Fe-S] Assembly
- Ca<sup>++</sup> Homeostasis
- Urea Homeostasis
- Thermogenesis
- Coordination with
  - Lysosome
  - Endo Reticulum
  - Inflammasome
- Amino Acid Pathway
- Antioxidant Pathway

Terminal Destination for Oxygen & Iron: Mitochondria!

# [A mitochondrial paradigm of metabolic and degenerative diseases, aging, and cancer: a dawn for evolutionary medicine](#)

Douglas C Wallace <sup>1</sup>

## **Abstract**

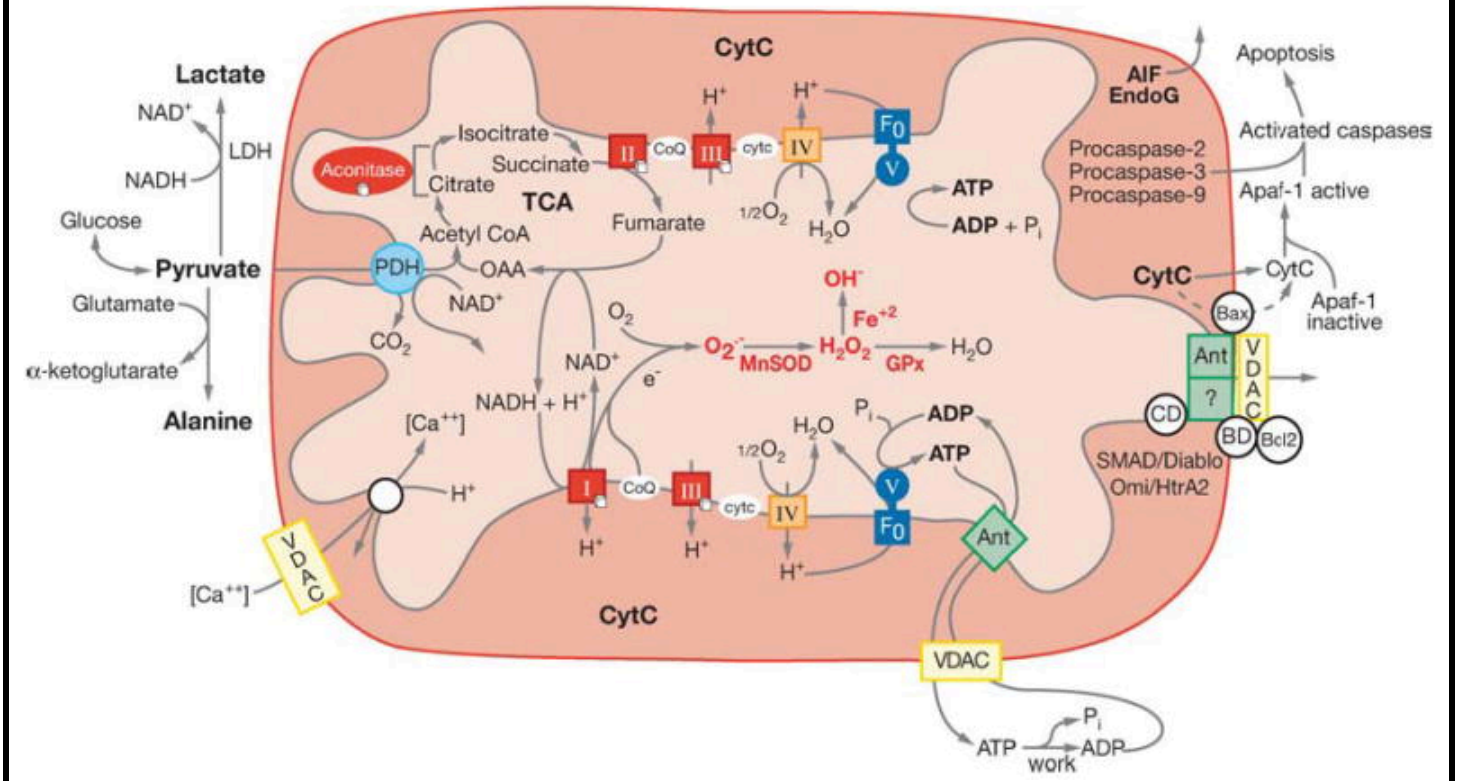
Life is the interplay between structure and energy, yet the role of energy deficiency in human disease has been poorly explored by modern medicine. Since the mitochondria use oxidative phosphorylation (OXPHOS) to convert dietary calories into usable energy, generating reactive oxygen species (ROS) as a toxic by-product, I hypothesize that mitochondrial dysfunction plays a central role in a wide range of age-related disorders and various forms of cancer. Because mitochondrial DNA (mtDNA) is present in thousands of copies per cell and encodes essential genes for energy production, I propose that the delayed-onset and progressive course of the age-related diseases results from the accumulation of somatic mutations in the mtDNAs of post-mitotic tissues. The tissue-specific manifestations of these diseases may result from the varying energetic roles and needs of the different tissues. The variation in the individual and regional predisposition to degenerative diseases and cancer may result from the interaction of modern dietary caloric intake and ancient mitochondrial genetic polymorphisms. Therefore the mitochondria provide a direct link between our environment and our genes and the mtDNA variants that permitted our forebears to energetically adapt to their ancestral homes are influencing our health today.

## Structure + Energy = Life

**Energy:** fats + sugars + oxygen = energy (heat + work) +  $\text{CO}_2$  +  $\text{H}_2\text{O}$

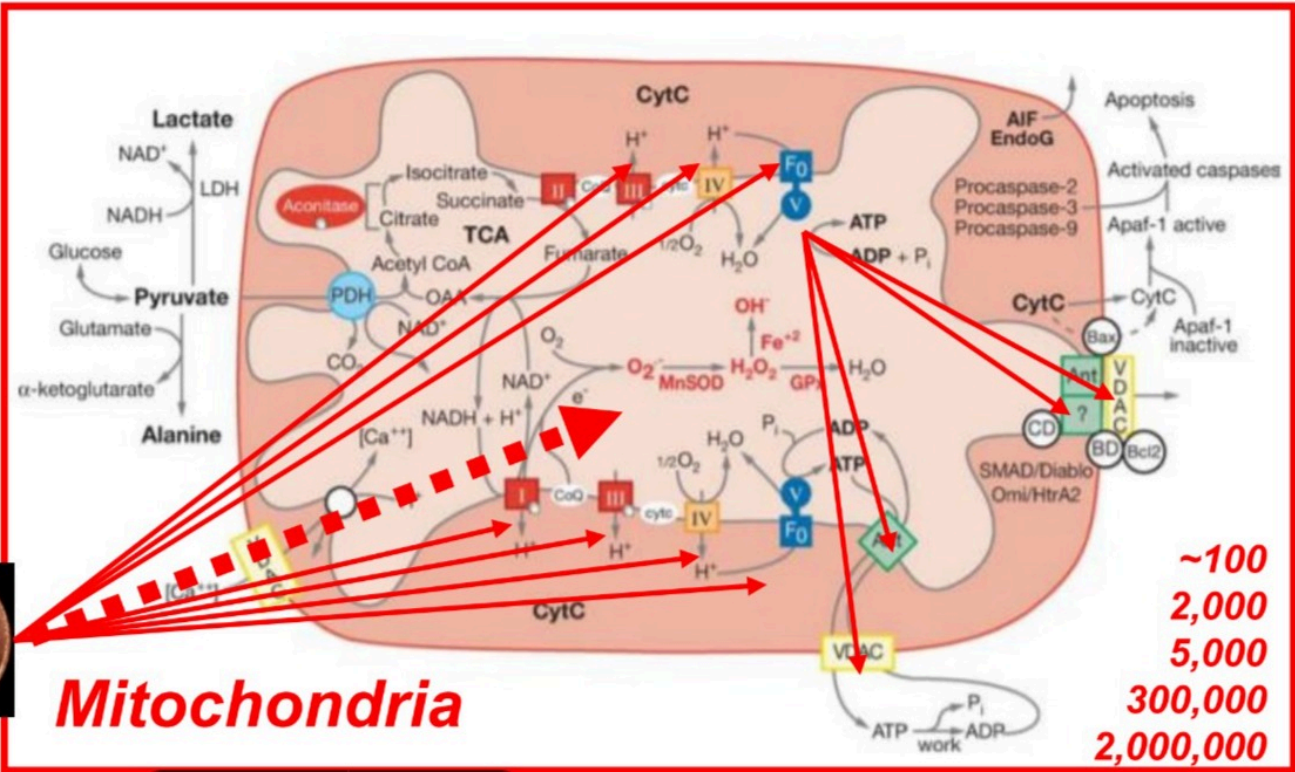
**Reactive oxygen species:** mitochondrial combustion  $\rightarrow$  oxygen radical

**Apoptosis:** energy  $\downarrow$  + ROS  $\uparrow$  = mtPTP activated  $\rightarrow$  cell death (apoptosis)

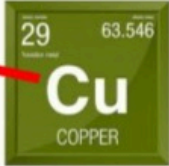
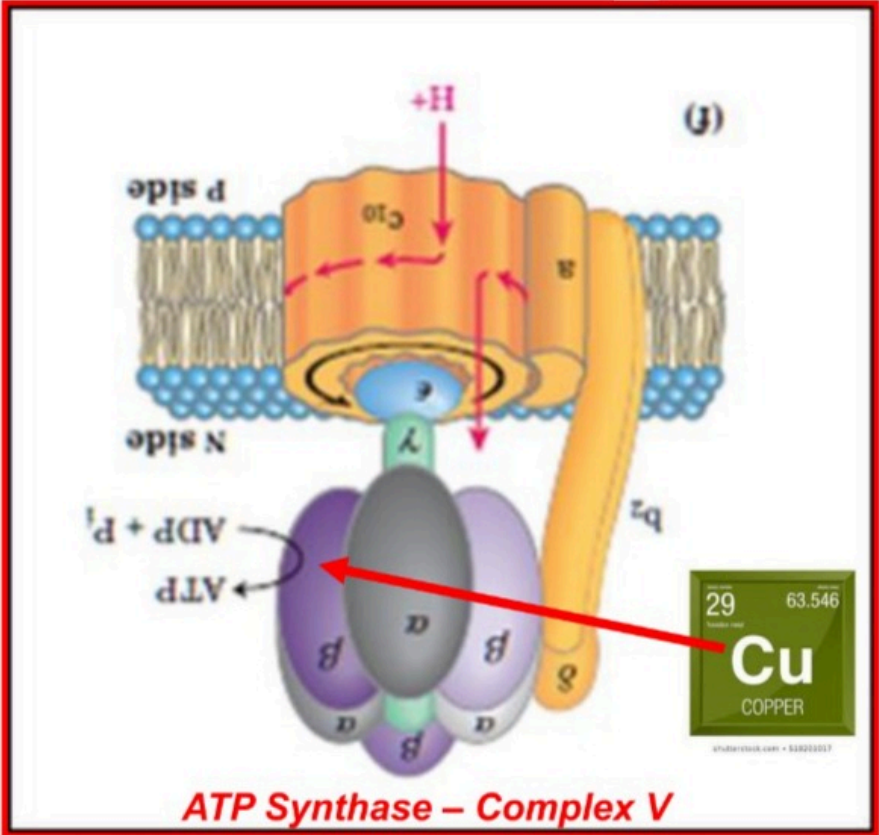


*Complex Truth:  
Copper creates  
energy*

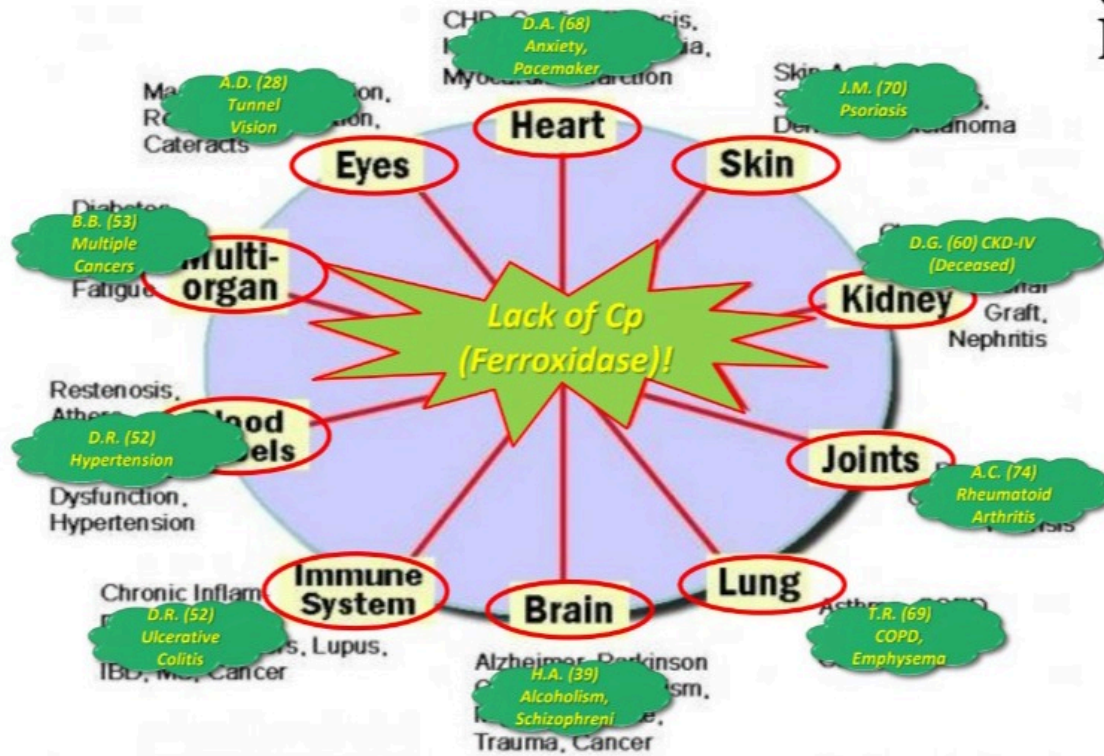
**Structure + Energy = Life**



*Last step of mitochondria is also copper dependent*



Mao S et al, 2000-Sep, "Mitochondrial Transcription Factor A is Increased but Expression of ATP Synthase Beta Subunit... are Decreased in Hearts of Copper Deficient Rats" *Journal of Nutrition* 130(9): 2143-2150

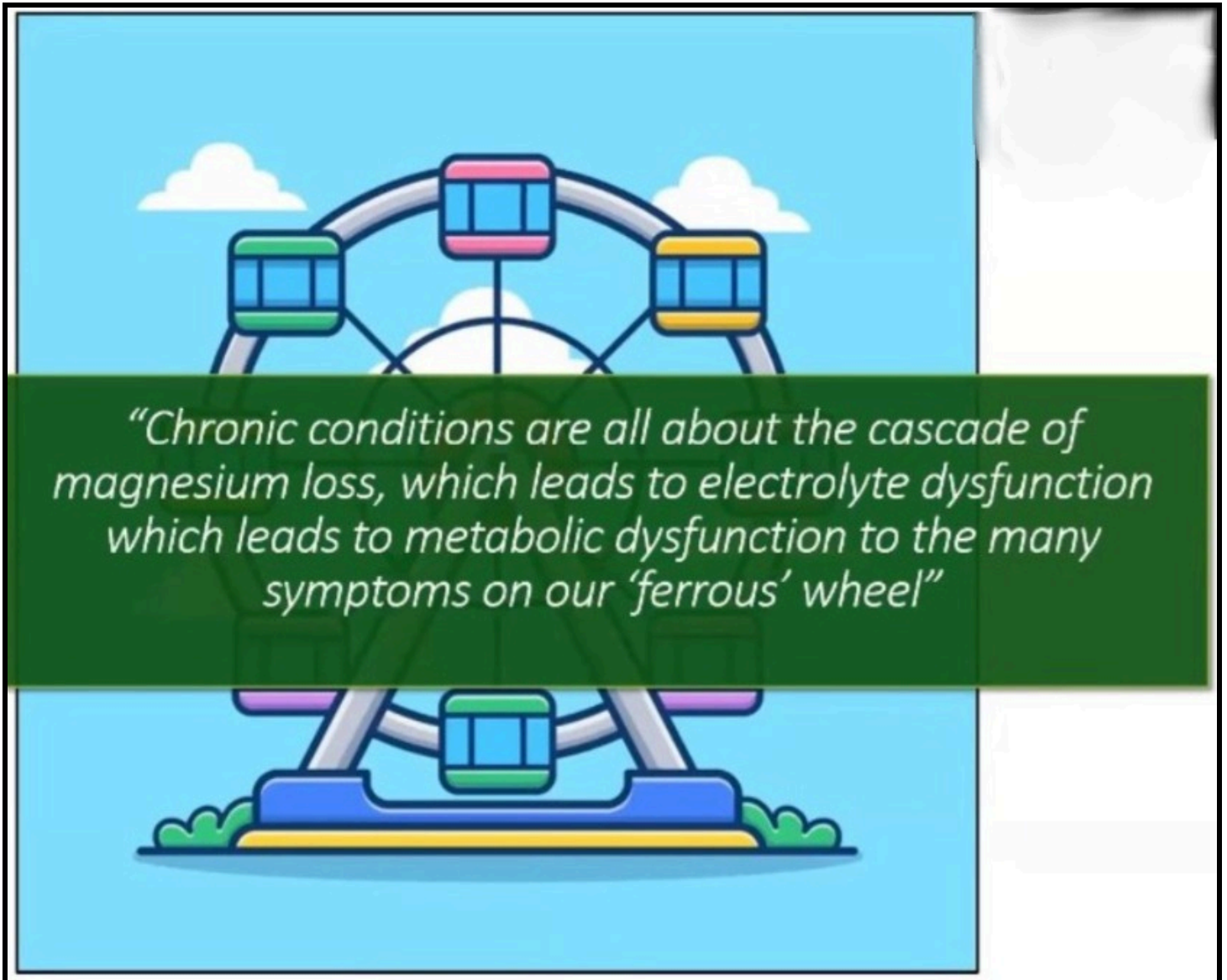


"You don't really believe in the 'Free Radial Theory of Aging,' do you?..."

Altura, BM et al Short term Mg Deficiency Results in Decreased Levels of Serum Sphingomyelin, Lipid Peroxidation and Apoptosis in Cardiovascular Tissues *Am Jrl Phsy Heart Circ Physiol* 2009; 297:H86-H92; Foteinou P et al In Silica Simulation of Corticosteroids Effect on an NFkB-Dep Physiochemical Model of Systemic Inflammation *PLoS One* 4(3):e4706; Weglicki WB et al The Role of Magnesium Deficiency in Cardiovascular & Intestinal Inflammation *Magnesium Research* 2010; 23(4):S199-S206; and 30 Additional Citations on this inflammatory spectrum...

*Understanding the connection between  
STRESS <> mineral loss...*





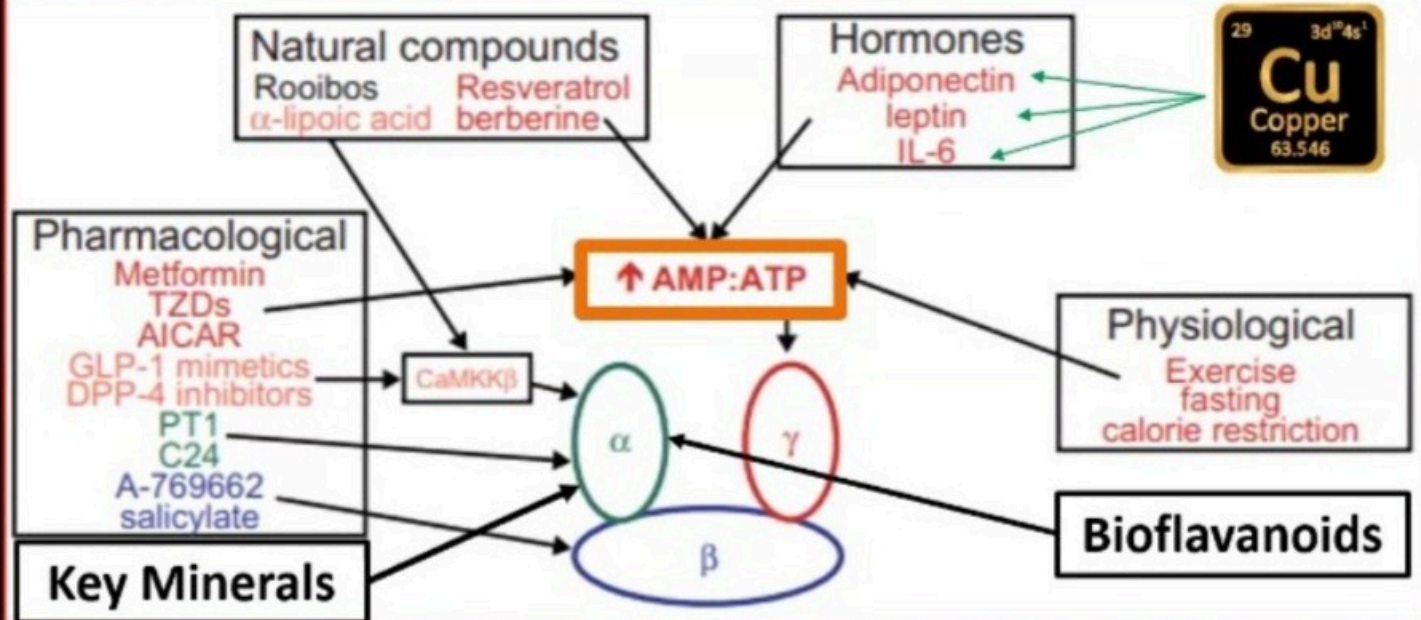
*Building on Dr. Marketa's comments...”*

**The RCP allows the Cells:**

- to “breathe...” (AMPK Pathway)
- to “balance...” (Catabolism vs Anabolism)
- to “bounce back...” (Resilience)

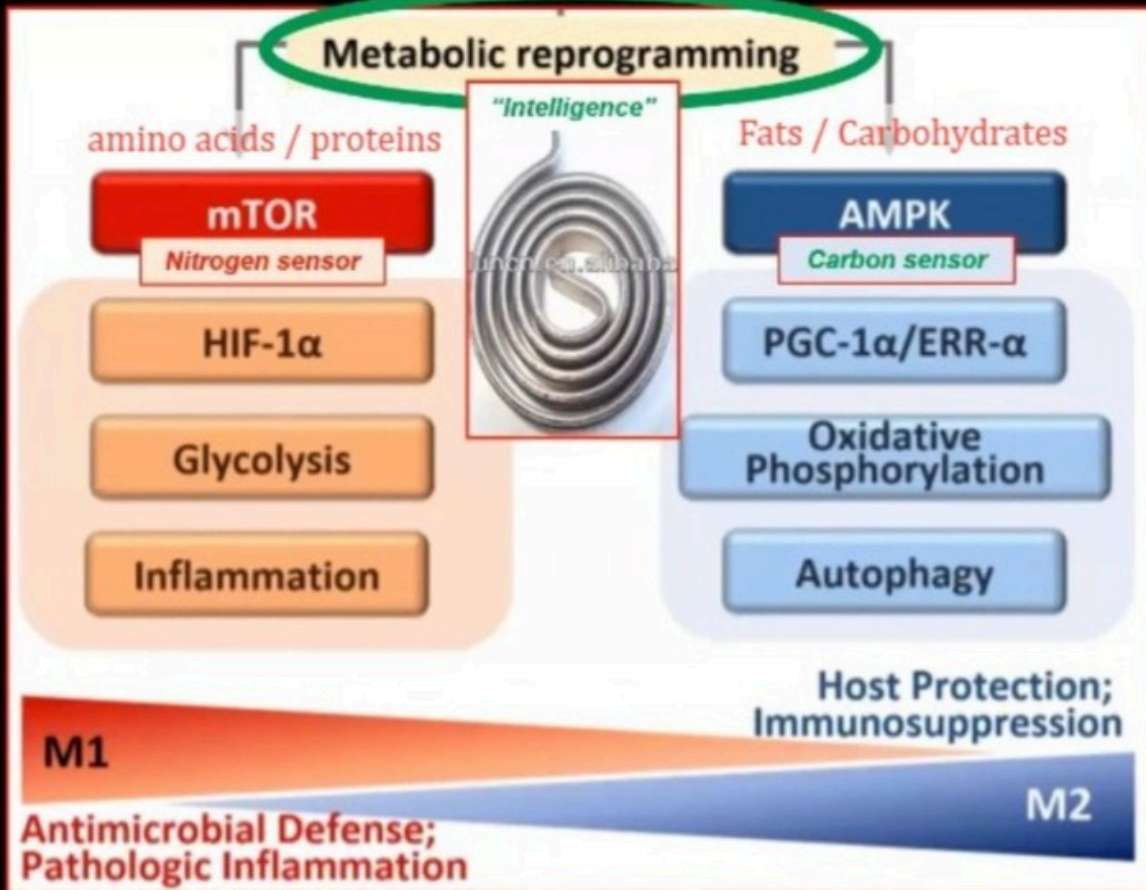
# Activators for AMPK...

balancing sensor of AMP TO ATP (ATP - P = ADP - P = AMP)

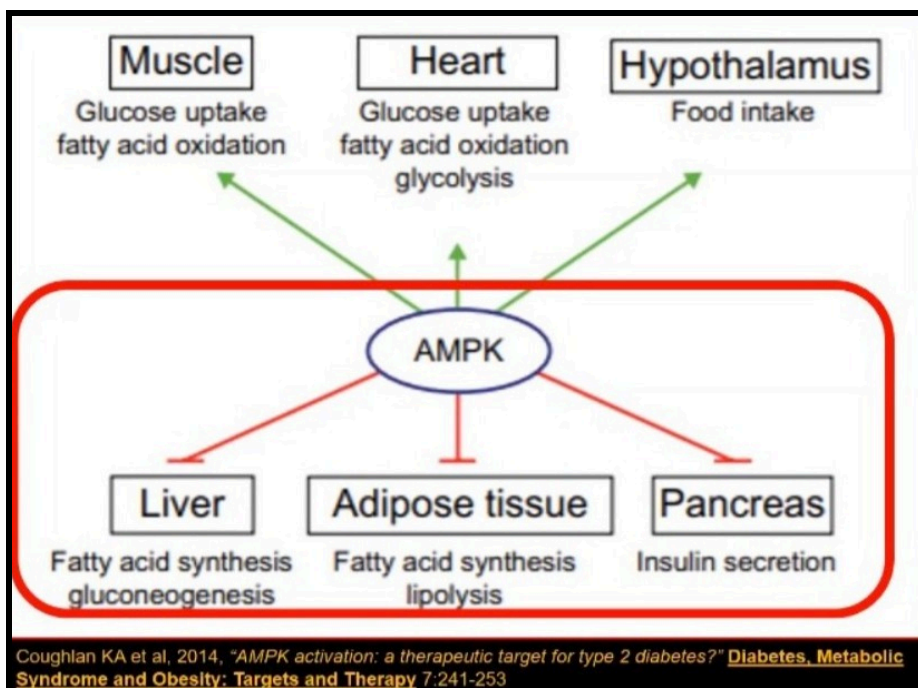


Coughlan KA et al, 2014, "AMPK activation: a therapeutic target for type 2 diabetes?" *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy* 7:241-253

# A MOST important balancing act...



"Although the *mTOR-HIF1α* pathway is essential for initial control of Mtb growth, *excessive induction of inflammation* seems to be harmful to the host. Similarly, the prolonged activation of *AMPK signaling* to drive M2-like macrophages may result in the *immunosuppression* that is detrimental to eradicate intracellular mycobacteria."





Yui et al, 2019

mTOR

AMPK



Shang et al, 2020

The "Simplicity" & the ENORMITY



mTOR

AMPK



# AMPK Regulates “Breathing...”

Review

## AMPK and the Need to Breathe and Feed: What’s the Matter with Oxygen?

A. Mark Evans <sup>1,\*</sup> and D. Grahame Hardie <sup>2</sup>

<sup>1</sup> Centre for Discovery Brain Sciences and Cardiovascular Science, Edinburgh Medical School, Hugh Robson Building, University of Edinburgh, Edinburgh EH8 9XD, UK

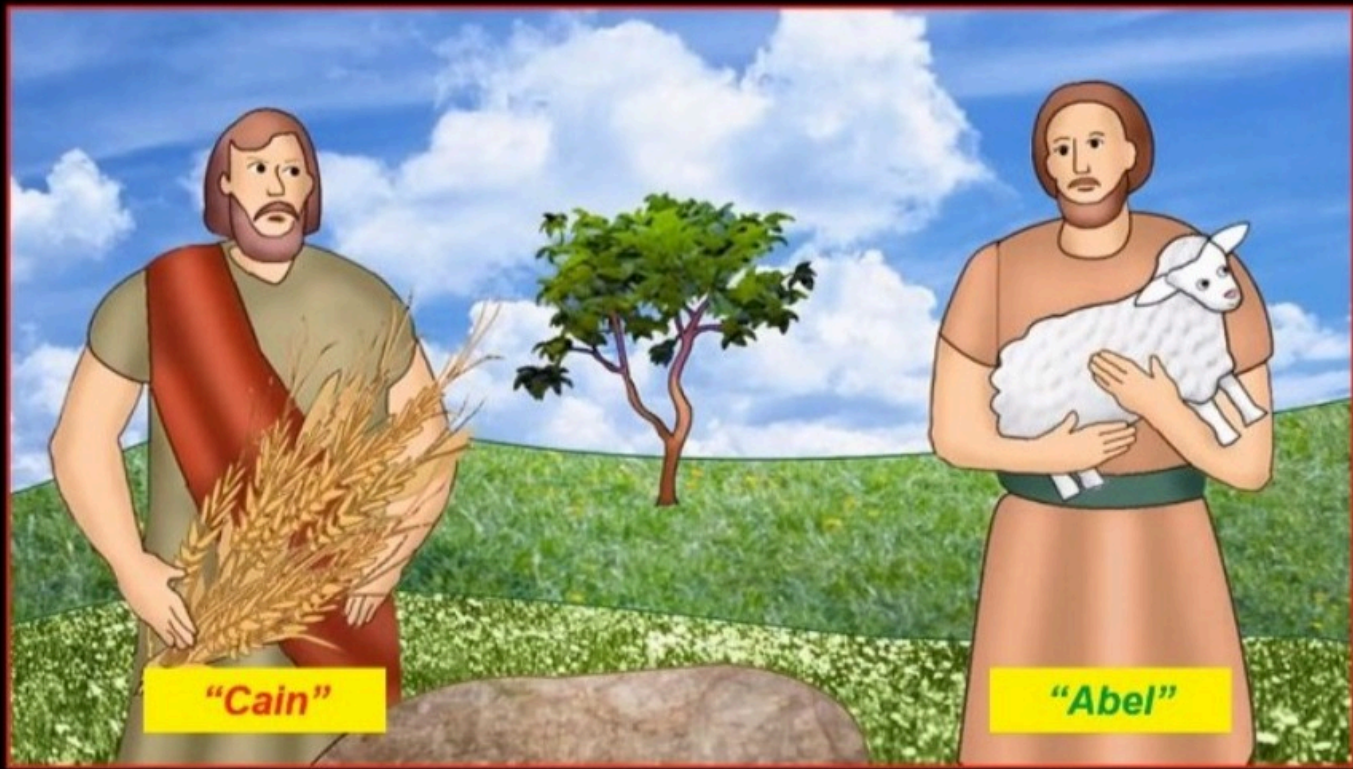
<sup>2</sup> Division of Cell Signalling and Immunology, School of Life Sciences, University of Dundee, Dow Street, Dundee DD1 5EH, UK; d.g.hardie@dundee.ac.uk

\* Correspondence: mark.evans@ed.ac.uk

Received: 8 April 2020; Accepted: 12 May 2020; Published: 15 May 2020



**Abstract:** We live and to do so we must breathe and eat, so are we a combination of what we eat and breathe? Here, we will consider this question, and the role in this respect of the AMP-activated protein kinase (AMPK). Emerging evidence suggests that AMPK facilitates central and peripheral reflexes that coordinate breathing and oxygen supply, and contributes to the central regulation of feeding and food choice. We propose, therefore, that oxygen supply to the body is aligned with not only the quantity we eat, but also nutrient-based diet selection, and that the cell-specific expression pattern of AMPK subunit isoforms is critical to appropriate system alignment in this respect. Currently available



**"Cain"**

- **Fe/Vitamin D**
- **Sugar**
- **Estrogen**
- **Angiotensin**
- **mTORC Pathway**
- **Anabolic (USE ATP)**

**"Abel"**

- **Cu/Vitamin A**
- **FAT**
- **Progesterone**
- **Adiponectin**
- **AMPK Pathway**
- **Catabolic (MAKE ATP)**