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# Cellular Metabolism and Nutrition: A Powerful Model for Self-Healing

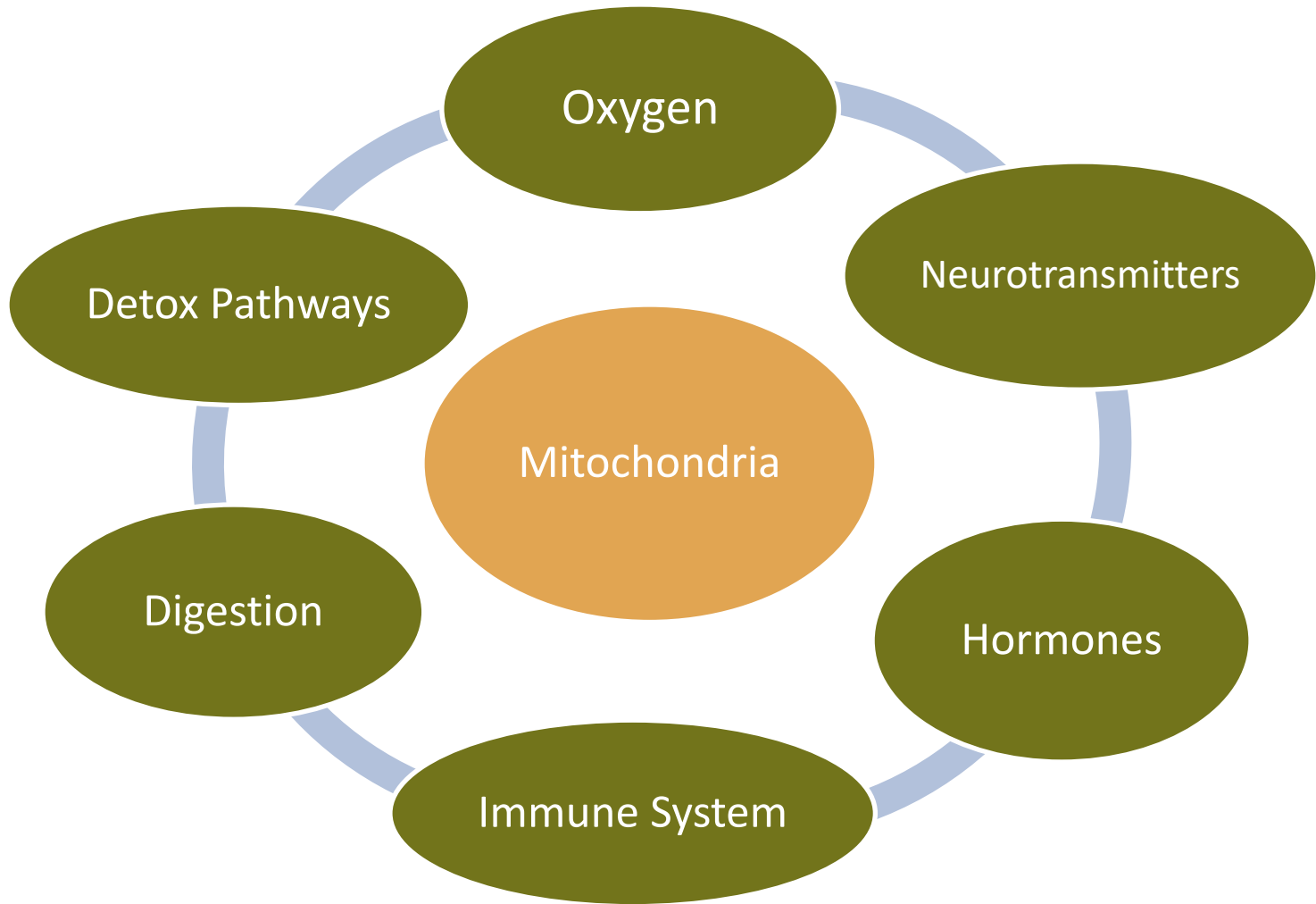
**Dr. Ritamarie Loscalzo**



**Medical Disclaimer:** The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Dr. Ritamarie Loscalzo, [drritamarie.com](http://drritamarie.com), and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional.



# What Affects Energy?



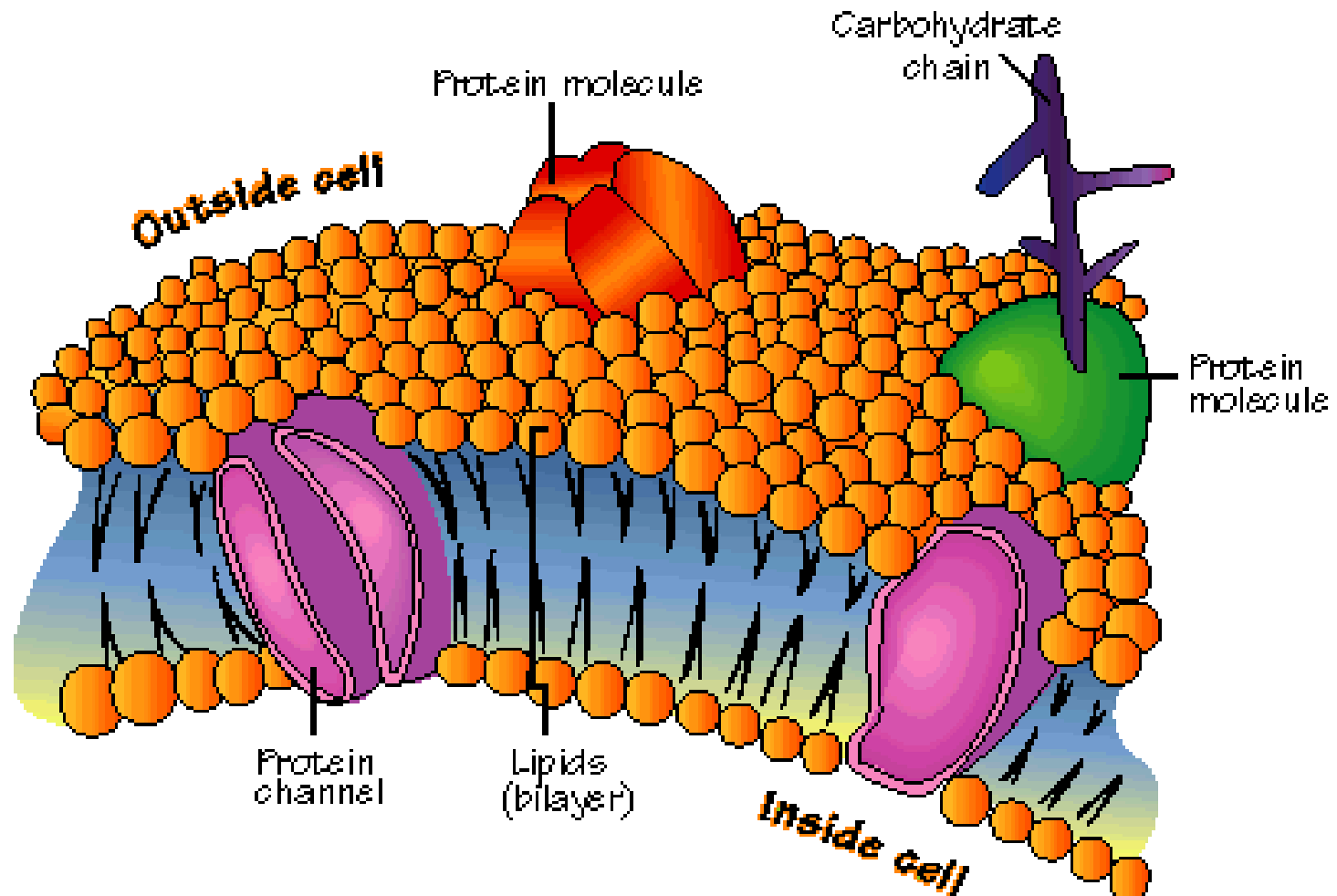
# What Causes Fatigue?

## Imbalances in:

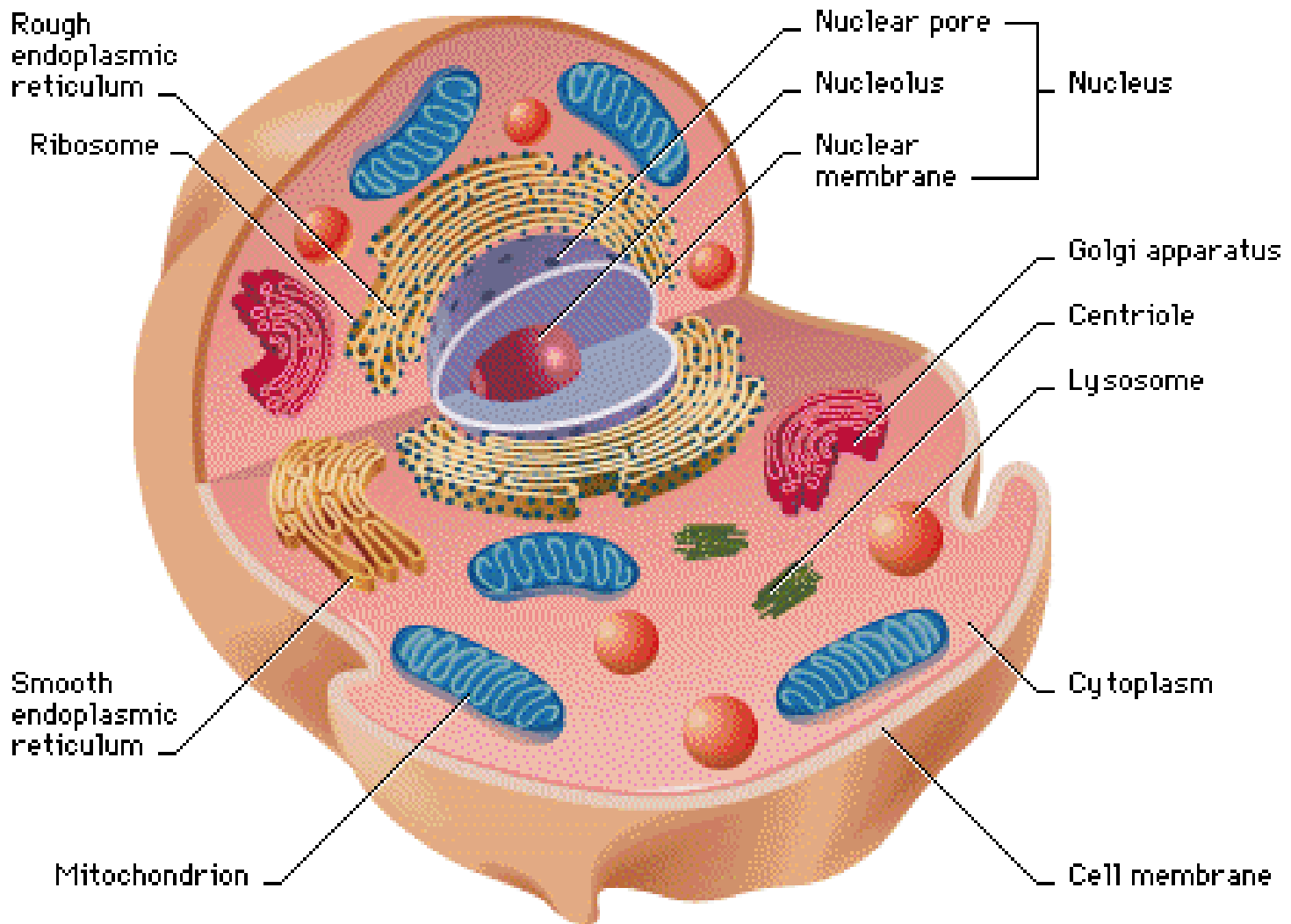
- ✓ Oxygen
- ✓ Neurotransmitters
- ✓ Hormones
- ✓ Mitochondria
- ✓ Immune System
- ✓ Digestion
- ✓ Detox Pathways



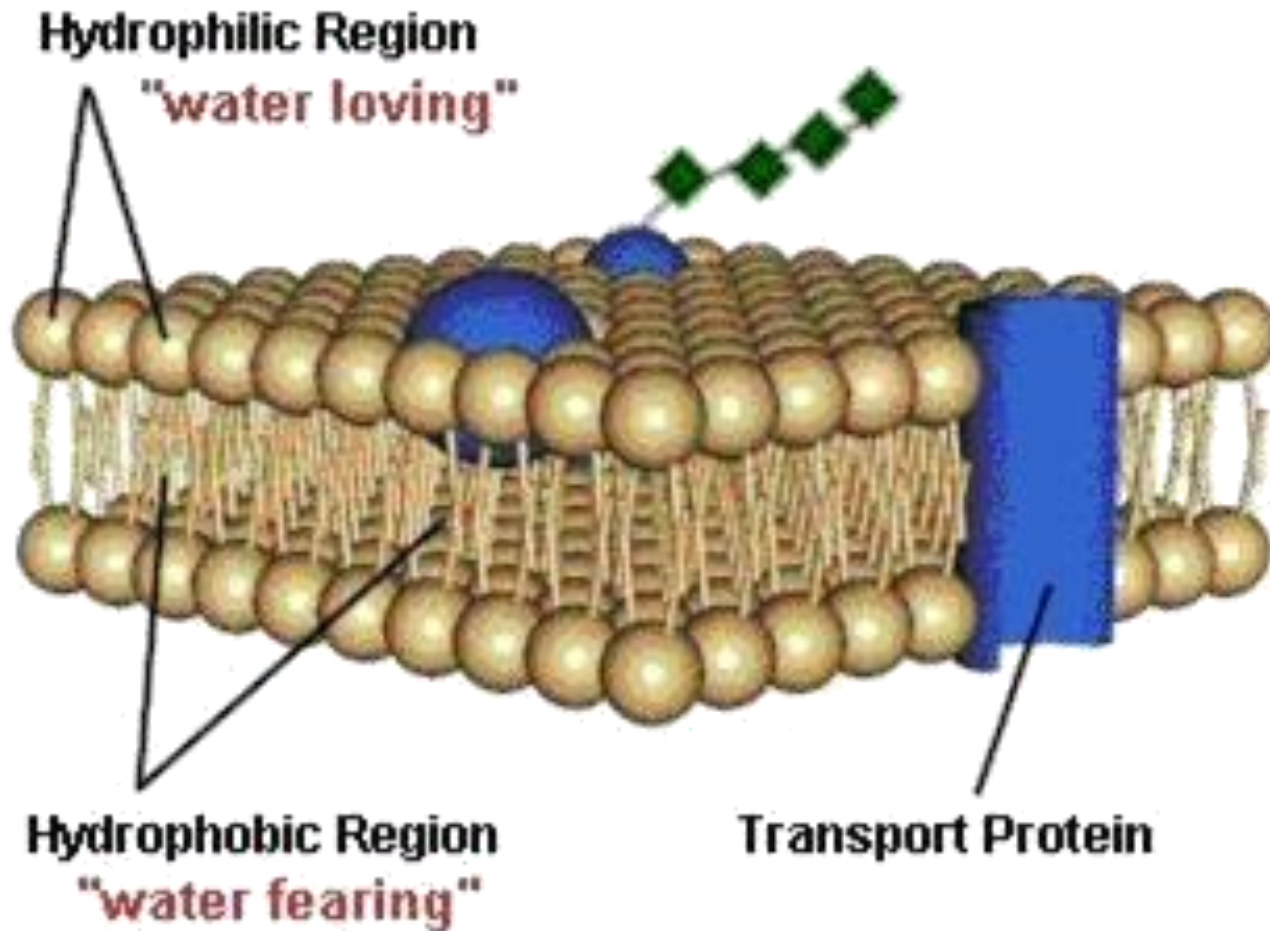
# Cell Wall



# Inside Cells



# Cell Membrane



# Mitochondria: The Power House of The Cells

Sugar and Oxygen



Free Radicals

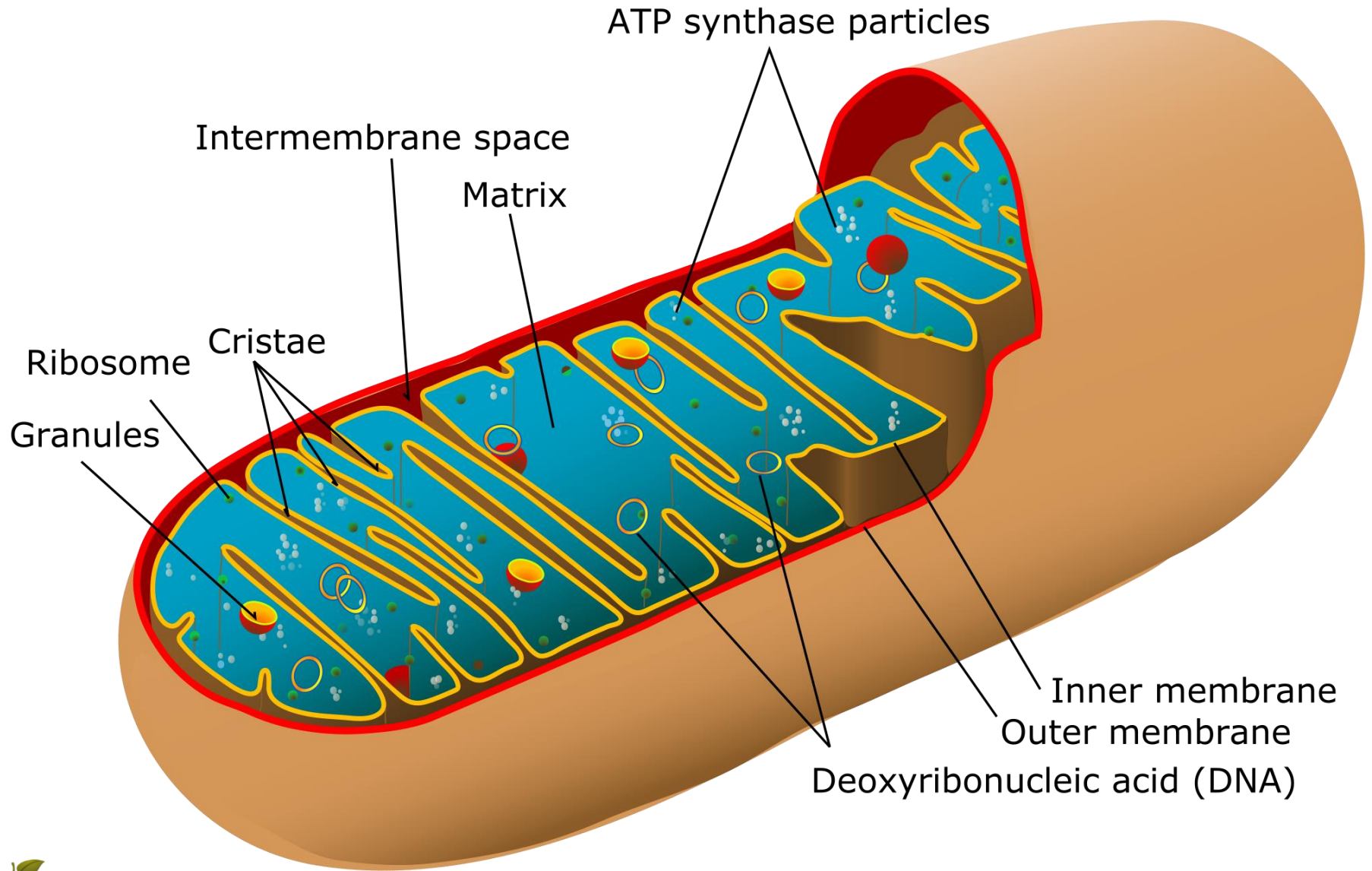


ATP (energy)



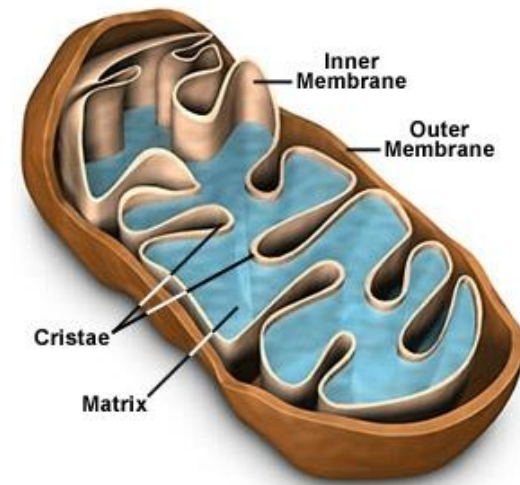


# A Peek Inside Mitochondria



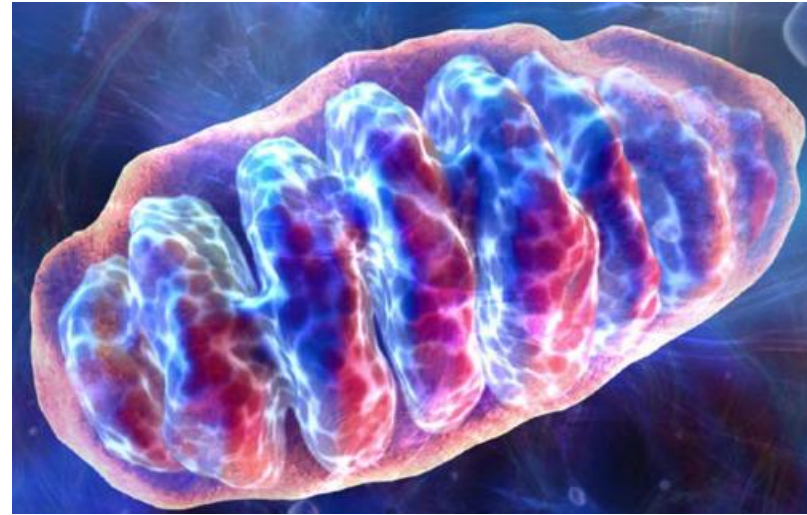
# Mitochondrial Parts

- ✓ **Outer membrane:** Semi-permeable phospholipid bilayer, allows passage of ions, ATP (adenosine triphosphate), ADP (adenosine diphosphate), and nutrients.
- ✓ **Inner membrane:** Permeable: allows oxygen, water, and carbon dioxide to pass through.
- ✓ **Cristae:** Shelf-like folds in inner membrane that help in expansion of the inner cell membrane.
- ✓ **Intermembrane space:** This is the space between outer membrane and inner membrane.
- ✓ **Intermembrane space:** Primarily responsible for oxidative phosphorylation.
- ✓ **Cytoplasmic matrix:** Contains the DNA molecules, enzymes, oxygen, carbon dioxide, recyclable intermediates (energy shuttles), and water.



# Mitochondria Functions

- ✓ Cellular respiration: The release of energy from glucose
  - **Stage 1**: Glycolysis
  - **Stage 2**: Citric Acid Cycle
  - **Stage 3**: Electron Transport
- ✓ Cell signaling for neurons
- ✓ Managing apoptosis
- ✓ Controlling cell cycle
- ✓ Monitoring cell differentiation, growth, and development



# Stage 1: Glycolysis



- ✓ Glucose is a six-carbon sugar.
- ✓ The enzymes in the cytoplasmic matrix initiate glycolysis.
- ✓ Glucose, a 6-carbon sugar, is oxidized to 2 molecules of a 3-carbon sugar, yielding two molecules of ATP, two molecules of pyruvic acid and two electron-carrying molecules of NADH (nicotinamide adenine dinucleotide).



# Stage 2: Citric Acid Cycle aka Krebs Cycle



- ✓ The three-carbon molecules which have been produced as a result of glycolysis are converted into acetyl compounds.
- ✓ The intermediary reactions of this process yields ATP molecules of energy and NAD and FAD (flavin adenine dinucleotide) molecules, too.
- ✓ NAD and FAD molecules are further reduced in the Krebs cycle to carry high energy electrons.





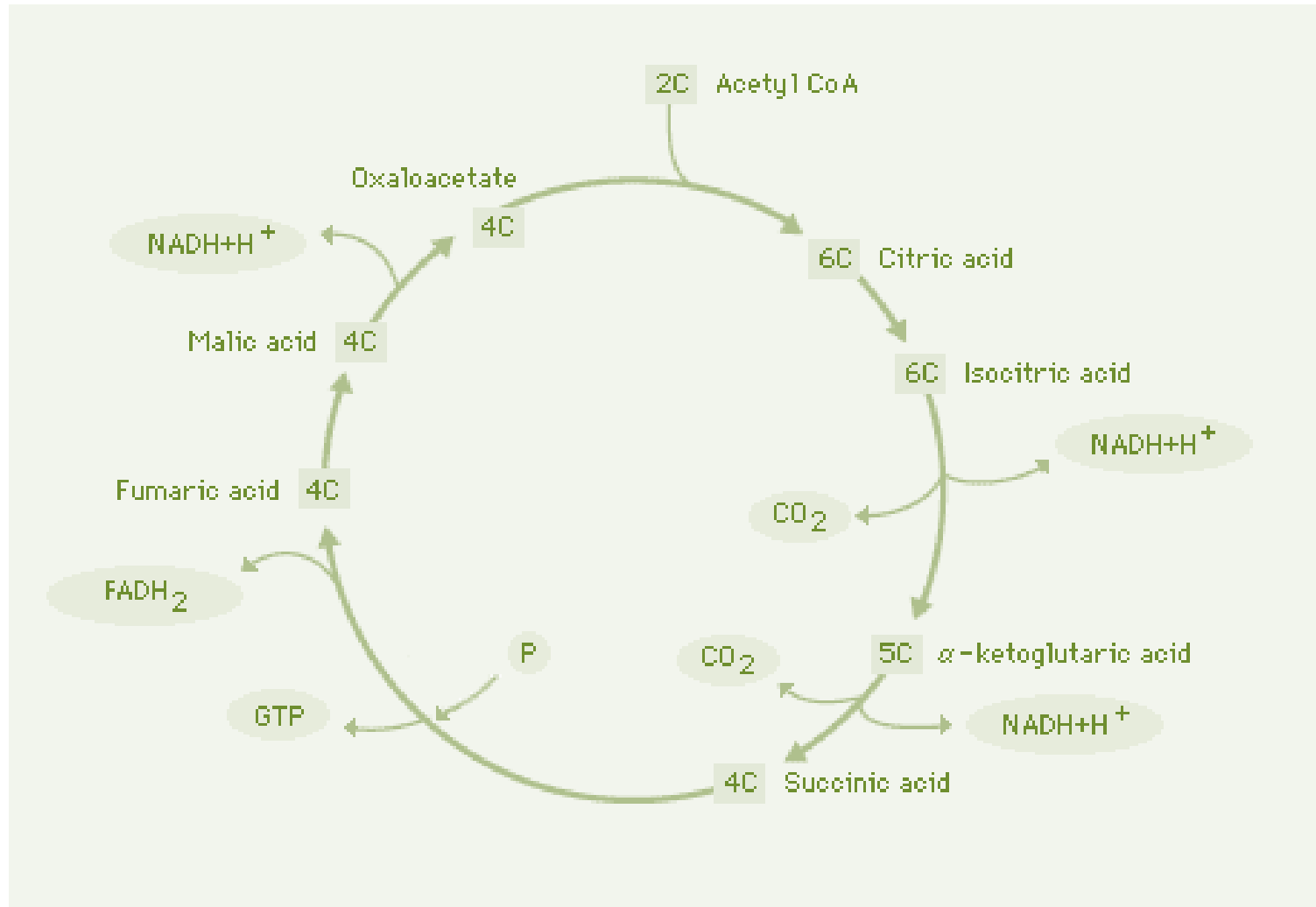
# Stage 3: Electron Transport



- ✓ A series of electron carriers generated in the membrane of the mitochondria from the Krebs cycle
- ✓ The ATP molecules are further produced by the chemical reactions of these electron carrier molecules
- ✓ **36 ATP molecules after cellular respiration**



# Creating Energy: The Krebs Cycle

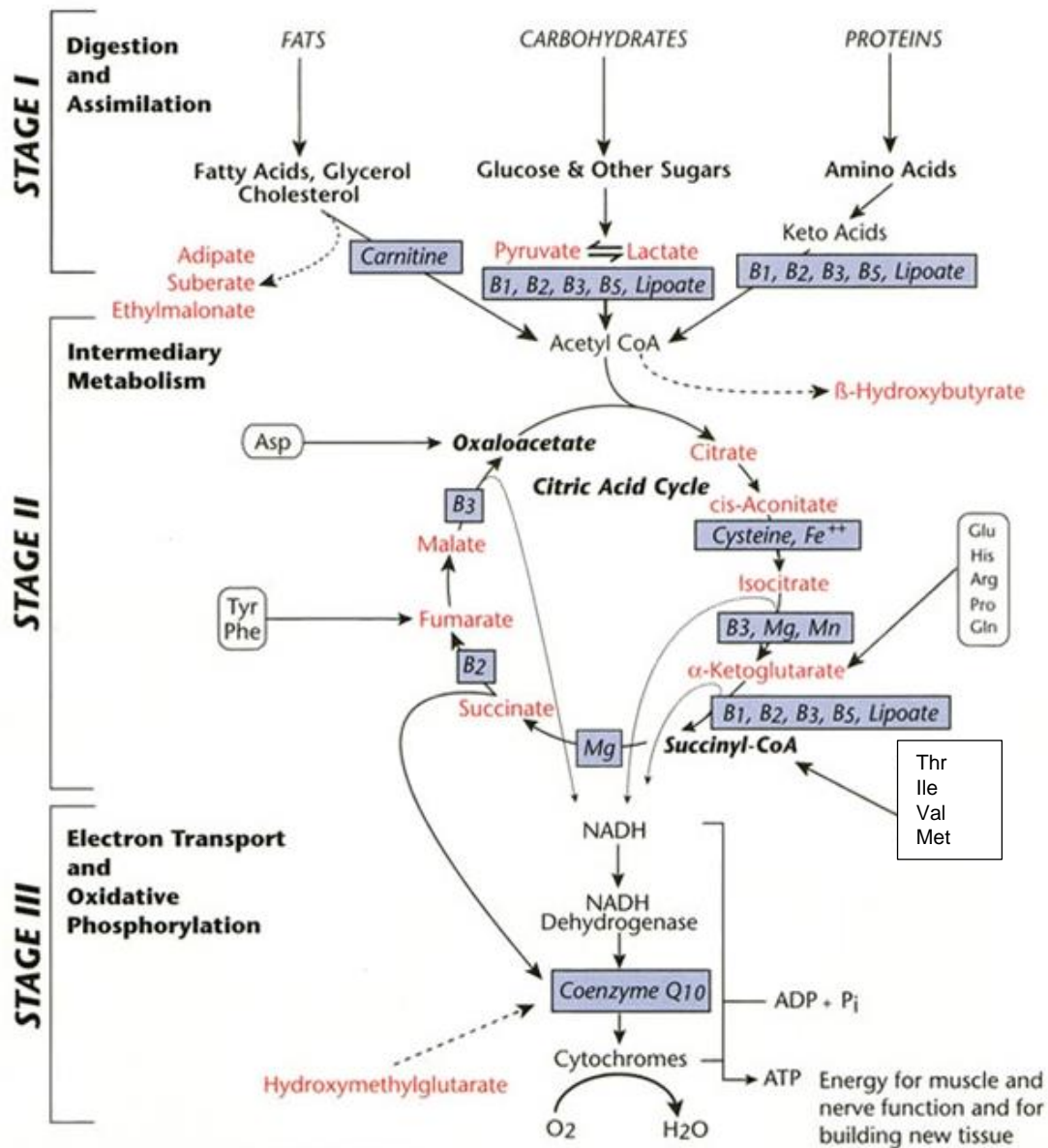


# Nutrients Needed for ATP Production

- ✓ Vitamin B3: Niacin NADH (Nicotinamide adenine dinucleotide hydride)
- ✓ Vitamin B2: *Flavin Adenine Dinucleotide (FAD)*
- ✓ Amino Acids: Krebs cycle intermediates
- ✓ CoQ10: Oxidative phosphorylation process
- ✓ Magnesium: Activates alpha-ketoglutarate
- ✓ Carnitine: Shuttles fat
- ✓ Ribose: Fuels Krebs cycle







# Nutrients to Protect From Free Radicals



- ✓ Zinc
- ✓ Selenium
- ✓ Vitamin C
- ✓ Vitamin A
- ✓ Manganese
- ✓ Copper
- ✓ Sulfur containing amino acids



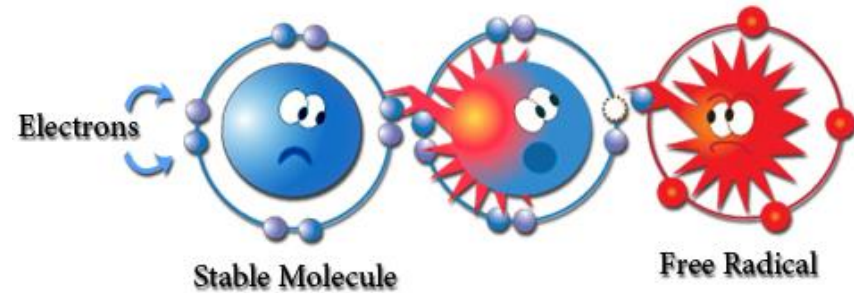
# Protecting Mitochondria

- ✓ Sugar balance
- ✓ Co-enzymes
- ✓ Antioxidants
- ✓ Fat balance
- ✓ Whole foods diet
- ✓ Avoidance of environmental toxins
- ✓ Be wary of medications
- ✓ Manage stress



# Free Radical Damage

Oxidize aka “rust” cells  
↓  
More free radicals  
↓  
More “rusted” cells  
↓  
Damaged DNA  
↓  
Damaged cell membranes  
↓  
Oxidized cholesterol  
↓  
Stiff arteries  
↓  
Wrinkles  
↓  
Brain damage  
↓  
Dementia, depression, brain fog, etc.



# Substances That Damage Mitochondria

- ✓ Sugar
- ✓ Trans and heated fats
- ✓ MSG
- ✓ Pesticides
- ✓ Preservatives
- ✓ Artificial flavorings
- ✓ Processed grains
- ✓ Acid forming foods
- ✓ Inflammatory foods
- ✓ Cortisol



# Restoring Your Client's Energy

## Food Choices

- Fresh, whole, organic

## Environment

- Air quality and quantity
- Sunshine

## Toxins

- Food, water, air
- Internally produced

## Movement and Rest

- Exercise
- Sleep

## Thoughts and Attitudes

- Positive, appreciative, caring

## Structural Alignment

- Posture, mobility

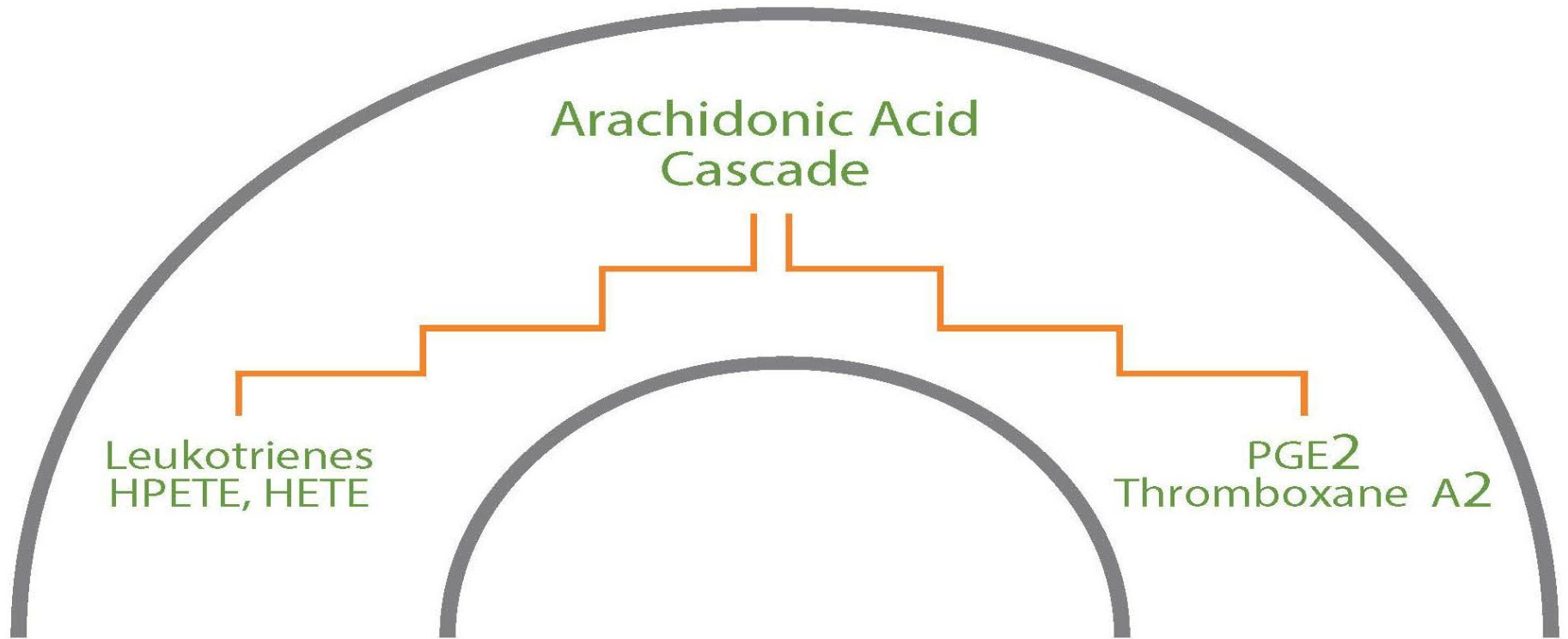
## Energetic Balance

- EMFs
- Meridians, chakras





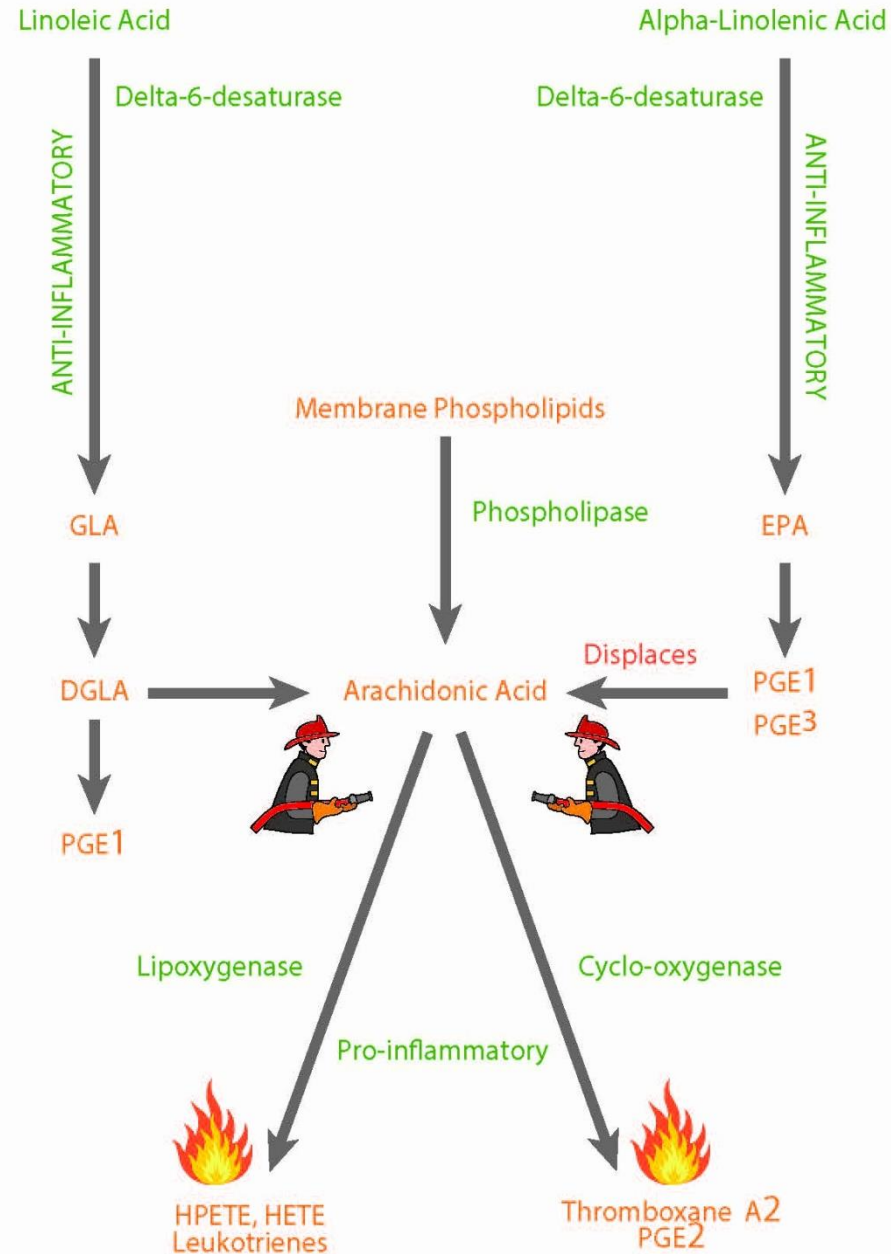
# Mast Cell Membrane



## Producing Pro-inflammatory Agents

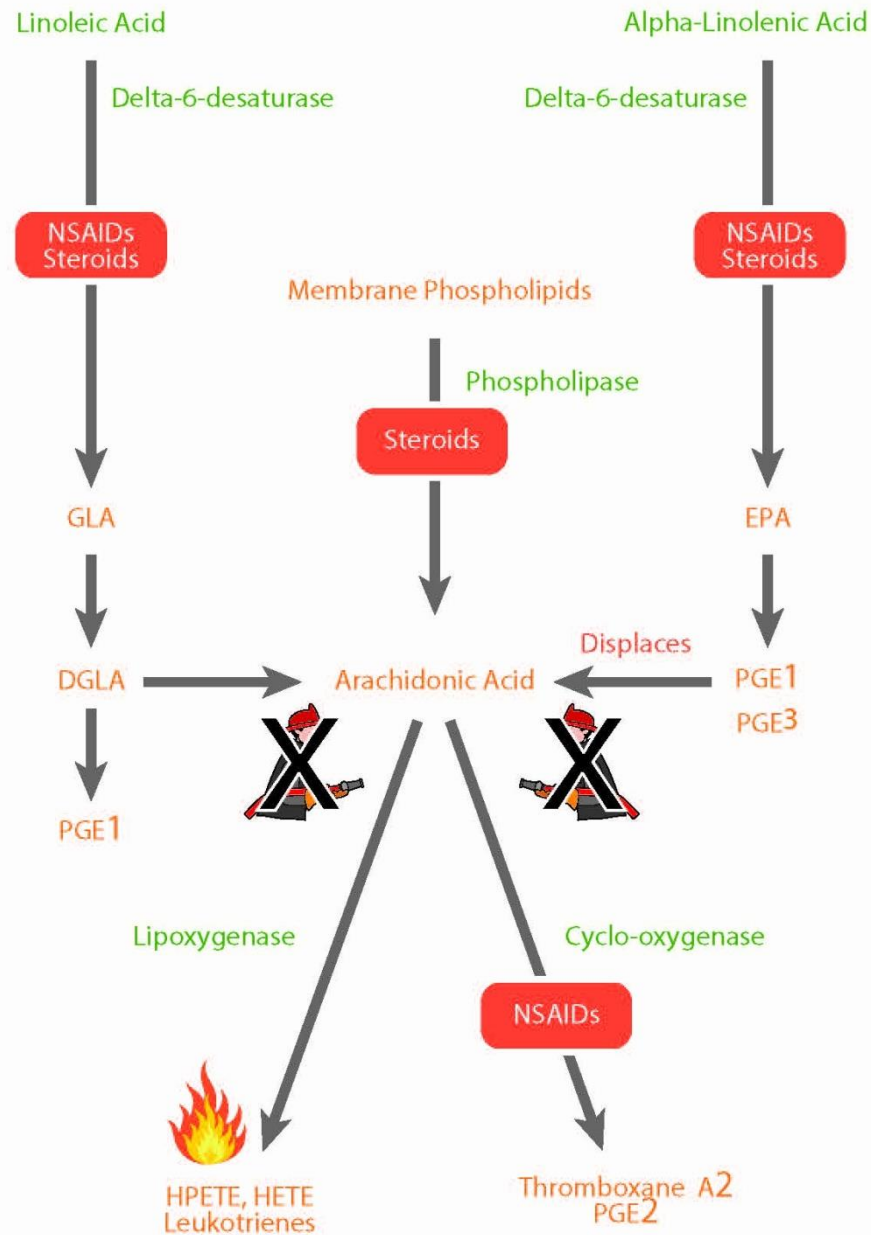


# Inflammatory Cascade





## Drug Modulation



# Nutritional Modulation

