



INE | INSTITUTE OF
NUTRITIONAL
ENDOCRINOLOGY

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

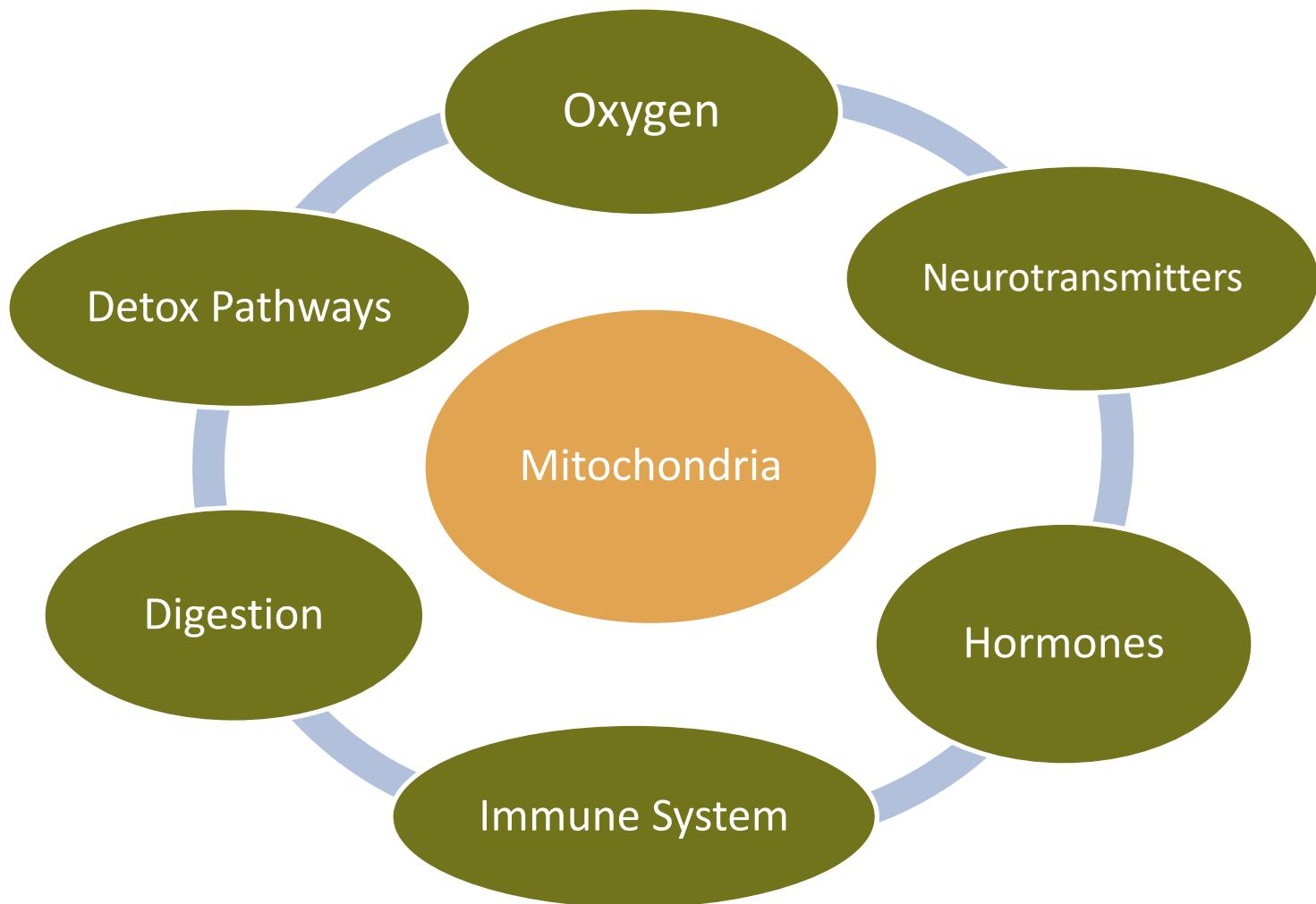
Dr. Ritamarie Loscalzo



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, 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?



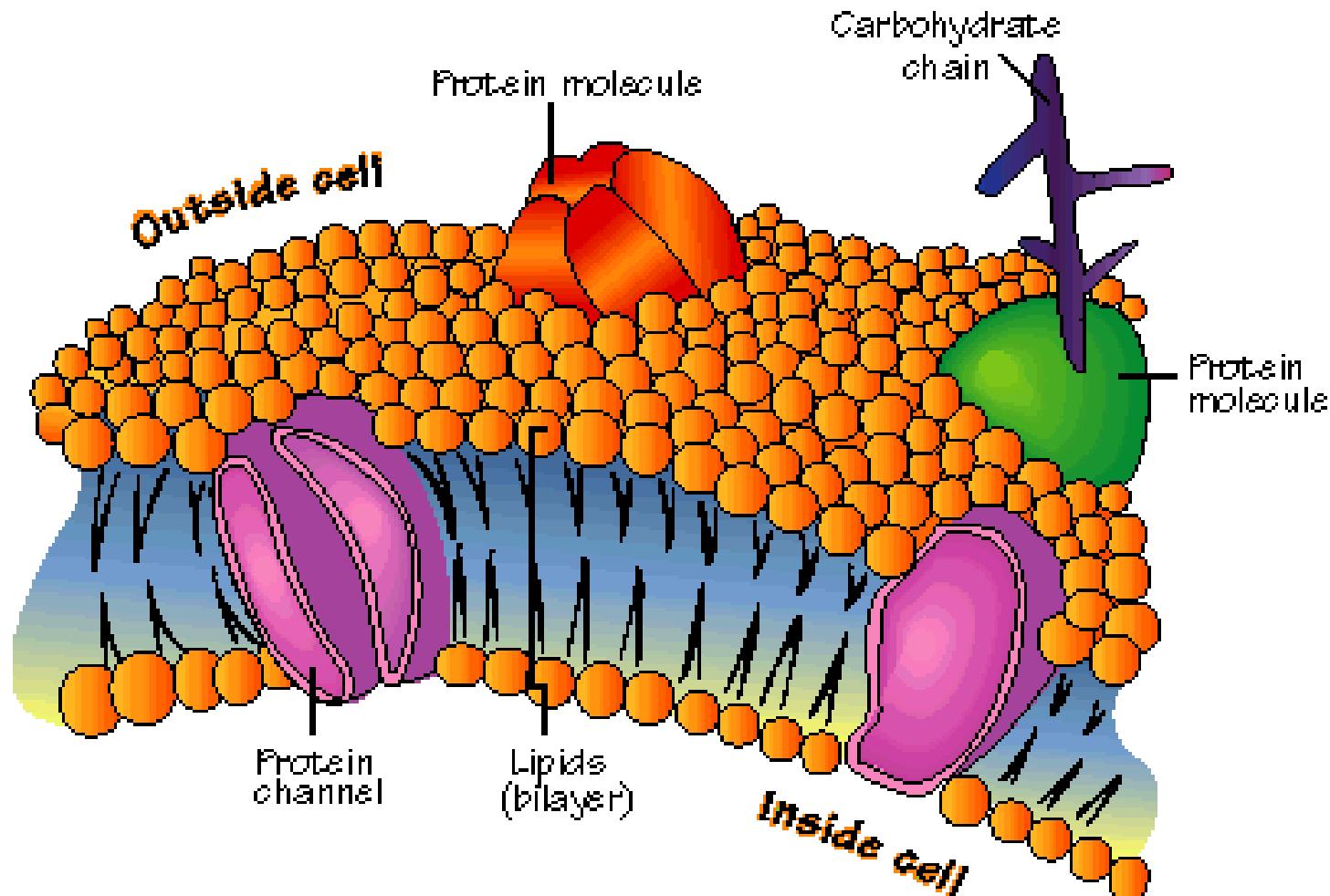
What Causes Fatigue?

Imbalances in:

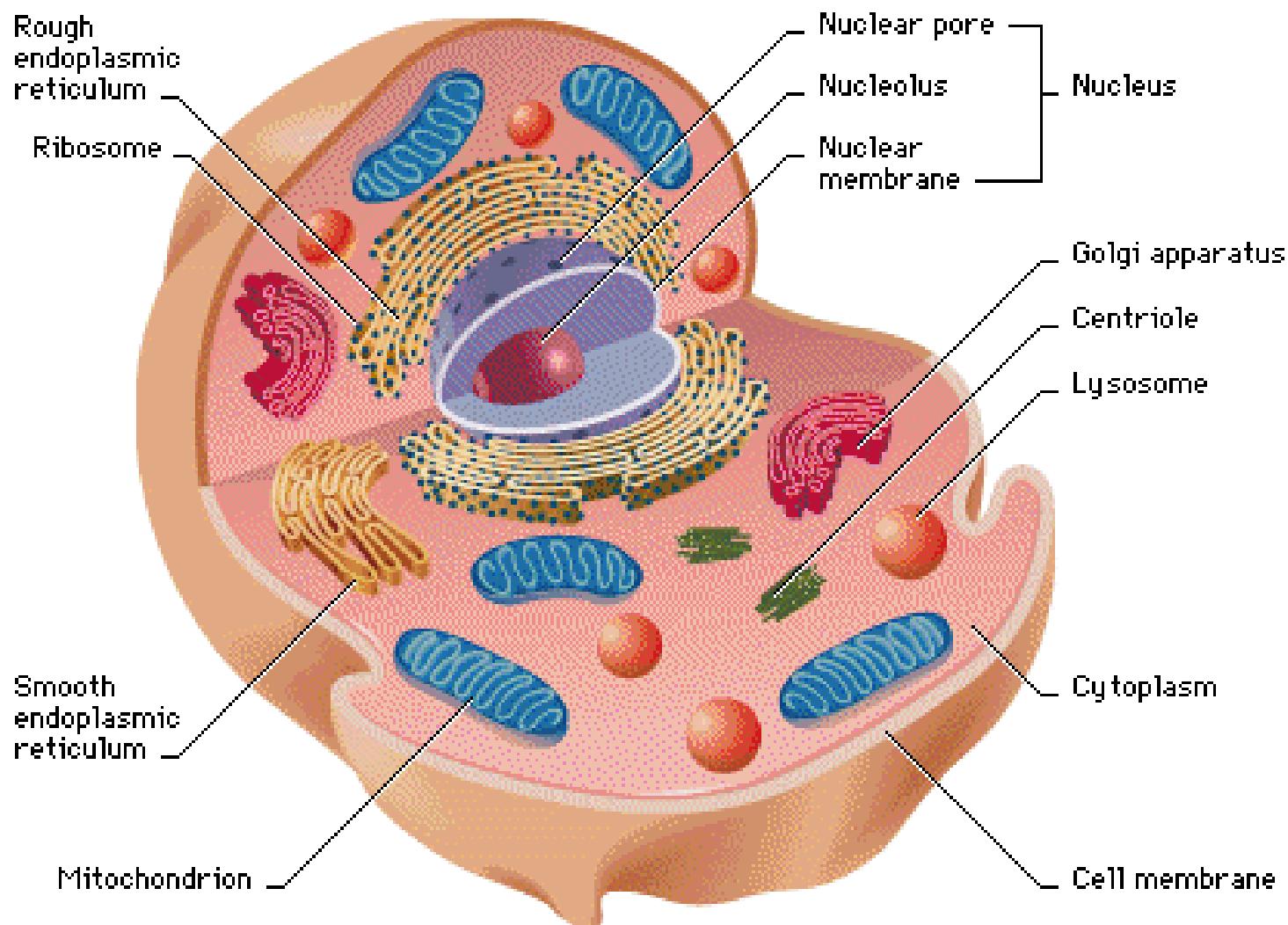
- ✓ Oxygen
- ✓ Neurotransmitters
- ✓ Hormones
- ✓ Mitochondria
- ✓ Immune System
- ✓ Digestion
- ✓ Detox Pathways



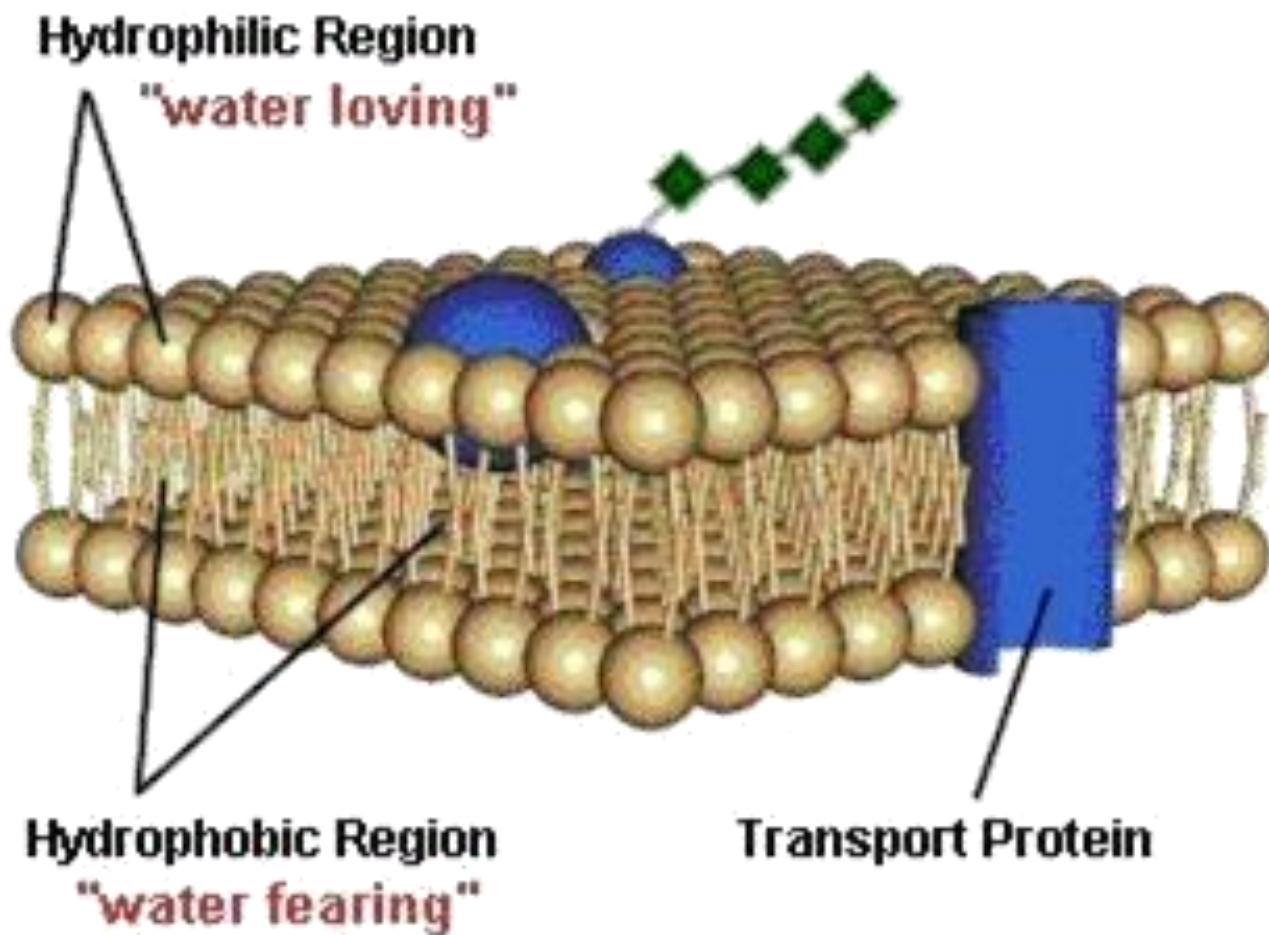
Cell Wall



Inside Cells



Cell Membrane



Mitochondria: The Power House of The Cells

Sugar and Oxygen

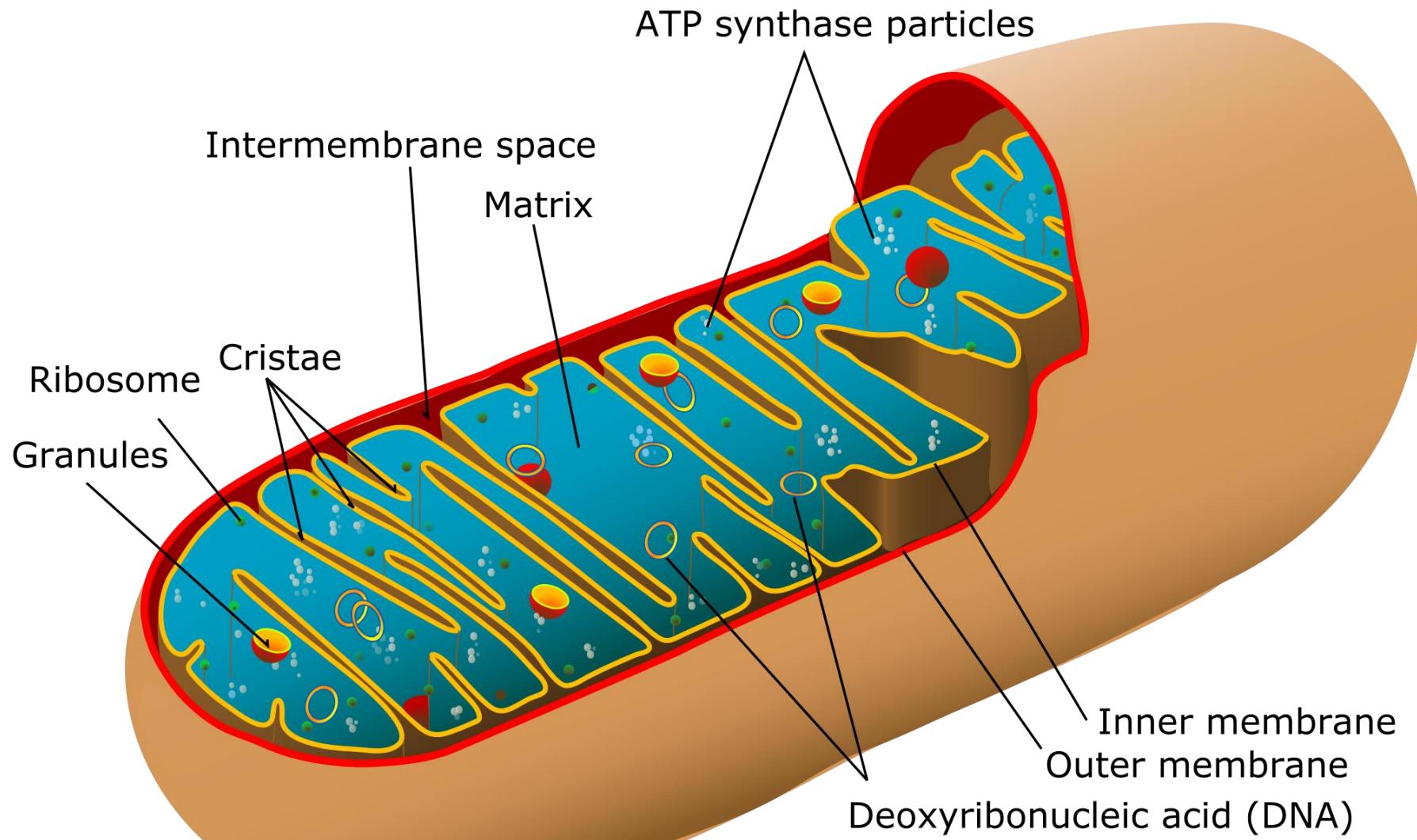


Free Radicals

ATP (energy)

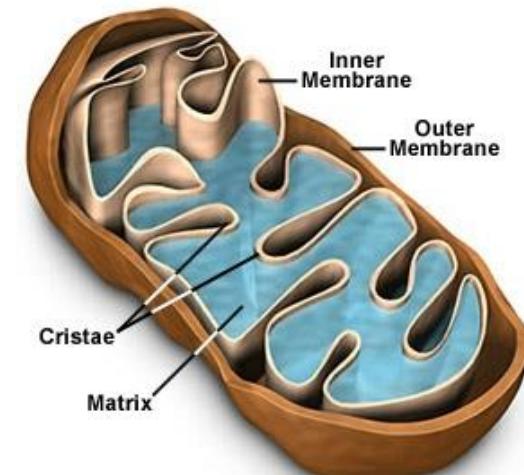


A Peek Inside Mitochondria



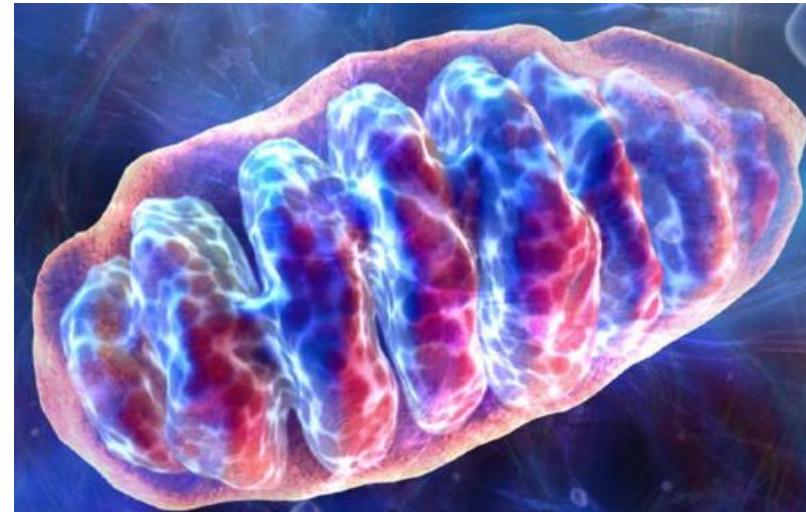
Mitochondrial Parts

- ✓ **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 Kreb cycle to carry high energy electrons.



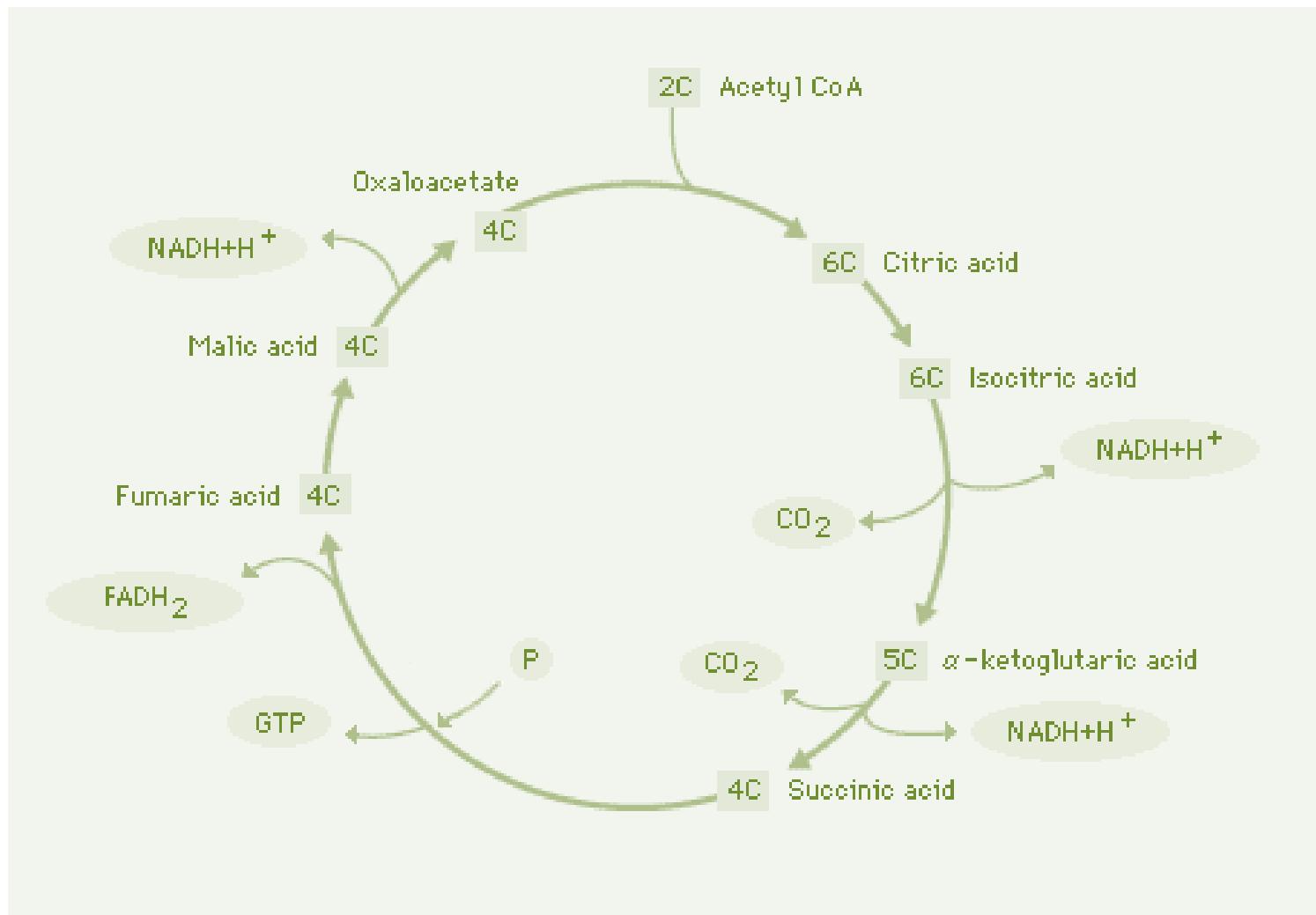
Stage 3: Electron Transport



- ✓ 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**

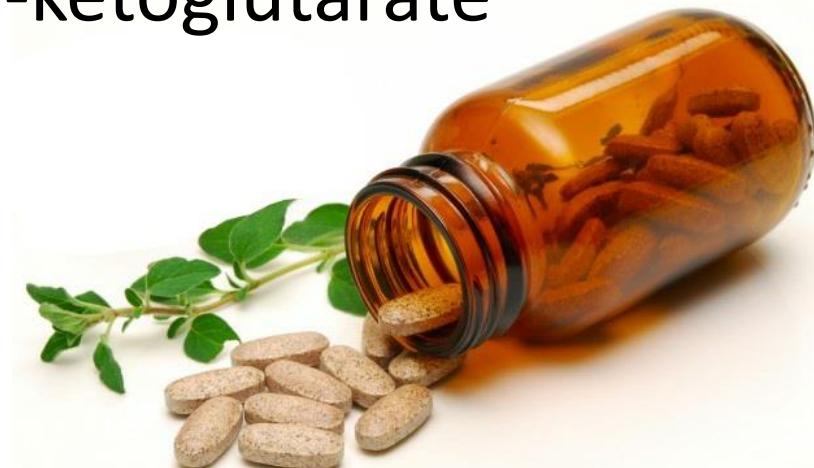


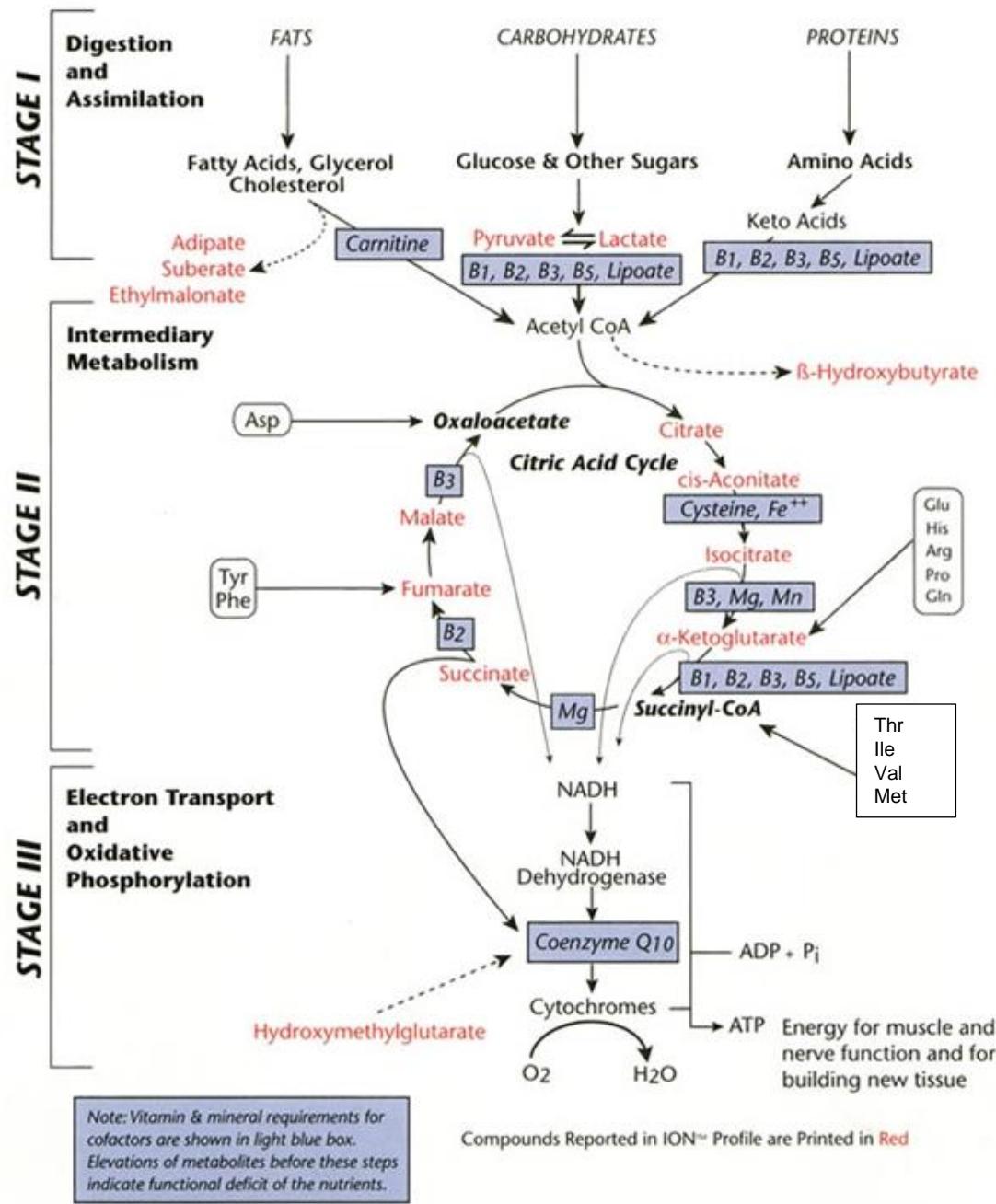
Creating Energy: The Krebs Cycle



Nutrients Needed for ATP Production

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





Nutrients to Protect From Free Radicals



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

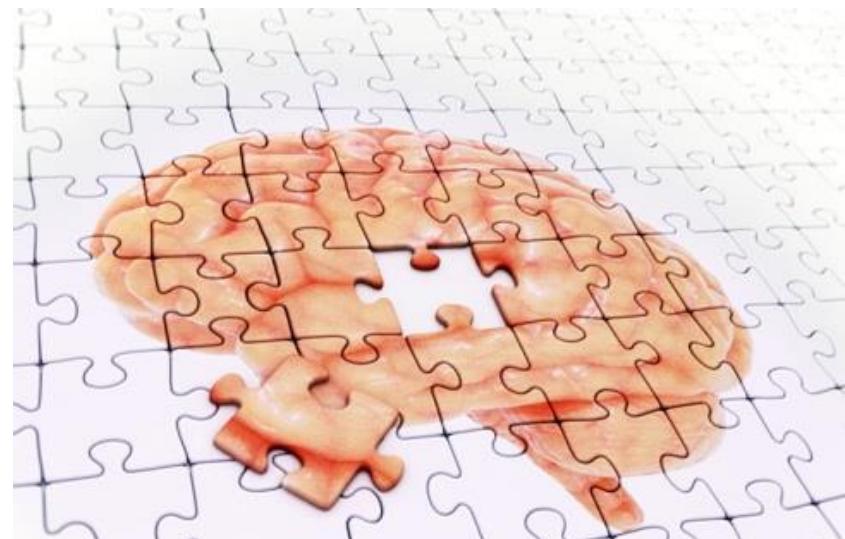
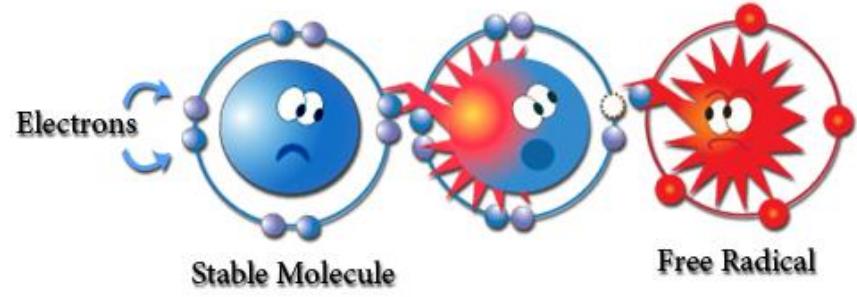


Protecting Mitochondria

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



Free Radical Damage



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

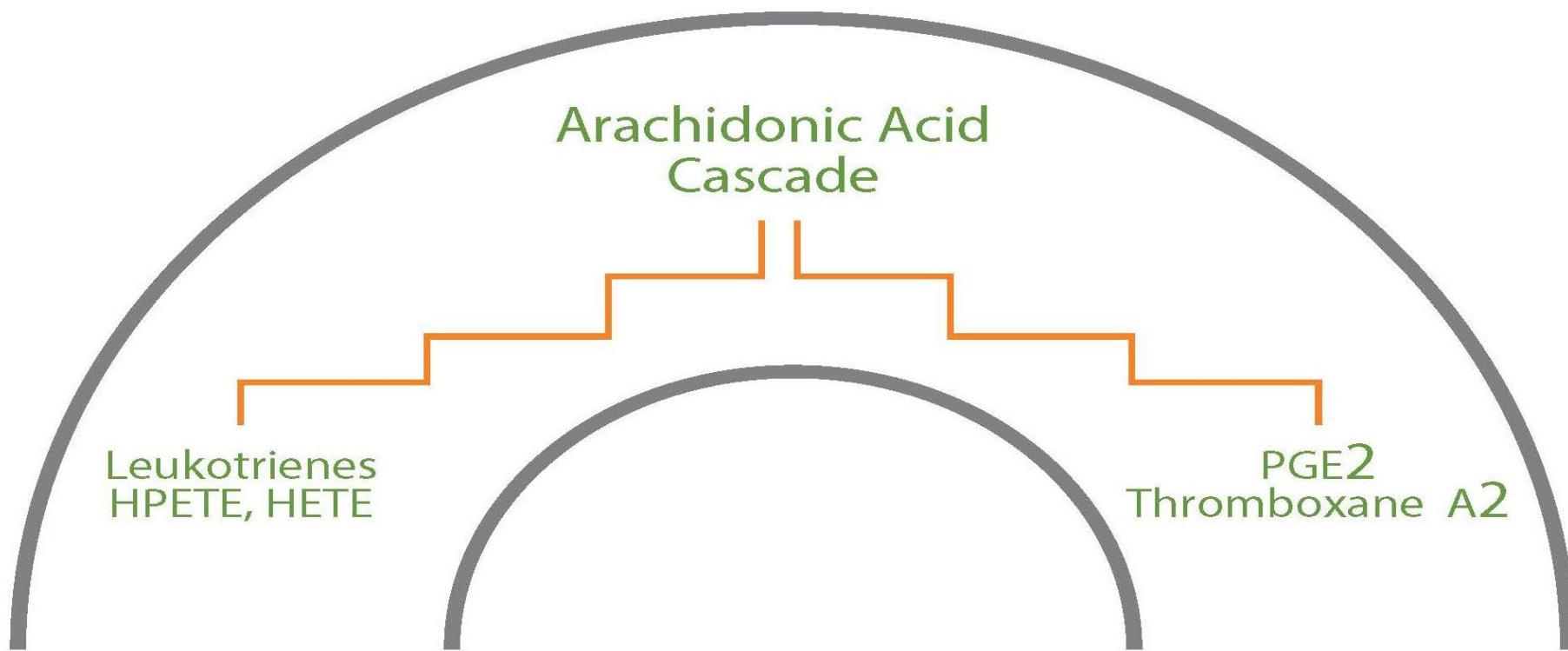
- Posture, mobility

Energetic Balance

- EMFs
- Meridians, chakras



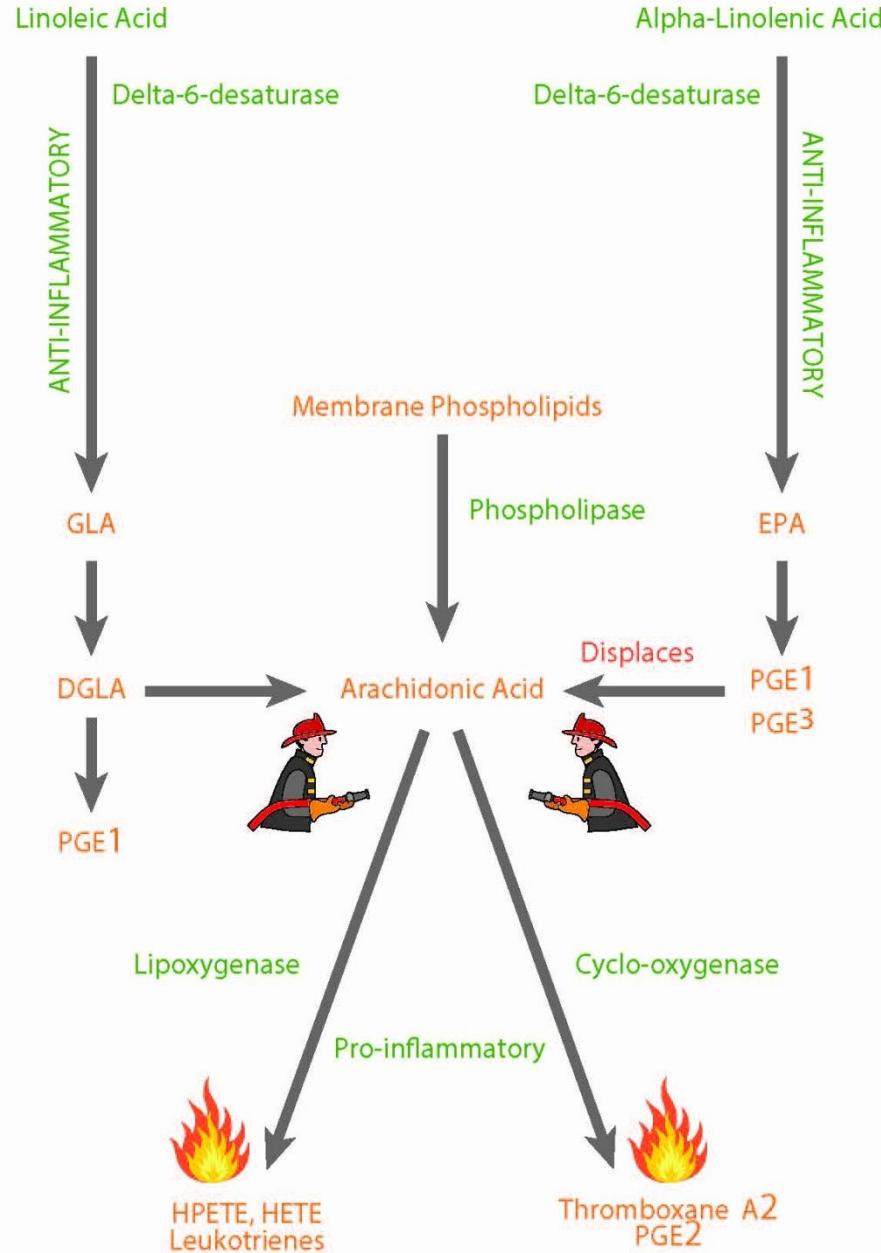
Mast Cell Membrane



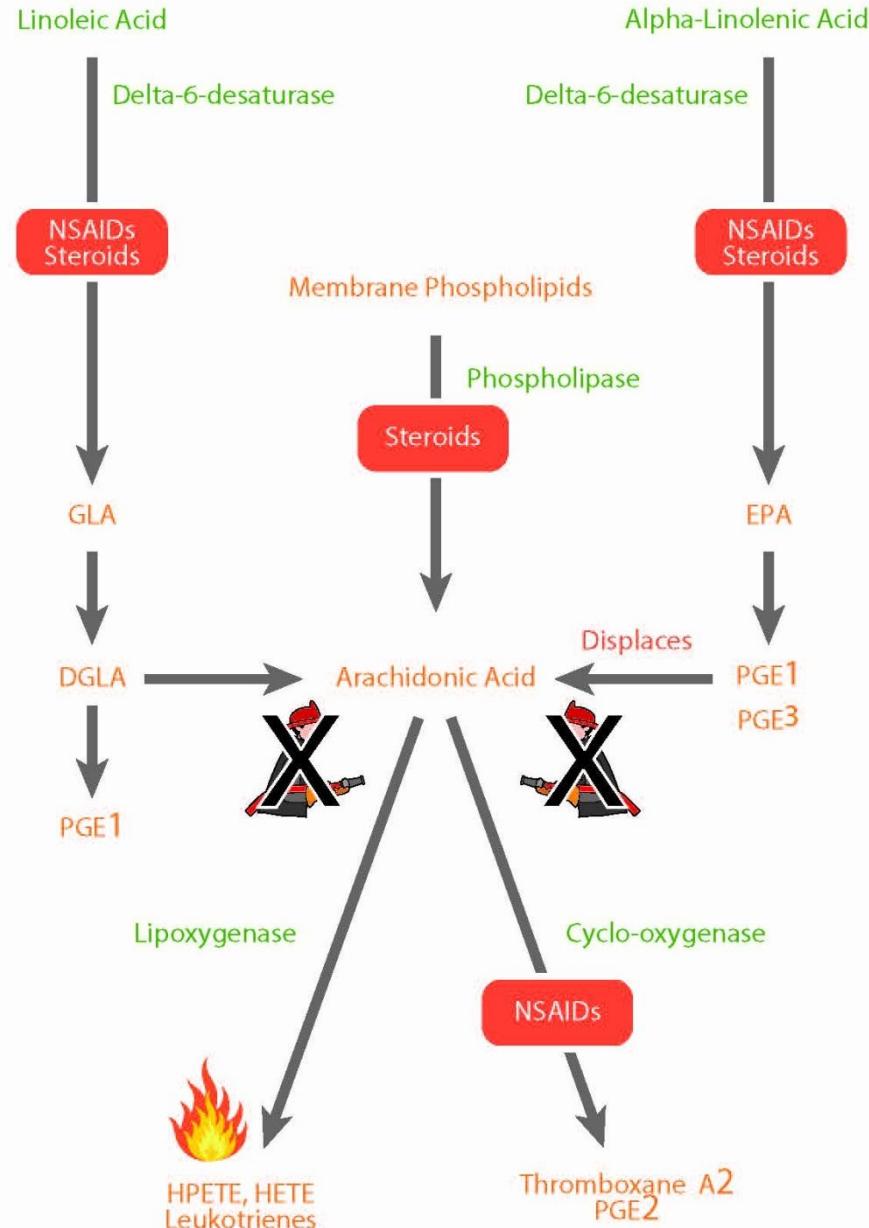
Producing Pro-inflammatory Agents



Inflammatory Cascade



Drug Modulation



Nutritional Modulation

