Nutrition and Immunity

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Objective

- Truth
- What and how are we to eat to be healthy?

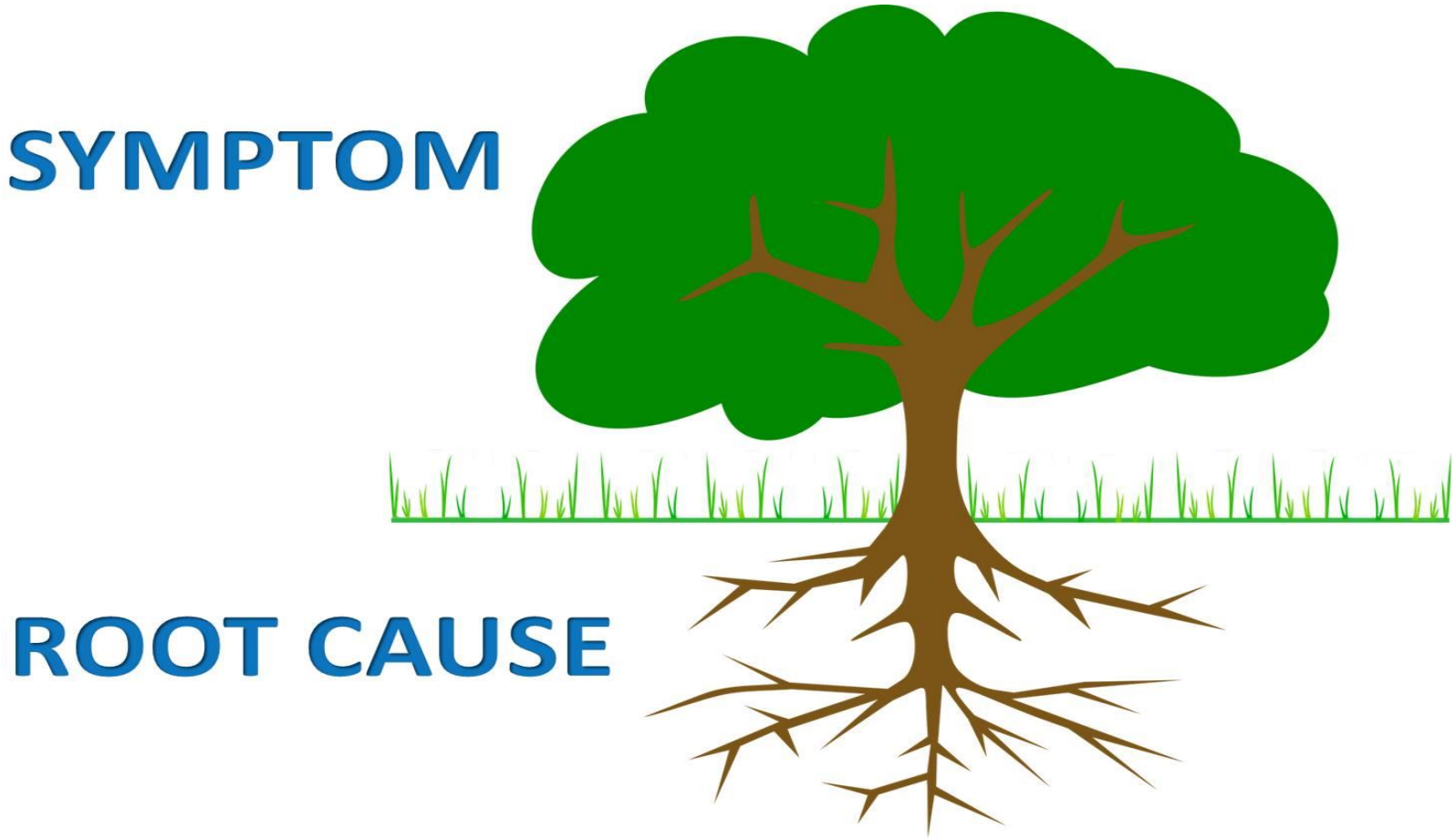
- Use the Q&A at the end of each class and/or my email to guide this talk.
- Fill out the survey at the end and say what you like and what you did not like

I am not a Medical Doctor and I this seminar is not medical advice

Nutrition Recommendations

- You are unique- age, gender, health, activity, genetics
- Eat real food
- Minimal work from farm to table
- As little processing as possible
- Get involved in the making/preparation of your food
- Get connected with your food- garden, know your farmer, etc.
- You are what you eat and what it eats
- Stay Hydrated- Don’t drink calories

Dig Deep



Nutrition and Immunity Topics

- Germ Theory, Immune System, and Metabolic Dysfunction
- **Top 10 Nutrition Myths***
- Micronutrients: Vitamins, Minerals, Antioxidants, etc.
- Toxins:

  Pesticides, medications, synthetic ingredients (food/skincare), food toxins naturally occurring (gluten, oxalates, etc.) or produced during cooking (HCA's, PAH's)

  Fats: *Focus on Polyunsaturated fats and Immune Function*

  Sugar (refined carbohydrates) and Immune Function
- Digestion and Immune Function- ***Introduce Expensive Tissue Hypothesis***
- Healthy Eating to Optimize Immune Function- ***Expand on Autophagy***
- Supplements

Mainstream Recommendations

- Masks
- Social Distancing
- Stay Indoors
- No Large Gatherings
- Wash Hands
- Get Tested
- Wait for a Vaccine

How About……..

- Eat healthy
- Fresh air
- Sunlight (vitamin D)
- Activity
- Rest

Those at Highest Risk of Infection

- Age
- Existing Lung Conditions
- Heart disease
- Obesity
- Diabetes
- Cancer
- Weak Immune System (Meds)
- Liver and Kidney Disease

Journal of Advances in Nutrition
2016 Jan; 7(1): pp.66-75
Impact of Obesity & Metabolic Syndrome on Immunity

- Obesity is the result of a disruption of energy balance that leads to weight gain and metabolic disturbances that cause tissue stress and dysfunction.
- Metabolic disturbances lead to immune activation in tissues such as adipose tissue, liver, pancreas, and the vasculature, and individuals often present with elevated plasma markers of chronic low-grade inflammation.
- In addition to immune cells playing a role in the perpetuation of chronic disease, it has further been established that obesity negatively affects immunity, as evidenced by higher rates of vaccine failure and complications from infection.

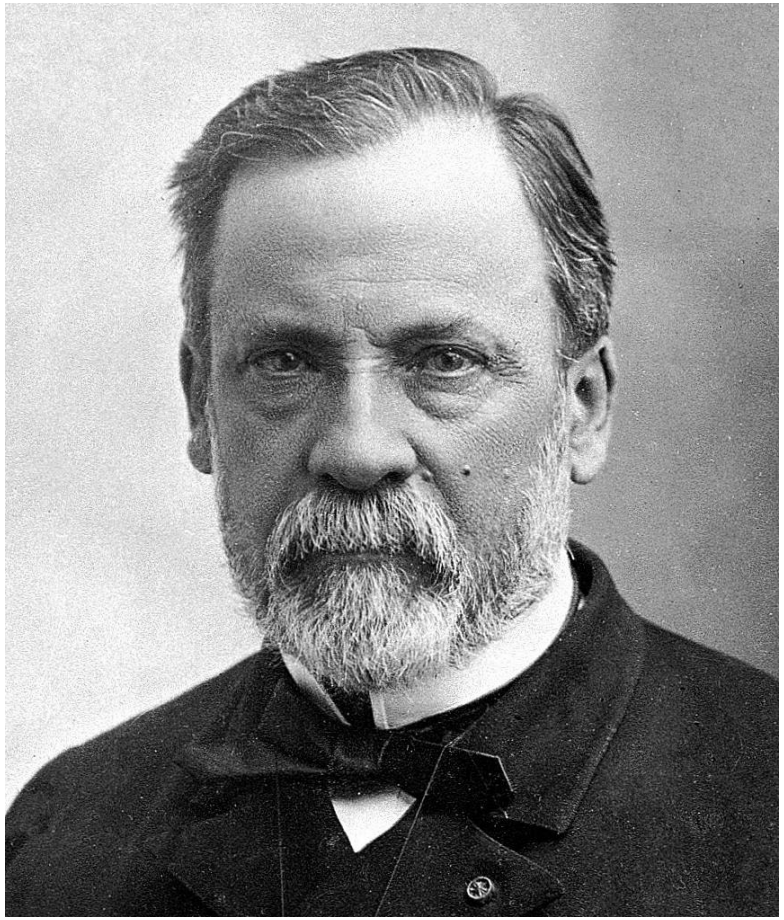
Impact of Obesity & Metabolic Syndrome on Immunity- continued;

- The accumulation of fat tissue in lymphoid organs is not a novel phenomenon, as it is known to naturally occur with age. However, this change adversely affects immunity in older individuals. Interestingly, caloric restriction is known to impede this process and is associated with greater immunity and a longer lifespan in various animal models, including rodents and nonhuman primates. **Therefore, obesity is thought to promote premature "aging" of the immune system.**
- Several studies have further demonstrated the complications of obesity after influenza exposure. **Diet-induced obesity has been shown to impair memory $CD8^+$ T cell responses to an influenza virus infection, resulting in increased mortality, viral titers in lung, and worsened lung pathology.**
- Accordingly, obesity has been shown to increase the risk of vaccine failure, including the vaccines for hepatitis B, tetanus, and influenza. Obesity is also associated with a greater risk of influenza-related complications and hospitalizations.

Germ or Terrain Theory

Germ Theory

- Louis Pasteur (1822-1895)
- Chemist
- “Father” of the germ theory
- Pasteurization
- Germs cause illness
- Believed the body to be sterile



Terrain Theory

- Claude Bernard (1813-1878)
- Physiologist
- Proposed *"Milieu Interieur"* (internal environment) which is the beginning of homeostasis coined by Walter Cannon
- Body is self regulating. If given optimal nutrition and a healthy environment it would function optimally

Terrain Theory

- Antoine Bechamp (1816-1908)
- Medical Doctor, Physicist, Chemist, Pharmacist
- “Father” of terrain theory
- Believed the body was not sterile and contained “mycrozymas” or little bodies
- The terrain (body) is everything

The Germ Filled Human

- Humans are composed of ~30-60 trillion cells (~20-30 trillion are immune related)
- Our microflora is part of our immune system
- Approximately 2-5 times more bacteria than human cells
- Microflora in our mouth, throat, intestine, skin, sinus, ears, stomach, lungs, etc..
- Yeast (Candida) is a normal part of our microflora
- 5-8%of the human genome is viral
- Microbes are nature’s recyclers

Germ or Terrain

- *Staphylococcus aureus* (staph infection) is a bacteria which is a normal part of our skin, sinuses, and other areas.
- *Streptococcus pyogenes* (strep throat) is a normal inhabitant of our throat, skin, and other areas
- *Candida albicans (yeast infection)* is a normal inhabitant of the colon, mouth and other areas

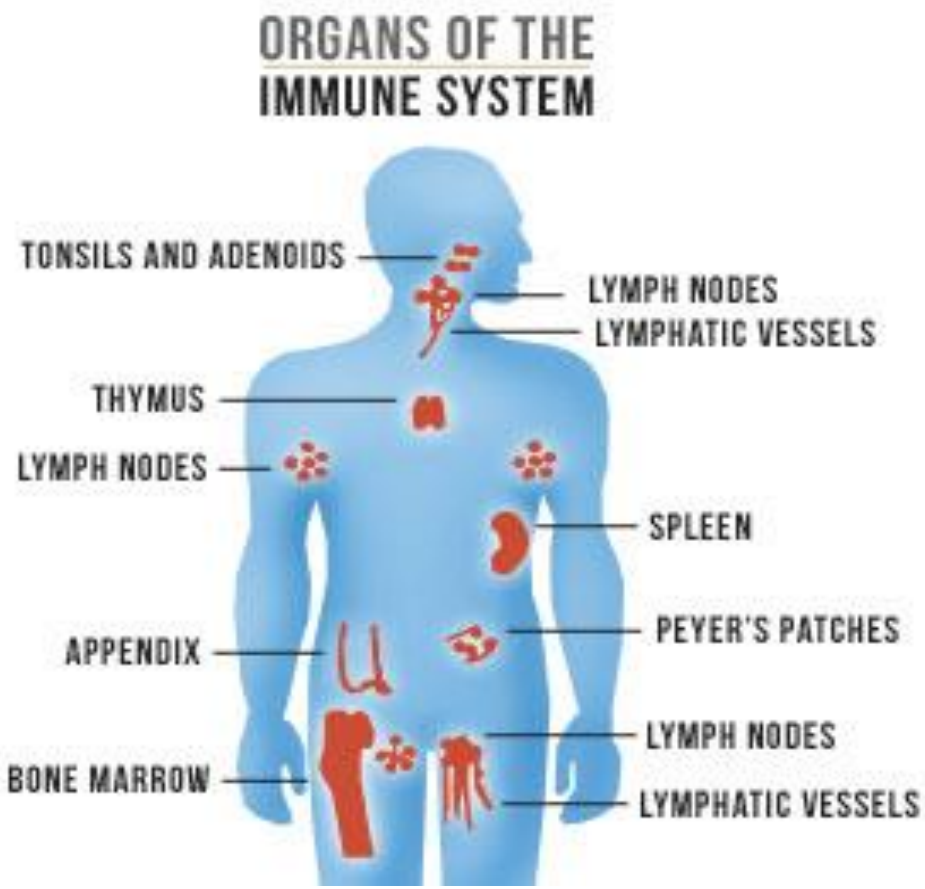
Bacteria, yeast, and viruses are a normal and important part of the human ecology. They provide various beneficial functions. Many scientists for over a century have shown that the PRIMARY cause of illnesses involving these microbes is an unhealthy body.

AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE

Immune System

- Recognize self from non-self
- Help in repairing the body
- Remove toxins- normal metabolic wastes, heavy metals, excess free radicals, synthetic chemicals, **undigested food particles**
- Fight and remove microbes that have translocated
- Search for and remove cancerous and damaged cells

Skin and microflora are also organs of the immune system



Immunology

- Most immune cells are made in the bone marrow
- 40-70% of immune system surrounds the gut
- Multiple types of immune cells with multiple functions
    1. White blood cells
    2. Macrophages
    3. T cells
    4. B cells
    5. Natural killer cells
    6. HDL and LDL

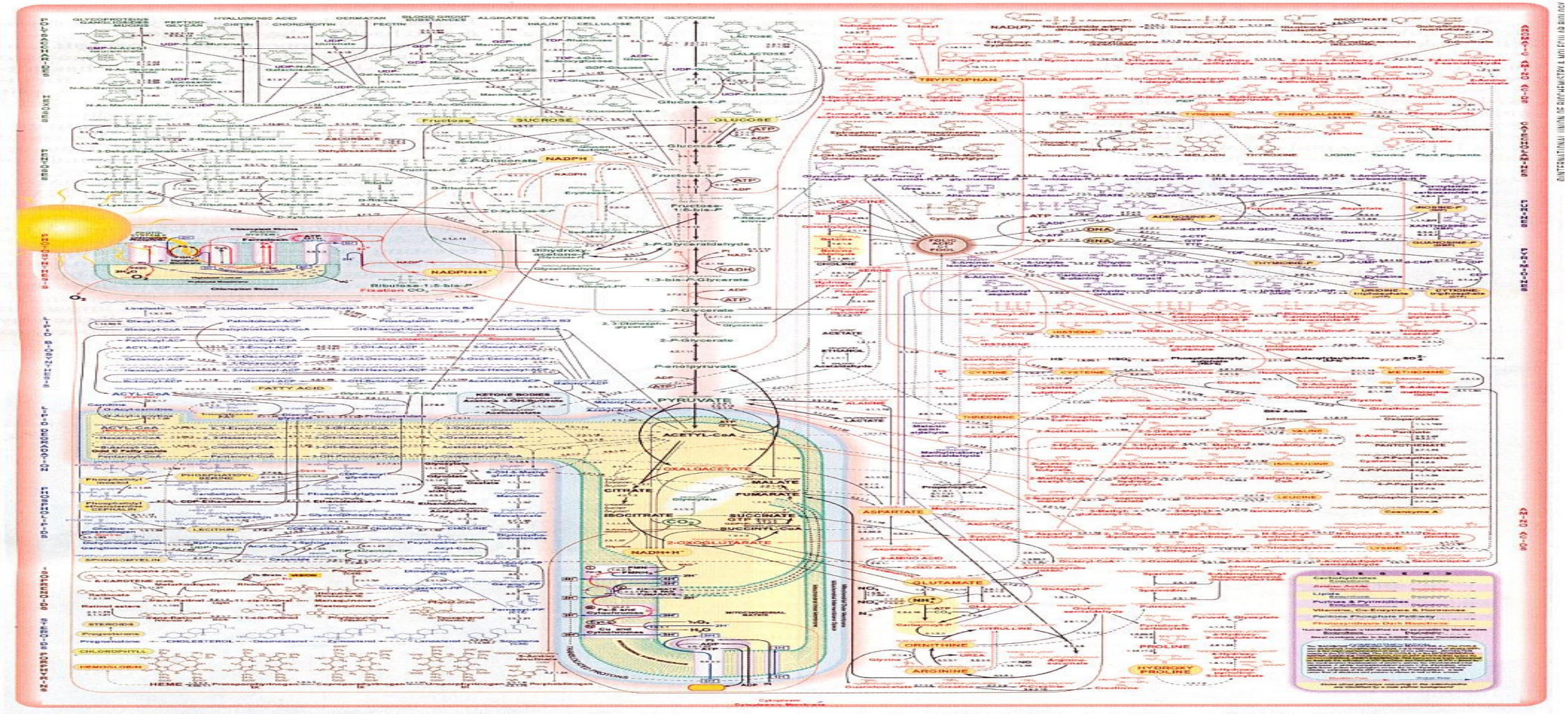
Microbiology and Immunology Journal 2010 April;54(4) Pgs: 246-253

- Plasma lipoproteins (VLDL, LDL, Lp[a] and HDL) function primarily in lipid transport among tissues and organs. **However, cumulative evidence suggests that lipoproteins may also prevent bacterial, viral and parasitic infections and are therefore a component of innate immunity. Lipoproteins can also detoxify lipopolysaccharide and lipoteichoic acid.** Infections can induce oxidation of LDL, and oxLDL in turn plays important anti-infective roles and protects against endotoxin-induced tissue damage. There is also evidence that apo(a) is protective against pathogens. Taken together, the evidence suggests that it might be valuable to introduce the concept that plasma lipoproteins belong in the realm of host immune response.

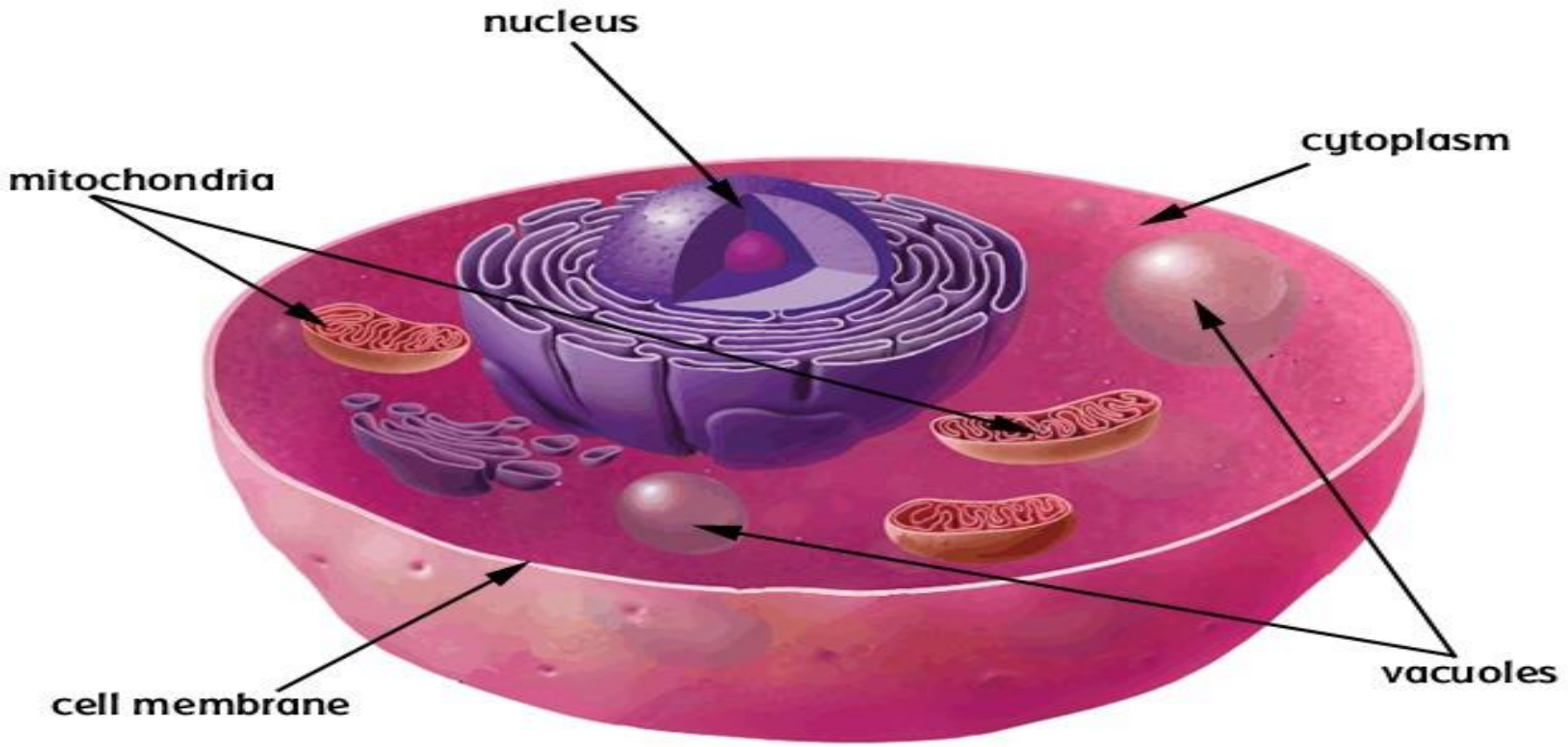
Metabolic Dysfunction: The Key to Health

- All cells need to:
    1. Produce energy
        a. Micronutrients (vitamins, minerals, amino acids, fatty acids) needed to use protein, fat, carbohydrates
        b. Macronutrients (protein, fat, carbohydrates) needed to provide energy
    2. Reproduce and repair itself
        a. Micronutrients needed to use fats and proteins
    3. Get rid of waste
        a. Micronutrients and Macronutrients needed

Your Metabolism: Micronutrients are the catalysts



Basic Cell Diagram



Essential Metabolic Nutrients That Run Your Metabolism

Vitamins

- Biotin
- Vitamin B1-Thiamin
- Vitamin B2- Riboflavin
- Vitamin B3- Niacin
- Vitamin B4- Choline
- Vitamin B5- Pantothenate
- Vitamin B6- Pyrodoxine
- Vitamin B9- Folate
- Vitamin B12- Cobalamin
- Vitamin A
- Vitamin D
- Vitamin E
- Vitamin K
- Vitamin C

Minerals

- Calcium
- Chloride
- Chromium
- Cobalt
- Copper
- Iodine
- Iron
- Magnesium
- Manganese
- Molybdenum
- Phosphorus
- Potassium
- Selenium
- Sodium
- Zinc

Essential Metabolic Nutrients

Amino Acids(Proteins)

- Leucine
- Isoleucine
- Valine
- Methionine
- Threonine
- Tryptophan
- Phenylalanine
- Lysine

Fatty Acids

- Omega 3 fat- alpha linolenic acid
- Omega 6 fat- linoleic acid

Journals of Gerontology A: Biological Sciences and Medical Sciences 2001
NHANES III: (1988-1994)

• **% Calories for 20-30 Year Olds**	**% Calories**
1. Non diet soft drinks	8.8
2. Pizza	5.1
3. Beer	3.9
4. Hamburgers/meatloaf	3.4
5. White bread	3.3
6. Cakes/pastries/doughnuts	3.3
7. French fries	3.0
8. Potato chips/popcorn/corn chips	2.7
9. Rice	2.6
10. Cheese/cheese spread	2.5
	38.6