Making the Connection:
The Impact of Leaky Gut on Pain, Autoimmunity & Cancer

Amy Rawls, MS, RD, LD, FMNS, CGN
Director of Education & Clinical Services
Transformation Enzyme Corporation

7 SIGNS of a SOUND Gut

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THE INCREASING PREVALENCE OF PAIN, AUTOIMMUNITY & CANCER

- In the United States, approximately 20.9% of adults (51.6 million people) reported experiencing chronic pain in 2021.
- Autoimmune diseases are dramatically increasing with more exposures to environmental toxins.
- Cancer incidence continues to rise for many common cancers—especially for women.
- 2024—First Year the US Expects More than 2M New Cases of Cancer

WHAT ARE YOU DOING IN YOUR PRACTICE?

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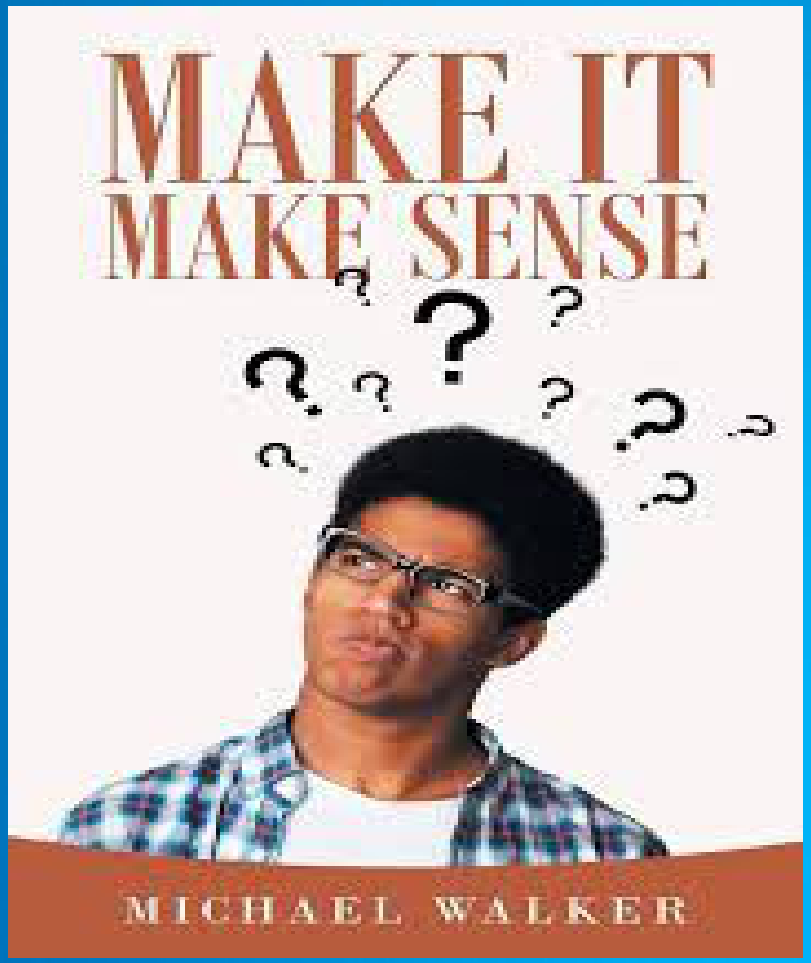
GOLD STANDARD STRATEGIES FOR PAIN, AUTOIMMUNITY, CANCER

- Pain medicines, pain blocking injections in tendons or joints
- Anti-inflammatory medication like NSAIDs or corticosteroids.
- Immunosuppressants
- Surgery: Removal of cancerous tissue is a common primary treatment for many types of cancer.
- Chemotherapy: Using drugs to kill cancer cells is a common treatment approach, often used in combination with other treatments.
- Radiation therapy: Using radiation to kill cancer cells is another common treatment approach, particularly for some types of cancer.
- Other Treatments: Immunotherapy, targeted therapies, and hormone therapy are some of the other treatment modalities that have been developed to treat cancer
- IVIG infusions



Last time I checked I didn't have a Platinol or Adriamycin deficiency

Last time I checked, I didn't have an NSAID deficiency

Last time I checked, I didn't have a prednisone or methotrexate deficiency.

Last time I checked, I didn't have an opioid deficiency.

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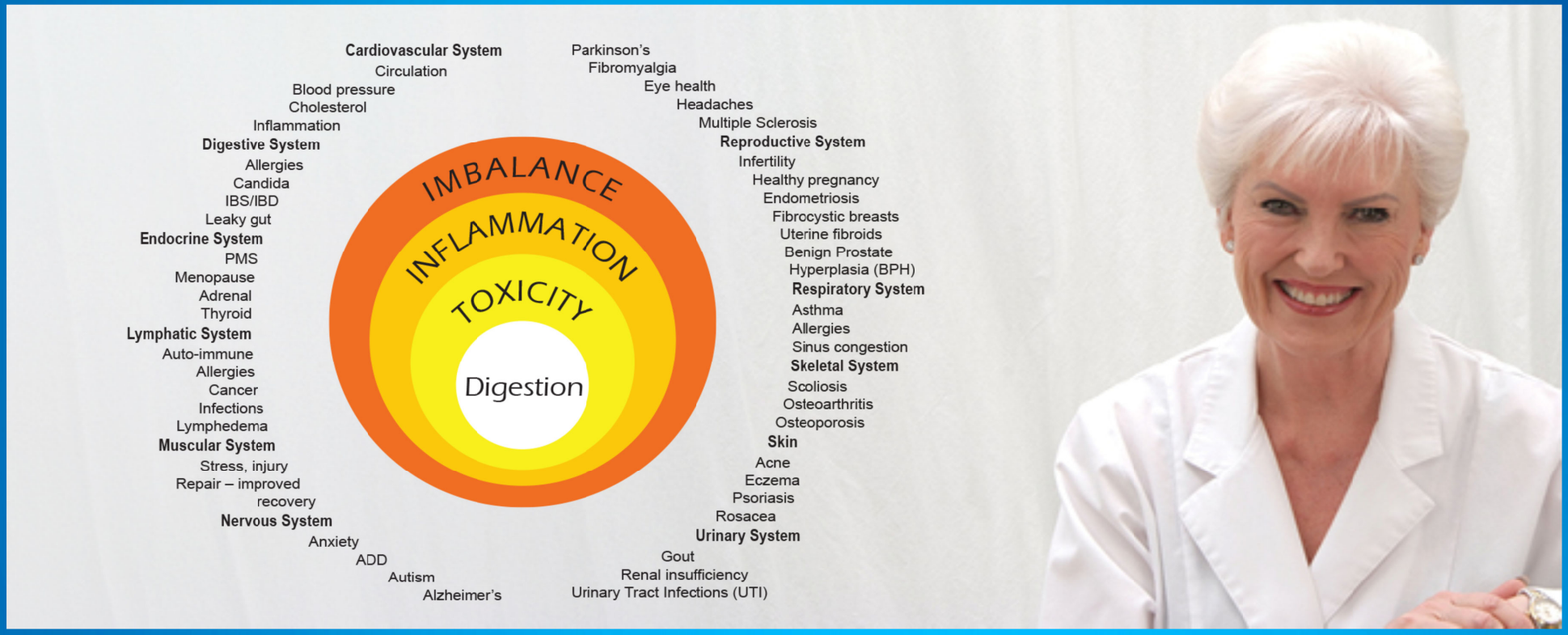
"We are not born diseased—we create it, and we can ***uncreate*** it"



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Making The Connection to How WE Create Disease

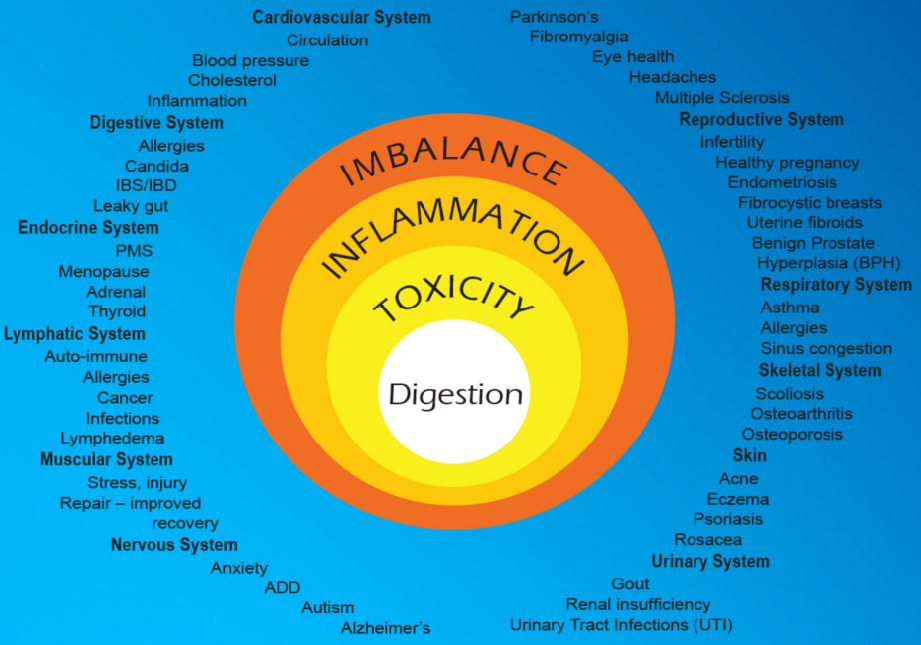
Ignoring importance of prenatal nutrition and digestive health for mom, embryo, fetus

Ignoring rate at which a human's digestive system develops

Unnecessary C-sections & declining rates of breast feeding

Ignoring nutrition deficiency& increasing rates of toxicity

Failure to recognize importance of enzyme therapy for disease management and prevention



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The First 1,000 Days Will Impact the Last 1,000 Days

- *Prenatal nutrition drives a child's early development and sets the footprint for the future health of that individual.*
- *The impact of a mother's nutritional status on her baby's health starts before embryonic development and is essential to providing building blocks for brain development, healthy growth, and a strong immune system.*
- *Mother's digestive health is of equal importance to ensure nutrients are making it to baby vs contributing to the ripple effect of disease.*

CURRENT PRENATAL NUTRITION COUNSELING

- *Recommended that pregnant women receive Nutrition Counseling with a Registered Dietitian but RDs seldom provide.*
- *PNC becomes the responsibility of the healthcare team which varies by provider, with 19% obstetricians & 26% general practitioner with limited and outdated nutrition training.*
- *A recent study identified a disconnect between the recognized impact of nutrition on pregnancy outcomes and doctor's ability to confidently and effectively counsel patients on nutrition in pregnancy.*
- *Results demonstrate a need to develop curriculum and interventions to educate Ob/Gyn residents about pregnancy-related nutrition.*

HOW DIGESTION CHANGES DURING PREGNANCY

- *Many of the digestive discomforts of pregnancy such as morning sickness, constipation, and heartburn are all related to the relaxed tone and slowed action of the digestive system.*
- *Progesterone causes smooth muscle relaxation which slows digestion and impacts nutrient absorption.*
- *The gallbladder is also affected with delayed emptying which increases the chances of gallstone formation.*
- *Stress on the body also shunts digestive capacity/output.*

TOXICITY BEGINS IN UTERO

- ***The gut microbiome can influence nutrient absorption during pregnancy and cause more global effects on gestation and fetal growth.***

- The maternal microbiome IS directly seeded into infant guts to influence their health internally.

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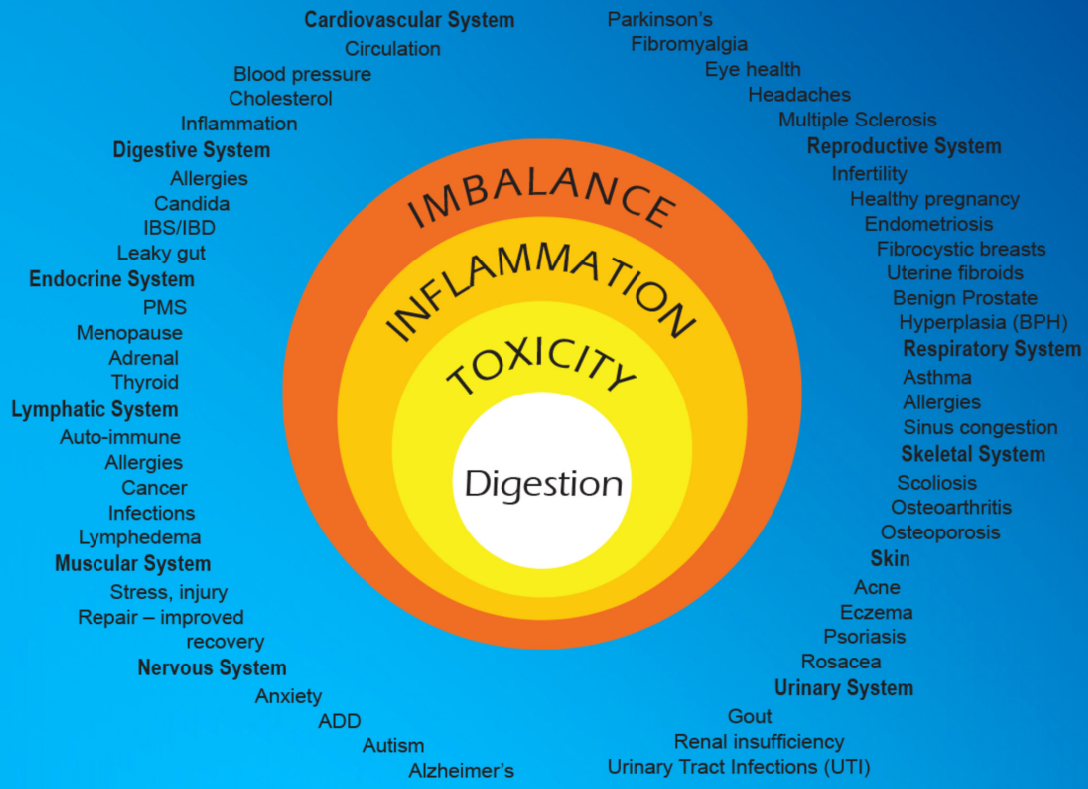

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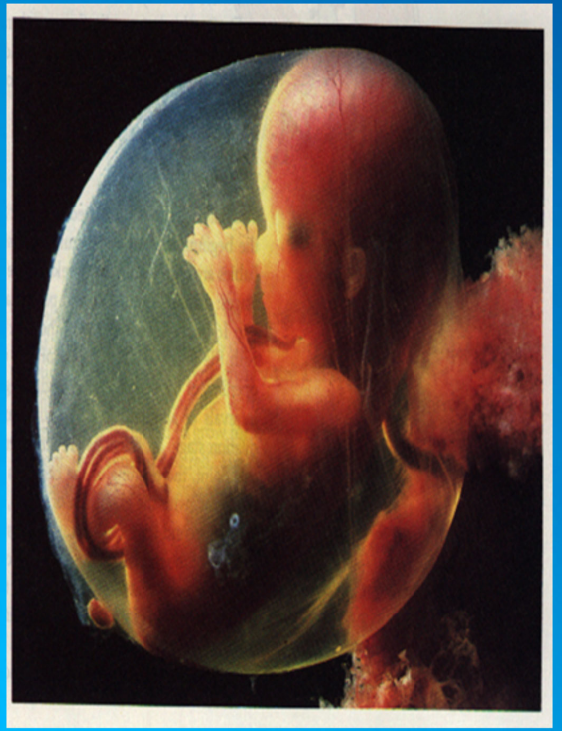
HOW WE CREATE DISEASE: IGNORING DEVELOPMENTAL BIOLOGY

- The gastrointestinal (GI) system is one of the first systems to develop during the process of ontogenesis.
- Any disorder of GI tract during this period can result to serious consequences on the organism.
- Therefore, it is important to address the processes of normal development of the GI tract for disease prevention in adulthood.



Gut Developmental Biology and Characteristics
IN-UTERO GI TRACT DEVELOPMENT

- Pancreas buds (v/d) are seen at 30 days
- Dilation of stomach at 6th week
- Duodenum and jejunum crypts at 10th to 11th week
- Ileum and colon crypts at 11th to 12th week

- Brush borders, and enzymes developed at 10th-12th week
  - Lactase, sucrase, maltase, glucoamylase start at 10th week
- α-amylase at 6th month after term birth
- Villi: fully developed in teenage years

Biochemicals (Nutrients, Enzymes & DNA)
are obtained through our mother's breast milk
NO BABY FORMULA CONTAINS THEM

DO NOT MAKE DIGESTIVE ENZYMES FOR FORMULAS,
ONLY FOR MOTHER'S BREAST MILK

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Limitations of the Infant Digestive Tract

- Newborn stomach secretions contain pepsin and HCL which, along with the pancreatic enzymes, effectively break down the specific proteins, minerals, and fats presents in **breast milk**
- The walls of the infant's small intestine are extremely permeable during the first 9 months ensuring maximum absorption but with less discretion than that of a mature gut
- Breakdown of more complex starches occurs in the small intestines and involves pancreatic amylase around 15 months
- Gut lining closes at closer to 24 months
- Foods that come in too early are going to bring on more toxicity and inflammation in that child if there is not proper digestive support provided.

THREE YEAR OLDS

- *CAN PROPERLY UTILIZE SUGARS BECAUSE THEY NOW HAVE BETTER GUT BACTERIA BALANCE*
- *BUT THEY ARE STILL NOT DONE, THEIR DIGESTIVE SYSTEM IS STILL DEVELOPING*

CHILDREN'S DIGESTIVE SYSTEMS ARE NOT FINISHED UNTIL THEY ARE OUT OF PUBERTY

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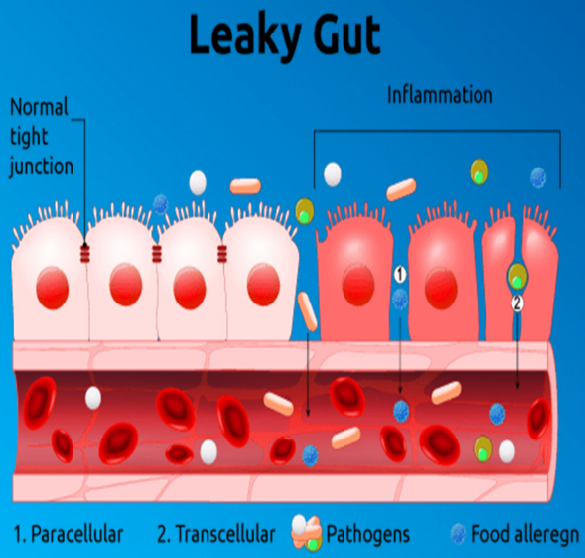
What is the Cost of Poor Digestion in Infancy Through Adolescents?

- Prolonged toxicity and inflammation from not digesting damages the intestinal lining as well as hormone and neurotransmitter balance.
- When gut flora is abnormal it can penetrate the gut lining and allow poisonous and pathogenic microroganisms to enter the blood stream.
- Many of these microbes have their own metabolisms and produce/regulate hormones and neurotransmitters.
- **What is occurring in epidemic proportions amongst our youth?**



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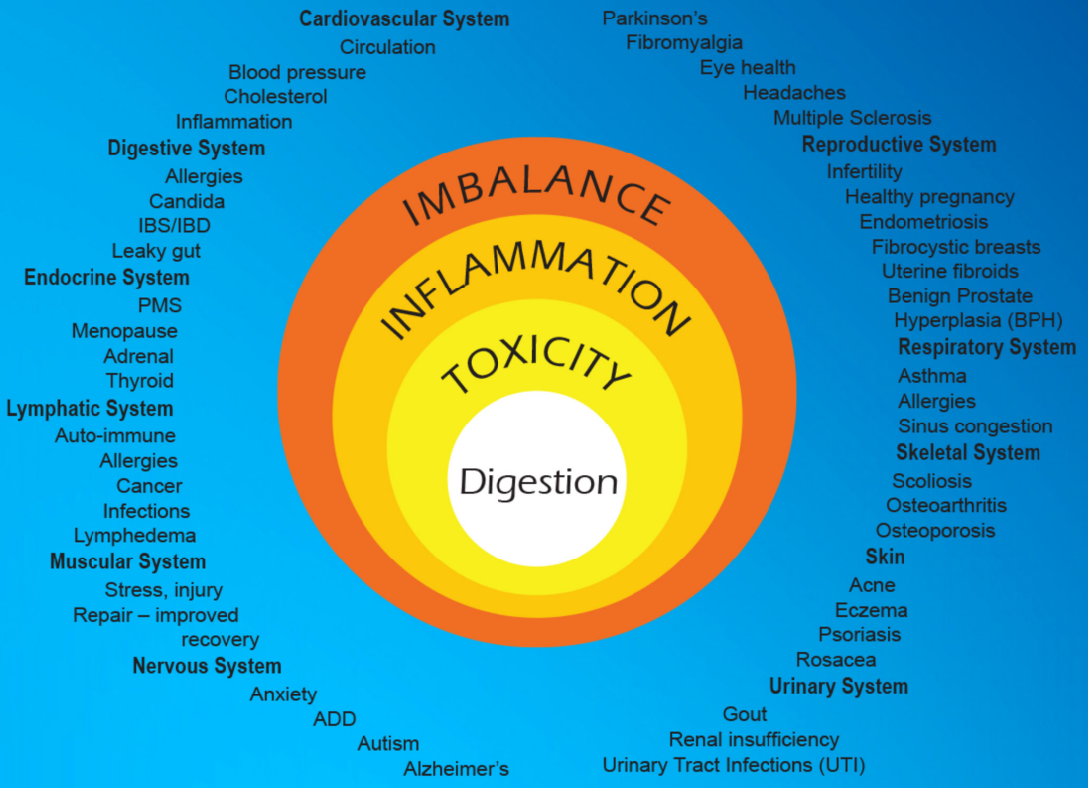

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LOSS OF NATURAL BIRTH, FEEDING, & IMMUNITY

- *Human microbial colonization begins at birth and continues to develop until the microbiota becomes adult-like.*
- *The infant's important developmental stages are entirely dependent upon the colonization of microorganisms, beginning at birth.*
- ***Modern changes in lifestyle, sanitization, c-sections, antibiotics, and immunizations are factors that shift the microbiota driving increases in immune-mediated diseases.***

Rising Rates of Caesarean Sections

- According to new research from the World Health Organization caesarean section use continues to rise globally, now accounting for more than 1 in 5 (21%) of all childbirths.
- This number is set to continue increasing over the coming decade, with nearly a third (29%) of all births likely to take place by caesarean section by 2030.
- While a caesarean section can be an essential and lifesaving surgery, it can put women and babies at unnecessary risk of short- and long-term health problems if performed when there is not medical need.

Declining Rates of Breastfeeding

- While about 80% of babies are breastfed at birth, by three months, less than 20% are exclusively breastfed.
- The official recommendation is that babies are exclusively breastfed for six months but only 1% of babies are exclusively breastfed by this point.

Table 1.1

Composition of milk from different types of animals.

Animal	Protein total %	Casein %	Whey protein %	Fat %	Carbo-hydrate %	Ash %
Human	1.2	0.5	0.7	3.8	7.0	0.2
Horse	2.2	1.3	0.9	1.7	6.2	0.5
Cow	3.5	2.8	0.7	3.7	4.8	0.7
Buffalo	4.0	3.5	0.5	7.5	4.8	0.7
Goat	3.6	2.7	0.9	4.1	4.7	0.8
Sheep	5.8	4.9	0.9	7.9	4.5	0.8

Component	Human	Bovine
Protein (g/dL)[1]	0.9 to 1.2	3.3
Fat (g/dL)[1]	3.2 to 3.6	3.7
Lactose (g/dL)[1]	6.7 to 7.8	4.5
Oligosaccharides (g/dL)[1]	0.7 to 1.2	0.1
No. of identified oligosaccharides[2]	<200	approximately 40
% fucosylated[2]	35% to 50%	approximately 1%
% sialylated[2]	12% to 14%	Less than 25%

Sources:[1] (Ballard & Morrow, 2013), [2] (Totten et al., 2012).

Bifidobacterium Infantis Extinction

- ***As a result of declining natural births and breastfeeding, humans in the U.S. have lost a third of their microbial diversity, mostly on their skin and in their stomachs and digestive tracts.***
- ***Vaginal bacteria changes and diversifies as we prepares for birth and children born via C-section miss out on an important inoculation.***
- ***Microbe extinction may be at the root of modern plagues like asthma, allergies, diabetes, obesity and even some forms of cancer.***
- ***Low levels of bifidobacteria in the intestines have also been associated with many other diseases, including celiac disease, diabetes, obesity, allergic asthma, and dermatitis.***

WHY DOES THIS MATTER?






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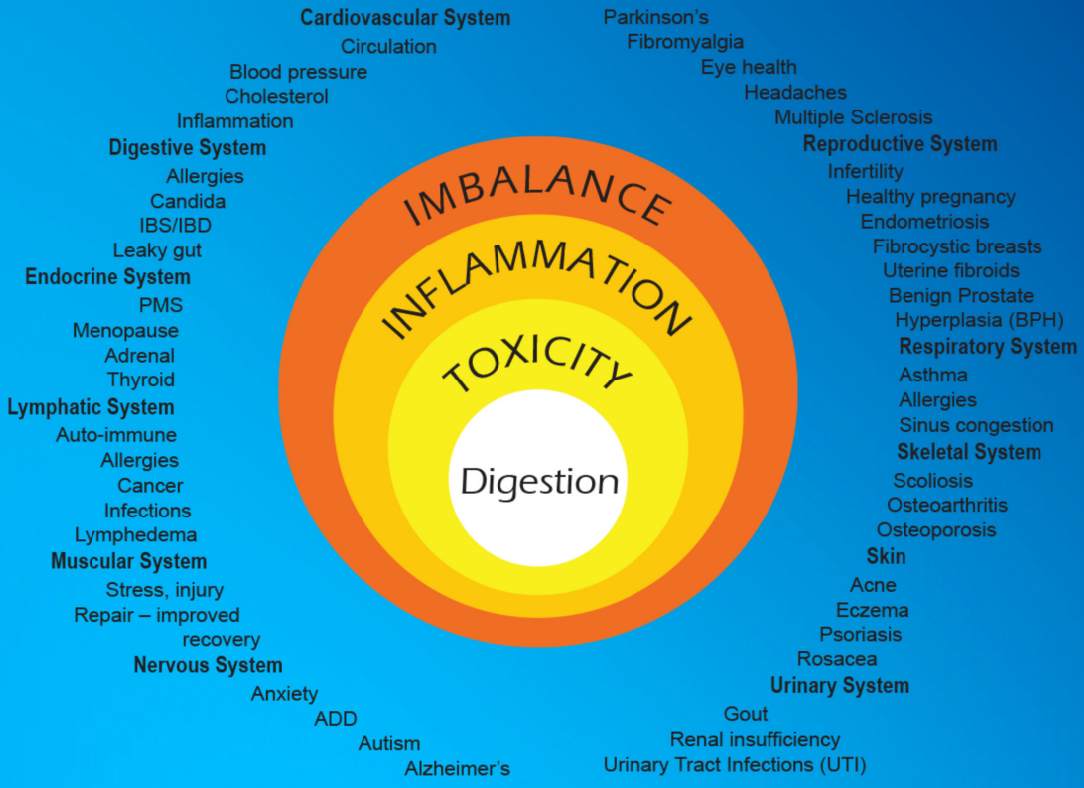

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MICRONUTRIENT DEFICIENCY & DISEASE DEVELOPMENT

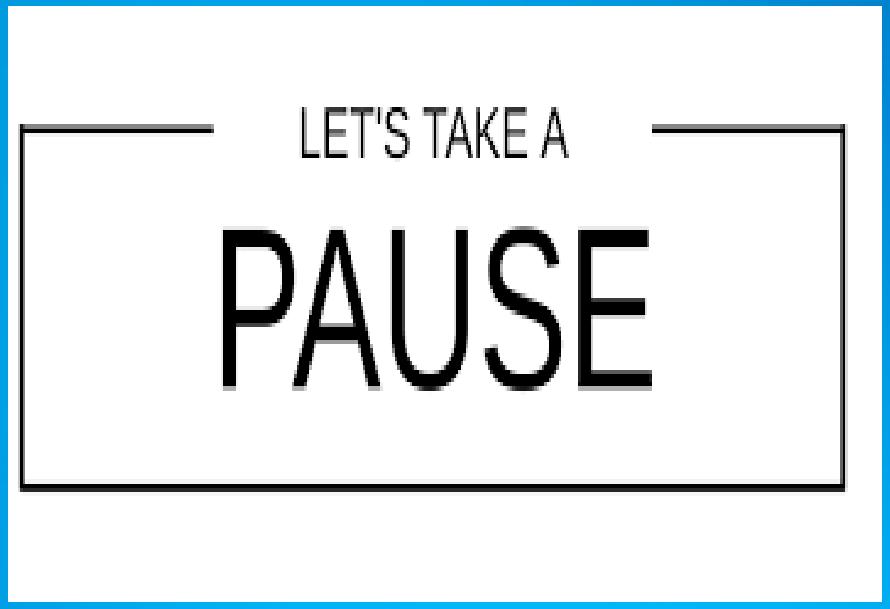
- Micronutrient inadequacies have important implications for long-term health and increase one's risk for chronic diseases like cancer, cardiovascular disease, type 2 diabetes mellitus, osteoporosis, and age-related eye disease.
- **BUT THAT'S ONLY A PROBLEM IN UNDERDEVELOPED COUNTRIES…RIGHT?**

OVERFED & UNDERNOURISHED

WRONG!!!

- *USDA's recommended daily fiber amount for adults is 25 -38 gm/day for adults*
  - *American adults eat 10-15 gm/day total fiber*
- *USDA recommends children should eat 14-38-gm/day depending on age*
  - *Actual consumption on average is less than 10 gm/day*
- *In the US and the UK, at least ½ of women of reproductive age are deficient in one or more micronutrients from diets high in processed nutrient void foods*
  - *Inadequacy for Vit A, 46% for Vit C, 95% for Vit D, 84% for Vit E, and 15% for Zinc*
  - *Most are also deficient in choline, which is critical during fetal development for stem cell proliferation and apoptosis.*

HOW IMPORTANT IS NUTRITION IN YOUR PRACTICE FOR MANAGEMENT OF DISEASE?



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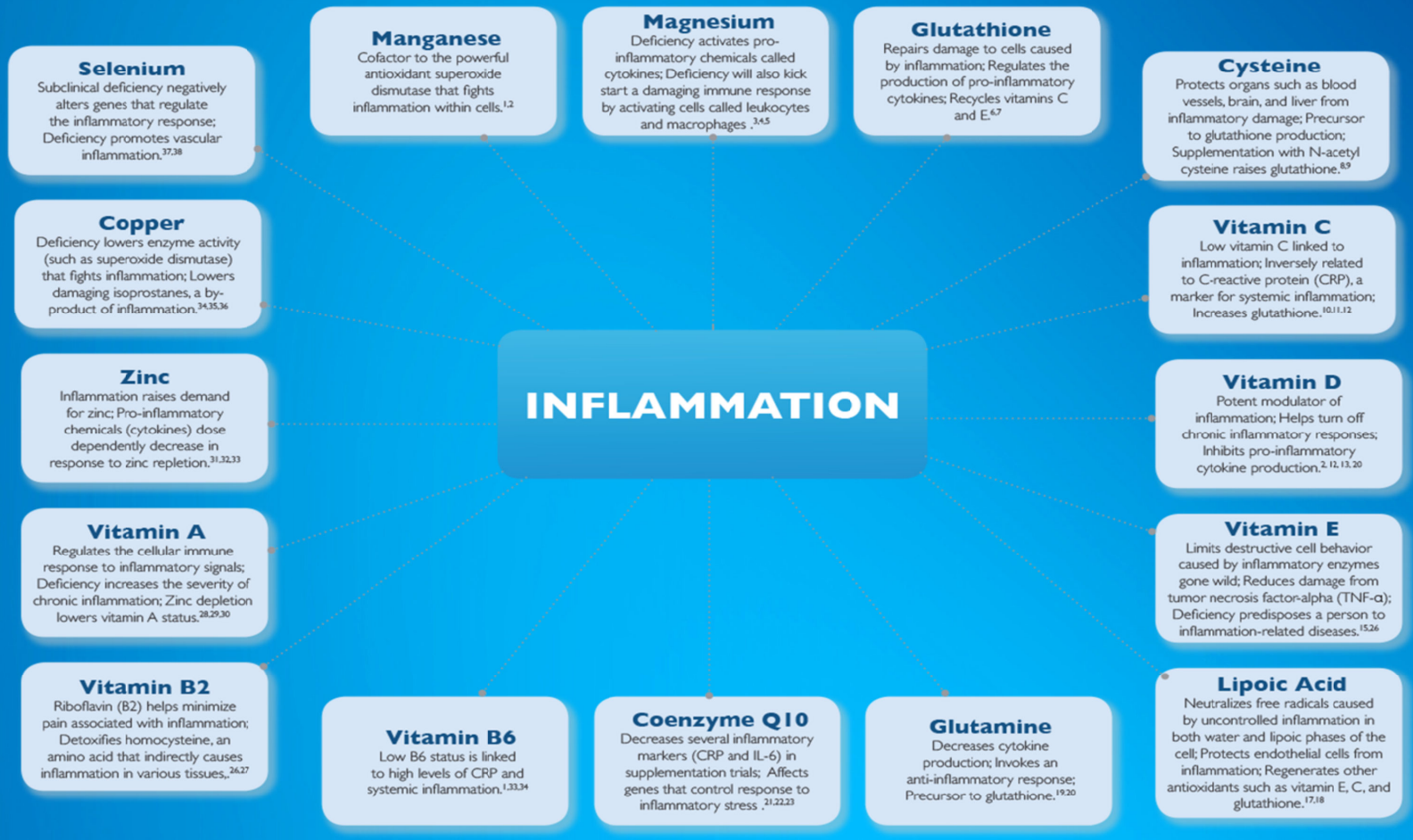

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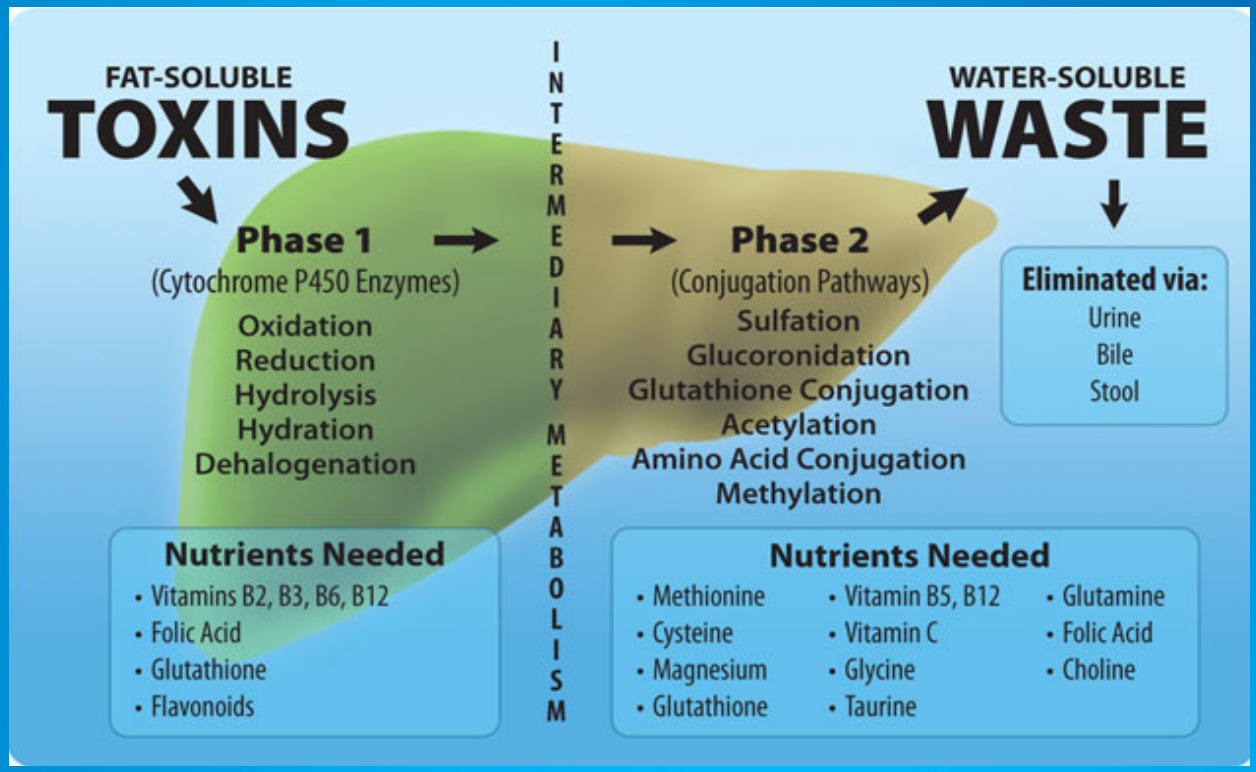
NUTRITION'S ROLE IN DETOX



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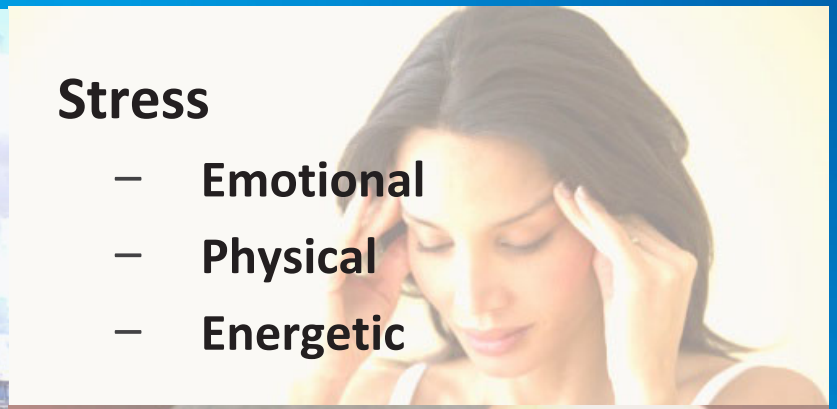
Our Toxic (external) World

Environment

- Air & Water
- Noise
- Technology



Stress

- Emotional
- Physical
- Energetic

Food Supply

- GMO's
- Chemicals
- Antibiotics
- Growth hormones

In Your Home

- Cleaning supplies
- Cosmetics
- Cookware
- Furniture

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Support Your **Digestive System**

- In addition to nutrition, A well-functioning digestive system is crucial for detoxifying the body.
- Gut health directly impacts how efficiently you eliminate waste and absorb nutrients.
- *Although food can function as medicine, it is difficult to replete a deficiency with food alone.*
- **Nutrition is only as good as your ability to digest what you are eating.**

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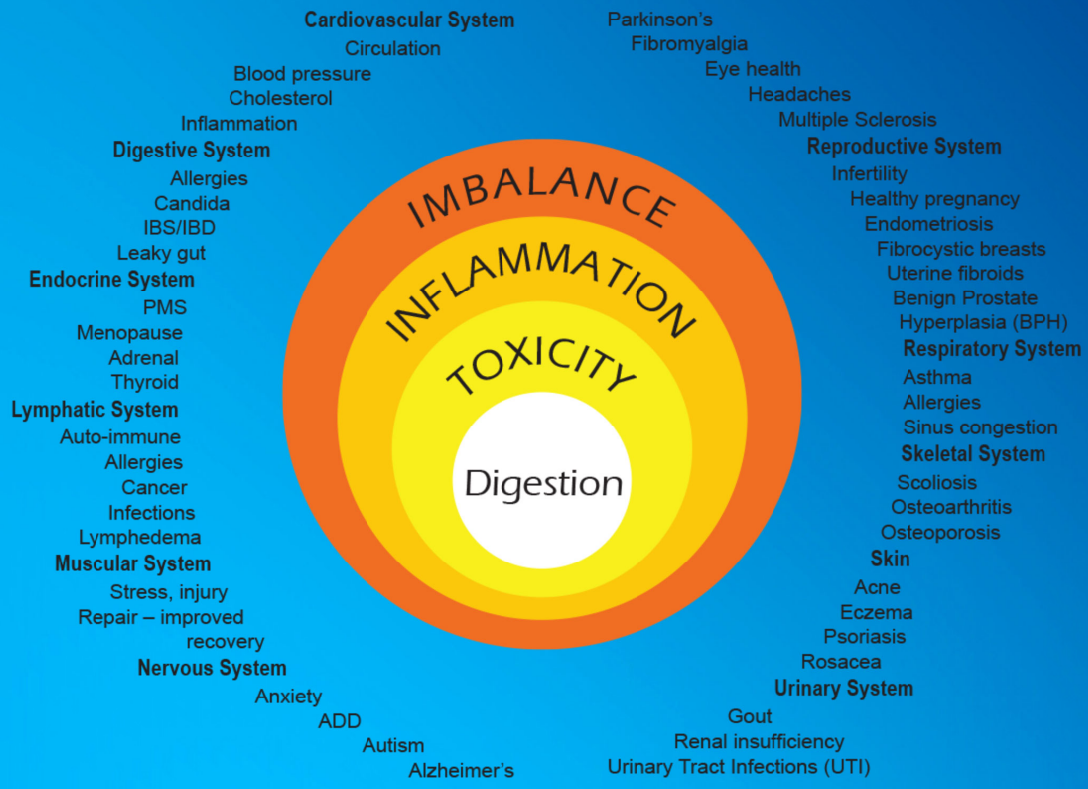
HOW WE ARE CREATING DISEASE

Failure to recognize importance of enzyme therapy for disease management and prevention



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Our Toxic (Internal) World

- Poorly digested carbohydrates ferment
  - Nutrients cannot be properly absorbed or utilized and become toxins
- Poorly digested lipids turn rancid
  - Toxins in the colon are absorbed into the bloodstream, oxidized to become free radicals
- Poorly digested proteins putrefy
  - Results in toxic amines and the kidneys become overloaded
  - The lymphatic system, which also works to remove toxins, will also suffer

Making The Connection

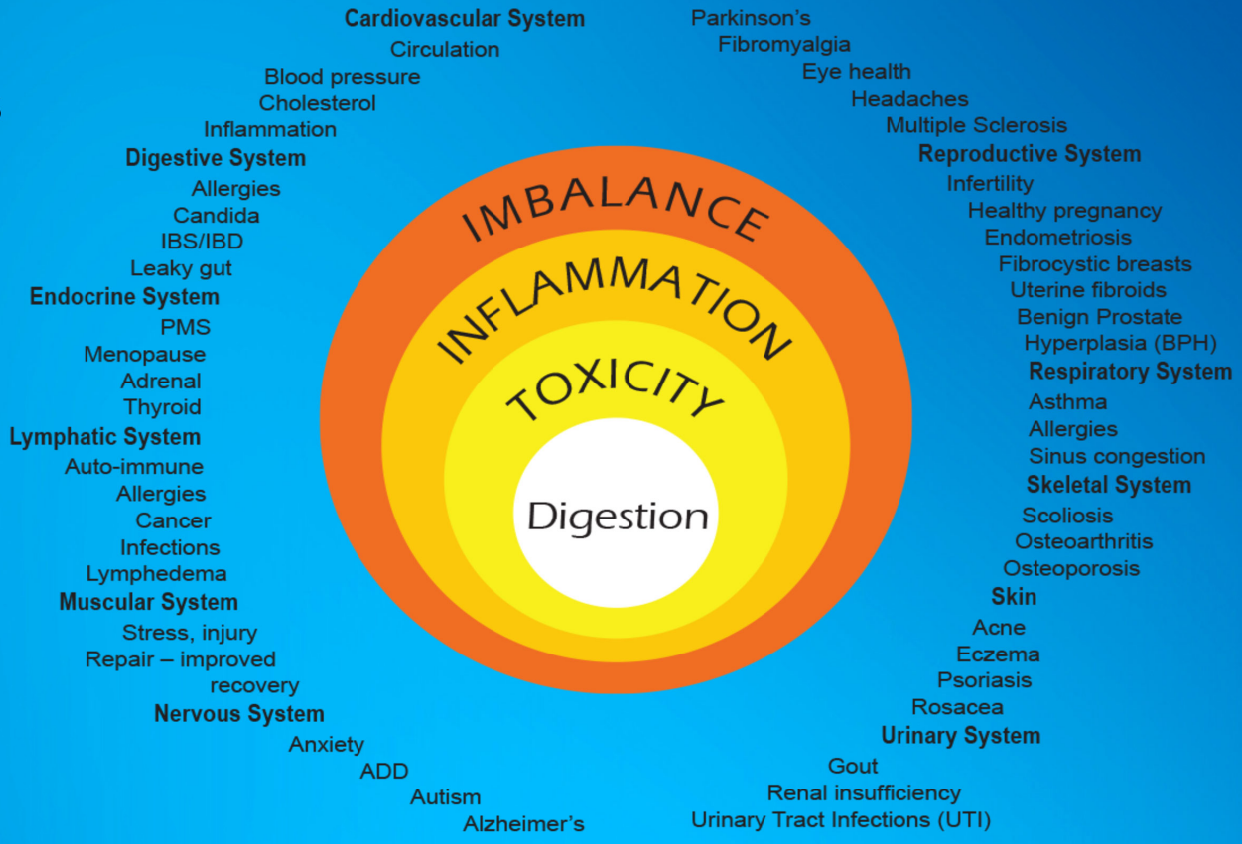
- **TOXICITY**
  - Headaches
  - Fatigue
  - Dry skin
  - Bad breath
  - Disturbed sleep
  - Cholesterol imbalances
  - Compromised immunity

Making The Connection

- **INFLAMMATION**
  - Inflamed bowels
  - Achy joints
  - Sinus congestion
  - Acid reflux
  - Frequent infections

Making The Connection

- **IMBALANCE**
  - Food allergies
  - Arthritis
  - Auto-immunity
  - Asthma
  - Eczema
  - Gout
  - MS
  - Cancer



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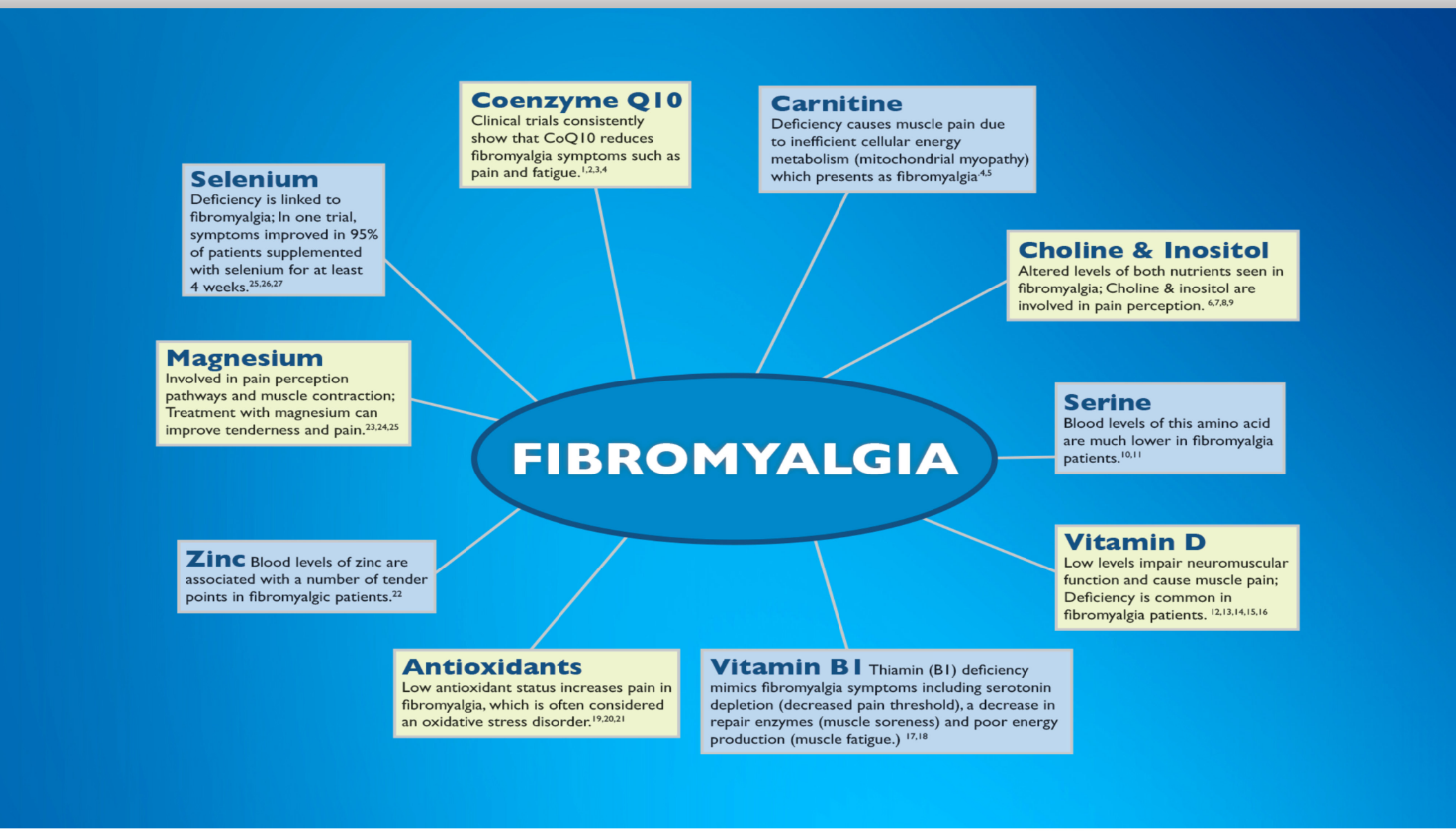
LEAKY GUT & PAIN

- *When the gut lining becomes permeable, undigested food particles and bacteria can enter the bloodstream, triggering an inflammatory response throughout the body, including joints and muscles, leading to pain.*
- *The composition and function of the gut microbiota influence cytokine production which will influence pain sensitivity and perception.*
- *Changes to gut bacteria in people with painful GI issues such as inflammatory bowel disease and irritable bowel disease has long been recognized.*



LEAKY GUT & CANCER

- *When "leaky" the immune system continually reacts to the array of pathogens and toxins entering the bloodstream. (Ripple Effect)*
- *The immune system becomes distracted away from the cancerous cells that are beginning to grow and multiply in another area.*
- *Dysbiosis or leaky gut promote the progression and the development of hepatocellular carcinoma (HCC) via the release of cancer-and senescence-promoting metabolites and increased hepatic exposure to gut-derived microbe-associated molecular patterns (MAMPs) such as lipopolysaccharide (LPS).*
- *MAMPs promote hepatic inflammation, fibrosis, proliferation, and the activation of anti-apoptotic signals.*

LEAKY GUT & CANCER

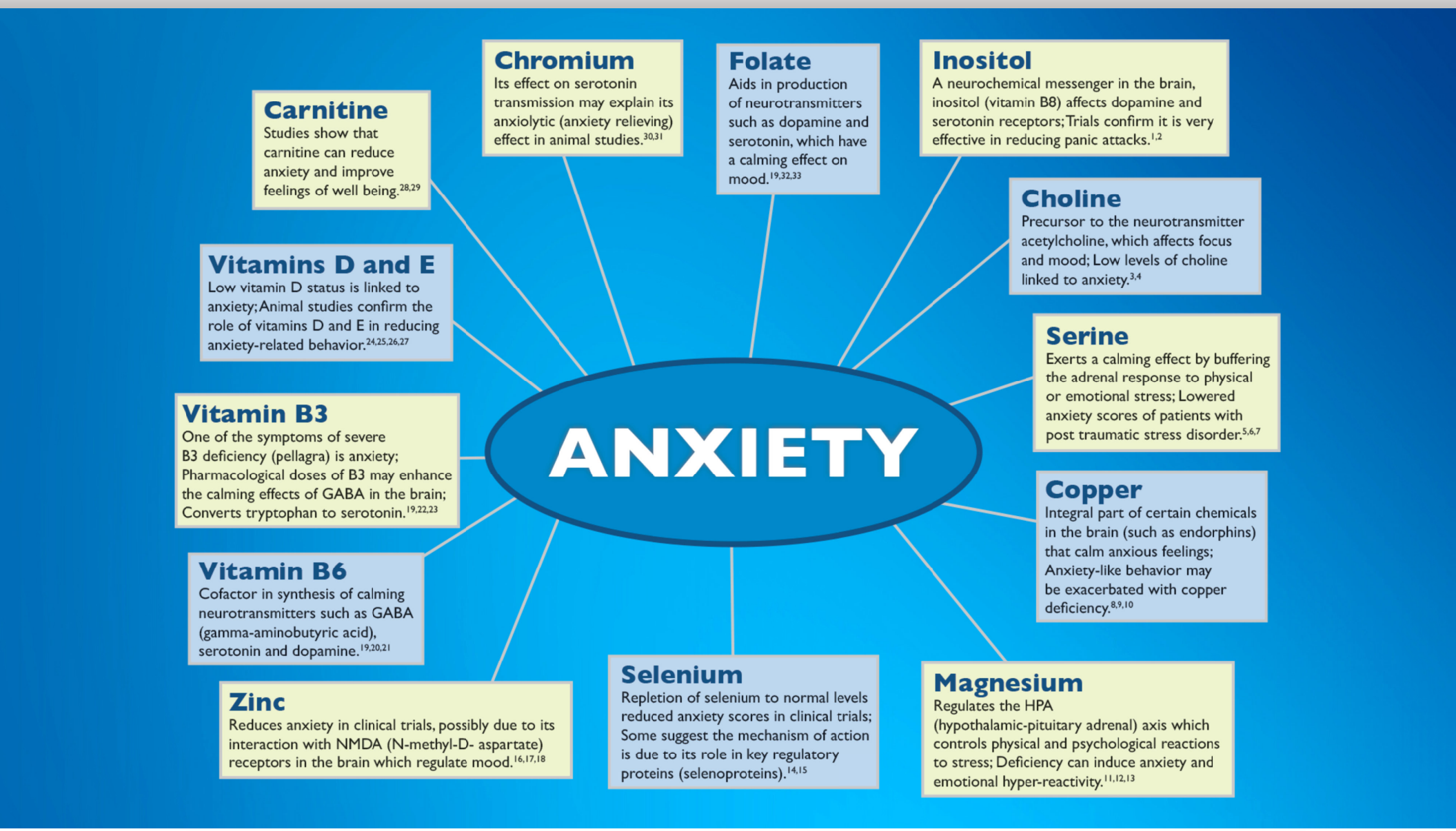
- *Breast cancer survivors are prone to weakened gut barriers, allowing bacteria to migrate into the blood stream (remember previous slide).*
- *Unaddressed gut permeability fuels inflammation, which, elevates risk for co-morbid disease development, cancer recurrence, and a poor quality of life.*
- *The body's inflammatory response to intestinal permeability promotes "inflamm-aging," that accelerates biological aging and age-related frailty, morbidity, and mortality.*

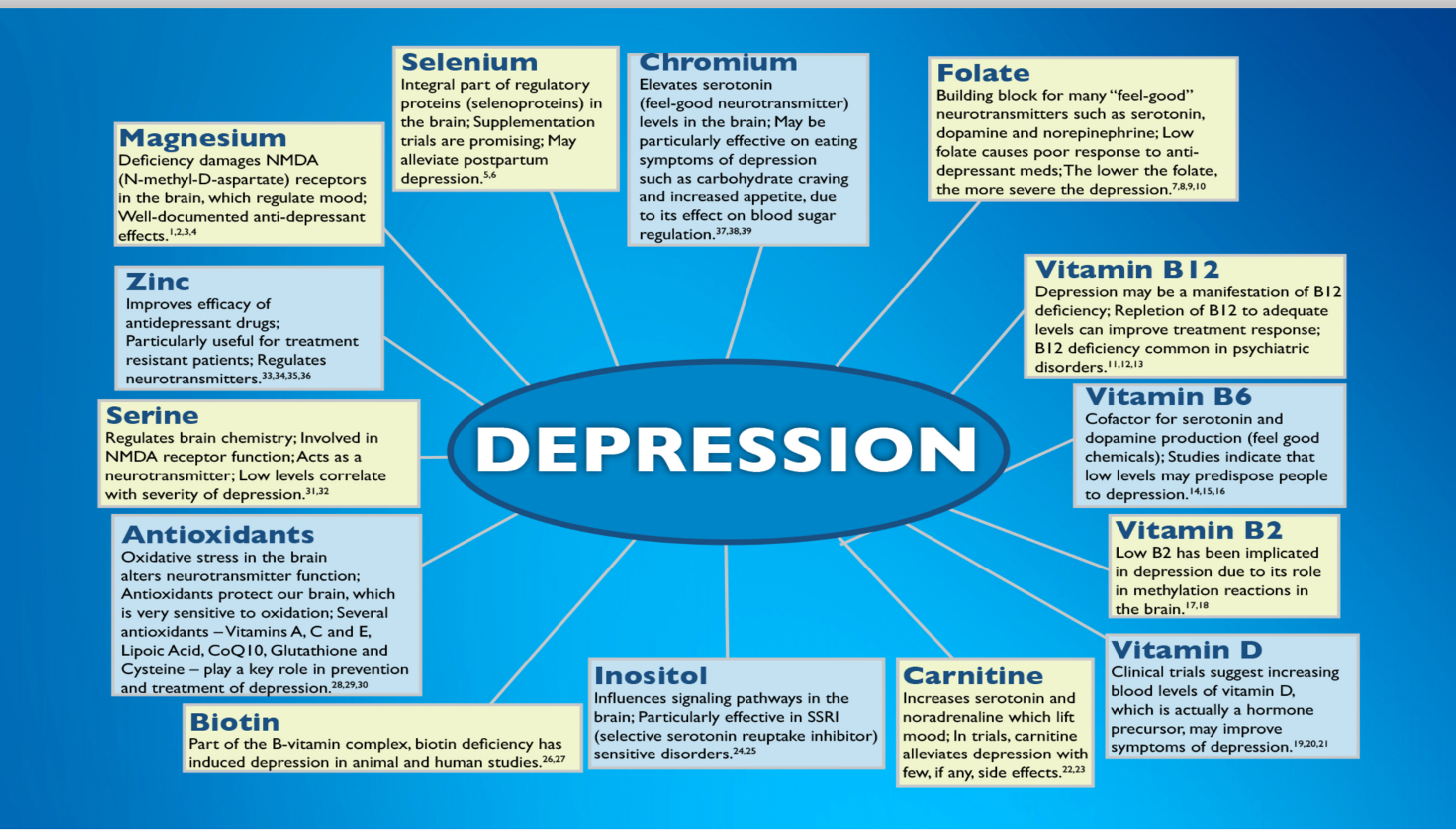
LEAKY GUT & CANCER

- *There is a causal relationship between colorectal cancer (CRC), chronic systemic inflammation, persistent infections, and the presence of dysregulated circulating inflammatory markers.*
- *Circulating levels of zonulin were higher in CRC patients compared to tumor-free controls supporting the hypothesis of an interplay of gut barrier dysfunction and bacterial translocation in colorectal carcinogenesis.*
- *How do we regulate zonulin?*

SIDE EFFECTS TO STANDARD CANCER TREATMENTS

- ***Cancer treatment, especially chemotherapy, can damage the intestinal lining.***
- ***Chemotherapy is implicated in increased intestinal wall permeability, mucositis, sickness behaviors, and changes in the gut microbiota.***
- ***Chemotherapy-induced mucositis is associated with increased symptoms of pain, anxiety, and depression.***
- ***Radiation therapy can significantly alter the gut microbiome, leading to an imbalanced and less diverse microbiota community.***
- ***This dysbiosis has been linked to increased inflammation, oxidative stress, and tissue damage.***





Leaky Gut As a Danger Signal for Autoimmune Diseases

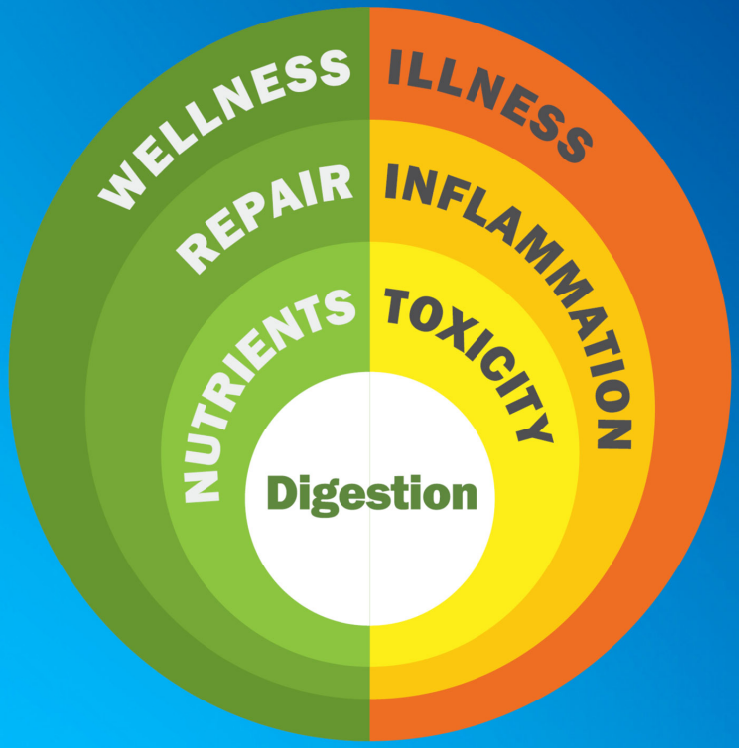
- *Genetic and environmental triggers have been long known as the major contributors to the development of autoimmunity.*
- *GENETICS LOAD THE GUN, THEY DON'T ALWAYS PULL THE TRIGGER*
- *Increasing evidence in recent years suggests that microbial translocation and intestinal barrier dysfunction, which may be affected by gut microbiota, are an important causative element for autoimmune disorders.*
- *The leakage of pathogens into the body system results in _____ which equals _____.*

Leaky Gut & Autommunity

- *Leaky gut can also contribute to inflammation throughout the body, which is a hallmark of autoimmune diseases.*
- *The increased permeability of the gut lining can trigger the immune system to mistakenly attack the body's own tissues and organs, leading to autoimmune conditions.*
- *Modulating the gut microbiome through dietary changes, probiotics, and other strategies can help to improve gut barrier function and potentially reduce the risk of autoimmune diseases.*

What We Should Be Doing

- Providing realistic and up to date nutrition guidelines and education
- Supporting a SIMPLIFIED approach to digestion and cleaning the gut
- Re-establishing harmonious microbiome
- Supporting the gut wall
- Reducing toxicity and Inflammation
- Promoting autophagy and a healthy terrain



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DIGESTIVE, SYSTEMIC & MICROBIOME SUPPORT SHOULD NO LONGER BE AN OPTION, IT SHOULD BE A NECESSITY IN EVERY CONDITION THAT WALKS THROUGH YOUR DOOR

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