

A Balance of Energy Needs and Essential Resources



John Brooks, LCP, CHC
Perfusion Dept. Manager
Missouri Baptist Med Center
St. Louis, MO

John Brooks

Front end -Proactive
Daily Wellness

Back end –Reactive
Chronic Illness

**Perfusion Department Manager
Missouri Baptist Medical Center
St. Louis, MO**

**Certified Health
& Wellness Coach in
Integrative Nutrition**

Website: nutritionrendition.com

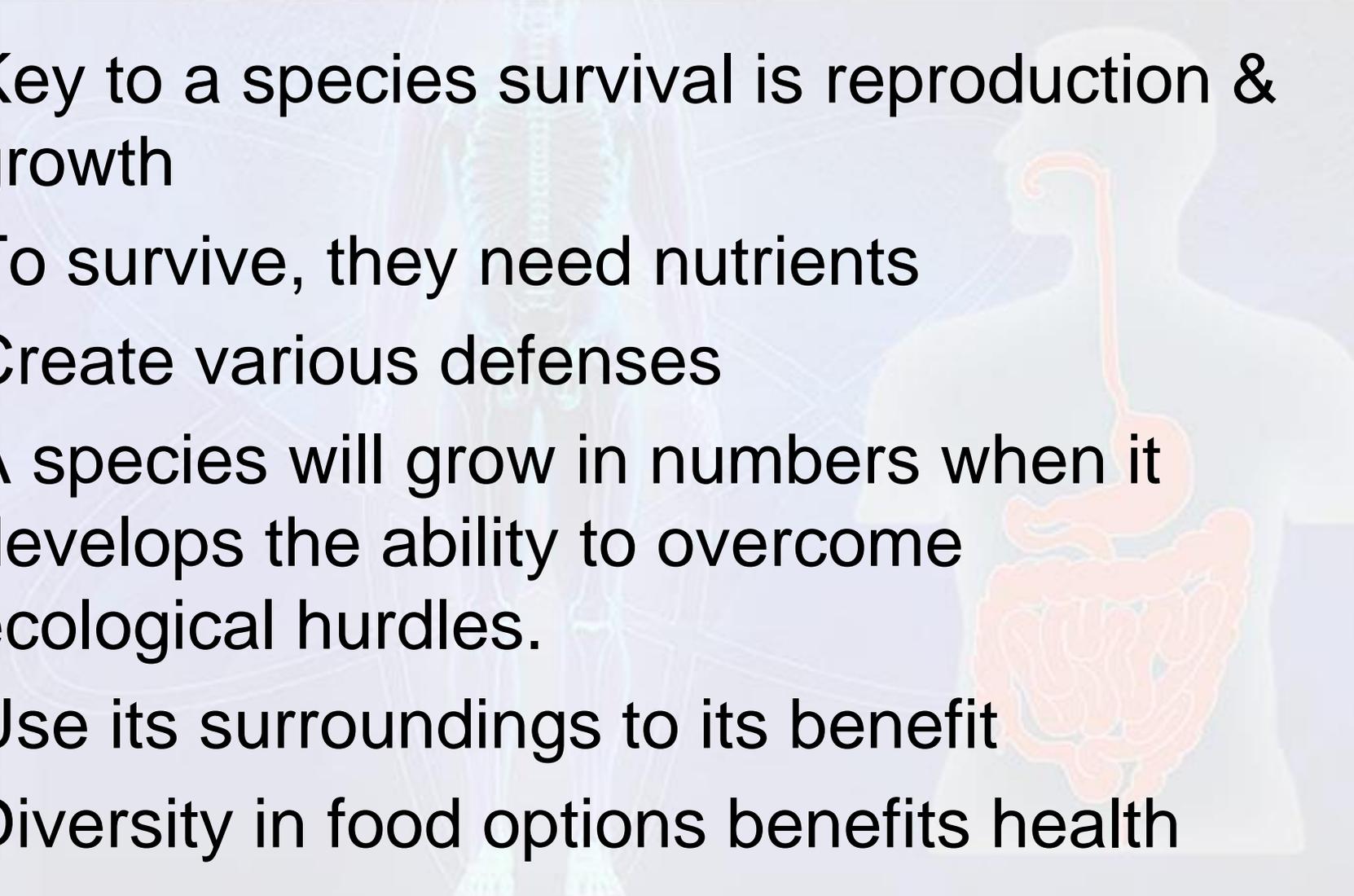
Disclaimer: I have no financial interests in anything discussed. No products are sold on my informational website.



A Healthy Life

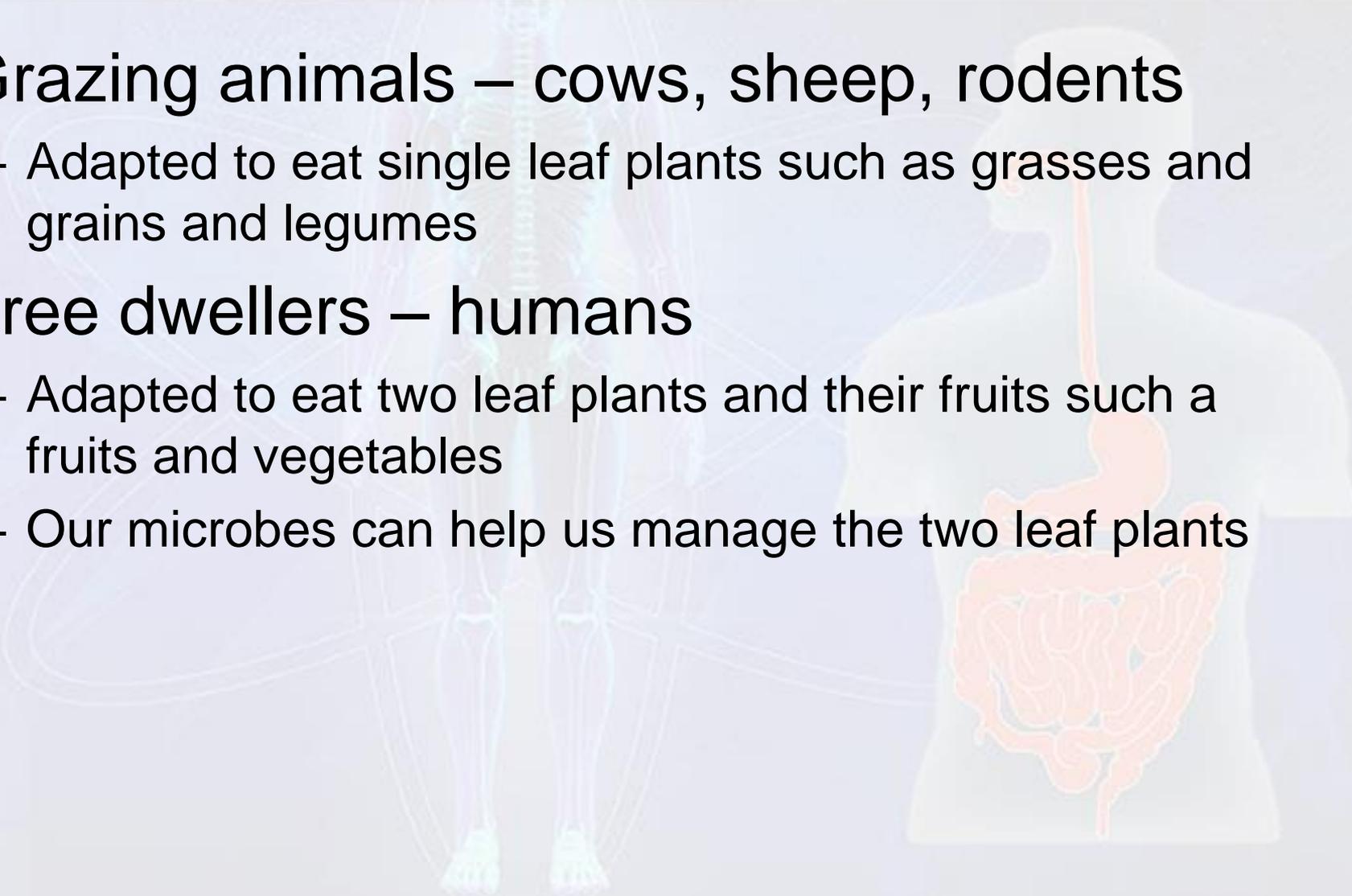
- A short 10,000 year history of change
- Recent changes in Health and Wellness Management
- Medical care approach to health
- Current integration of food/energy intake and genomics
- Proteomics (Epigenetics) – not just another protein
- Our digestive system turned inside out
- Health impact on what we ingest - lectins
- Who's in charge? Who are the decision-makers?
- What are the new technologies / research in health?
- What can you do to improve your health?

All Life is Opportunistic

- Key to a species survival is reproduction & growth
 - To survive, they need nutrients
 - Create various defenses
 - A species will grow in numbers when it develops the ability to overcome ecological hurdles.
 - Use its surroundings to its benefit
 - Diversity in food options benefits health
- 
- The background features faint, semi-transparent illustrations of a human skeleton and internal organs. On the left, a full-body skeleton is visible. On the right, a silhouette of a human torso shows the internal digestive system, including the esophagus, stomach, and intestines, highlighted in a light orange color.

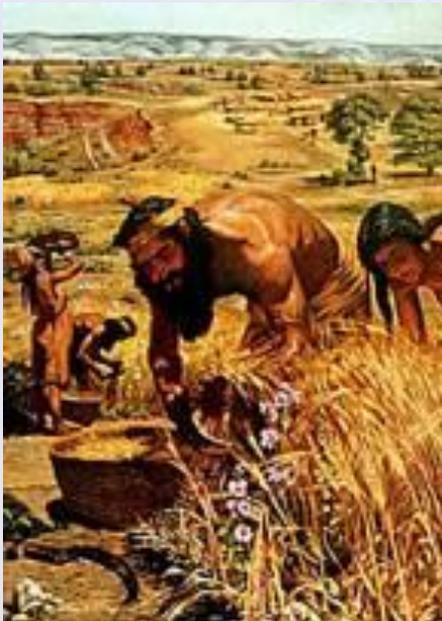
Grazer or Tree Dweller?

- Grazing animals – cows, sheep, rodents
 - Adapted to eat single leaf plants such as grasses and grains and legumes
- Tree dwellers – humans
 - Adapted to eat two leaf plants and their fruits such a fruits and vegetables
 - Our microbes can help us manage the two leaf plants



We are what we eat...and what our plants and animals consume

Paleolithic Era
Hunter -
Gatherers
Wild plants and
Wild game



Neolithic or
Agricultural
Revolution

Plant Cultivation
And
Animal Domestication
and Herding

Prior to WWII



Seasonal Crops



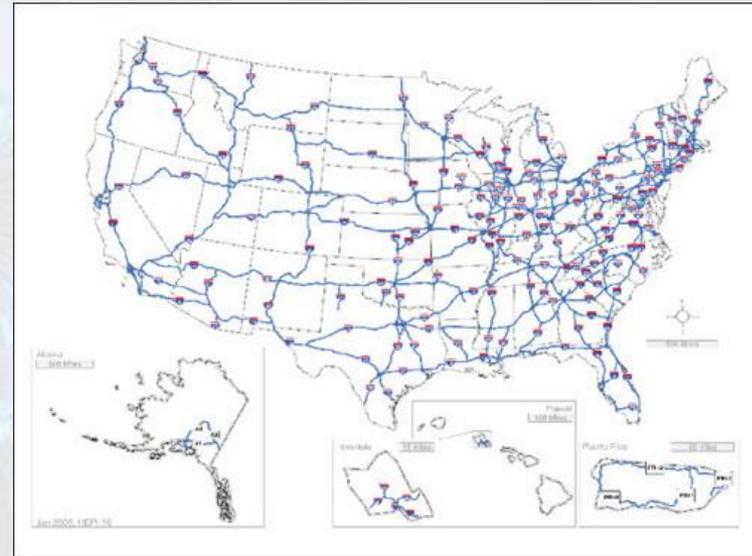
Local farming -
50 mile radius

Pasture raised

Crop & Livestock
Rotation

National Food Transportation / Refrigeration

In the mid 1950's the National Interstate Highway system was developed, changing the way that people and food moved around the country. The evolution of refrigeration trucks allowed perishable foods to be shipped beyond the typical 50 mile distance for local food markets, and helped spawn the frozen food industry



The development of residential refrigerator/freezers gave the typical household the ability to store perishable foods for longer periods of time



From Limited, seasonal food options to Abundant, year round of food options



Evolving Food industry



It's time to turn to A&P...

A&P SUPER MARKETS

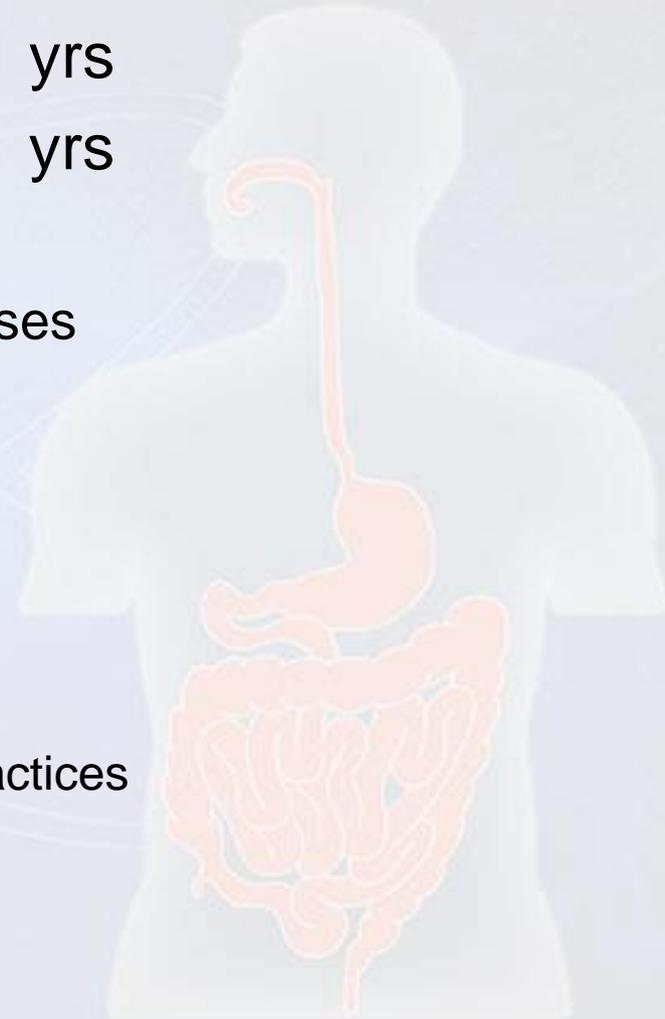
There are dozens of reasons why millions of America's families prefer A&P Super Markets. But the principal reason is that you can rely on A&P for really fine quality, and yet be certain that the prices you pay assure you of exceptional value for your food dollars. It is the certainty of getting your money's worth... often and time again... that has made A&P the world's foremost retailer of foods. If you like to choose from wide selections of the best of good things to eat... and if you desire to get the most possible for your food budget... then... It's Time To Turn to A&P!

© 1945 - The Great Atlantic & Pacific Tea Company

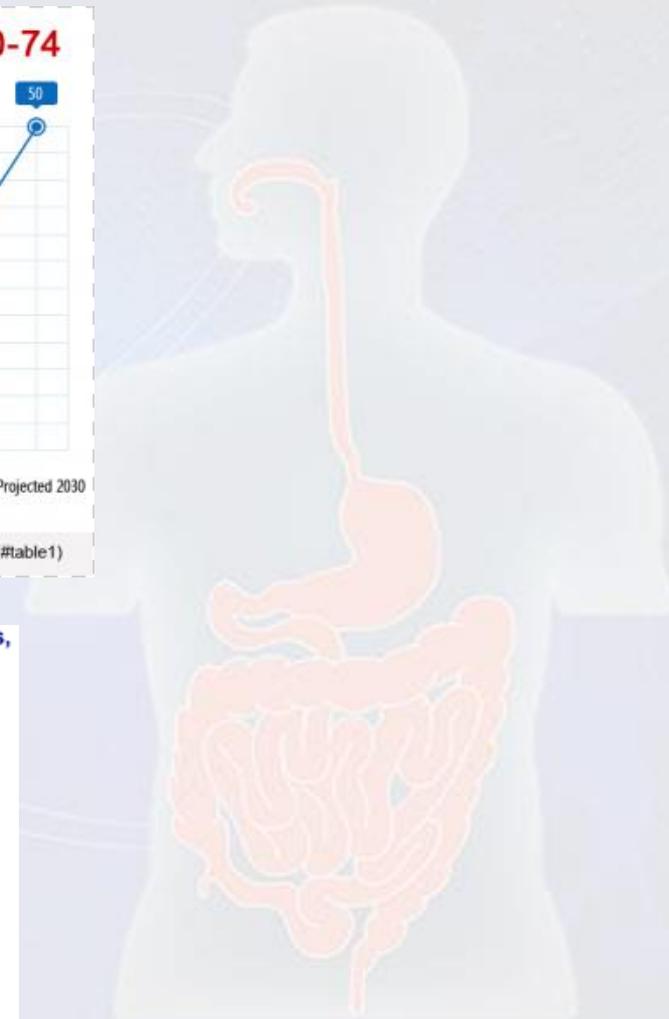
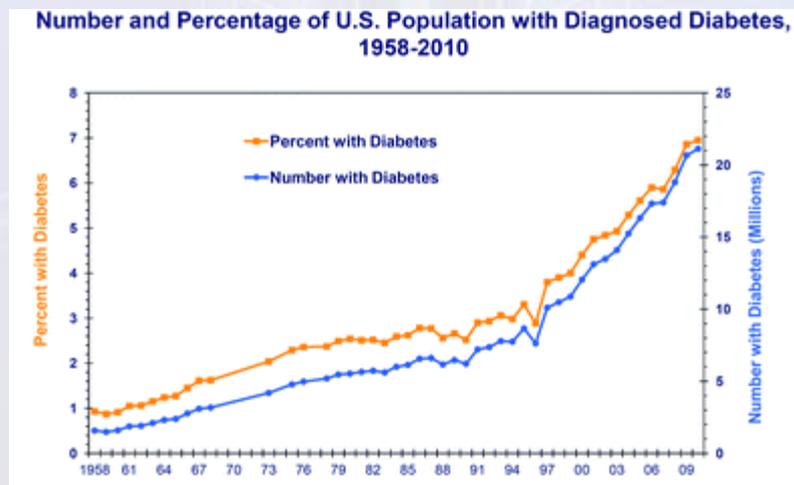
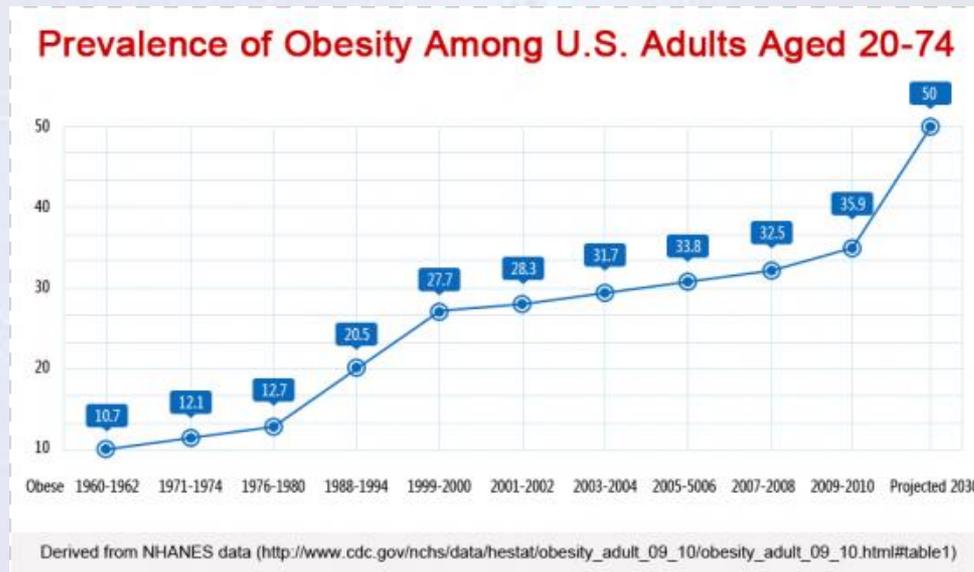


Life Expectancy

- 1960 - Men 66.4 yrs Women 73.1 yrs
- 2013 - Men 76.5 yrs Women 81.1 yrs
- What was the primary impact?
 - Reduction in deaths from infectious diseases
 - Mainly in infants and children
 - Impact of vaccines and antibiotics
- Infant Mortality
 - 1935 – 56 deaths per 1000
 - 2006 - 6 deaths per 1000
 - Improvements in pre-natal & child birth practices



Increase in Diabetes and Obesity

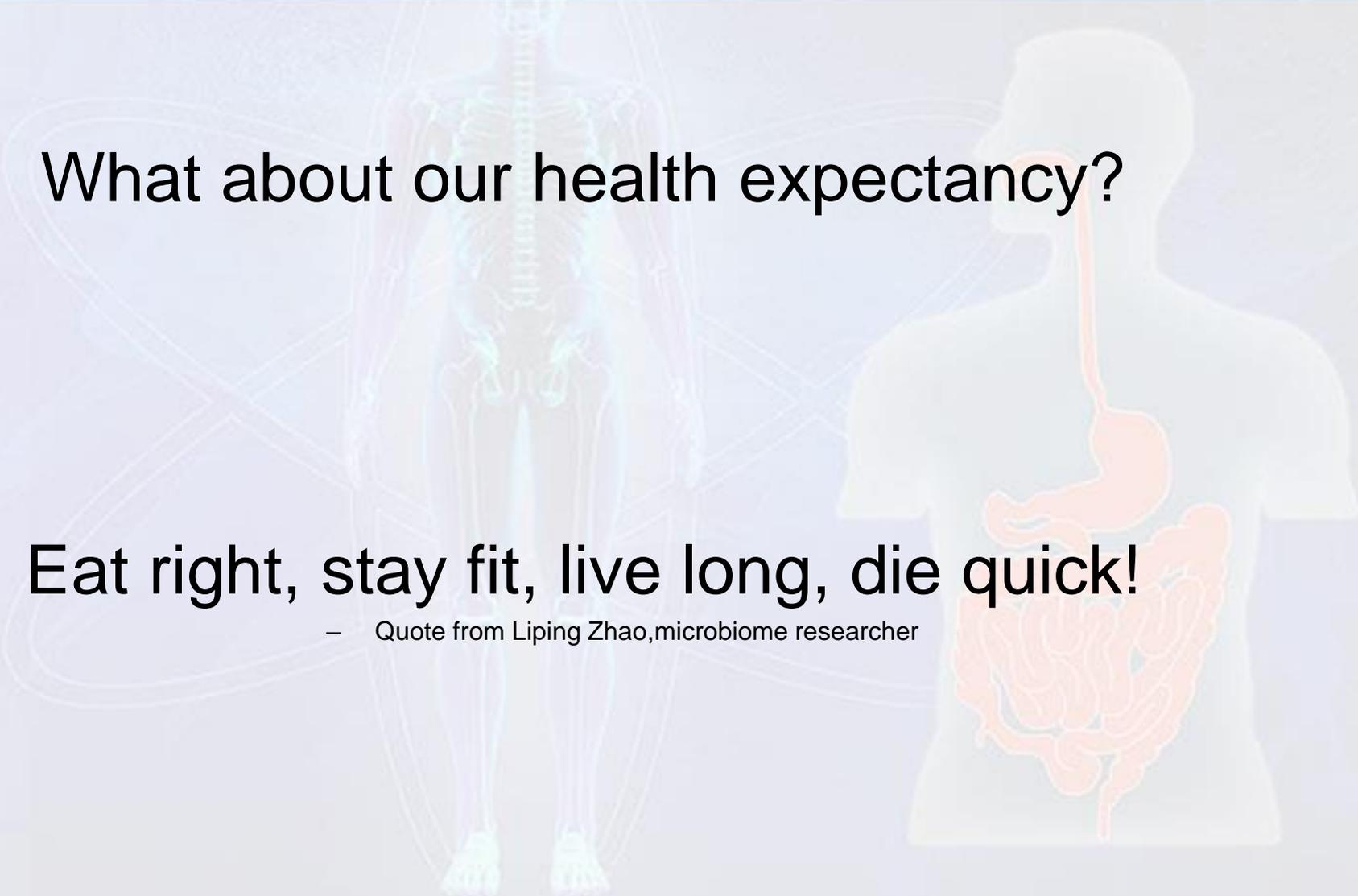


Health Expectancy

What about our health expectancy?

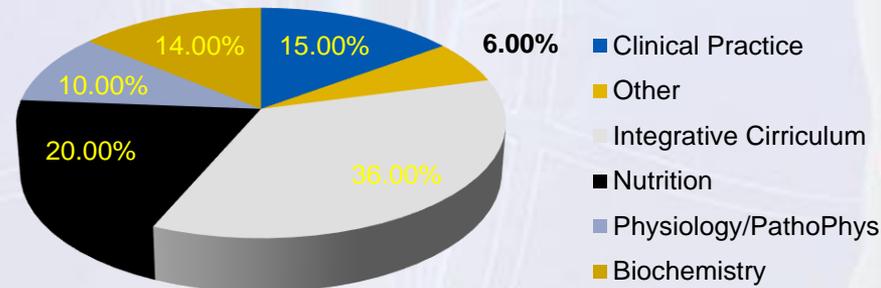
Eat right, stay fit, live long, die quick!

– Quote from Liping Zhao, microbiome researcher

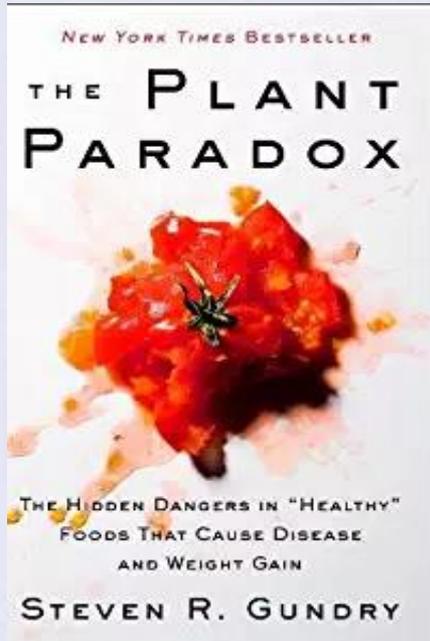


Physician Nutrition Education – a Knowledge Gap

- In a 2010 survey, only 25% of medical schools required a dedicated nutrition course.
- The typical medical student averaged about 20 contact hours in nutrition education during their entire medical training (range 0-70 contact hours).
- Only 27% of medical schools met the minimum 25 contact hours set by the National Academy of Sciences.
- 79% of Medical Instructors felt that nutrition should be a larger part of medical training.
- As seen below, 80% of nutrition instruction occurs outside of basic nutrition ed.



Steven Gundry, MD



Prolific in infant and pediatric heart transplants at Loma Linda, in CA.

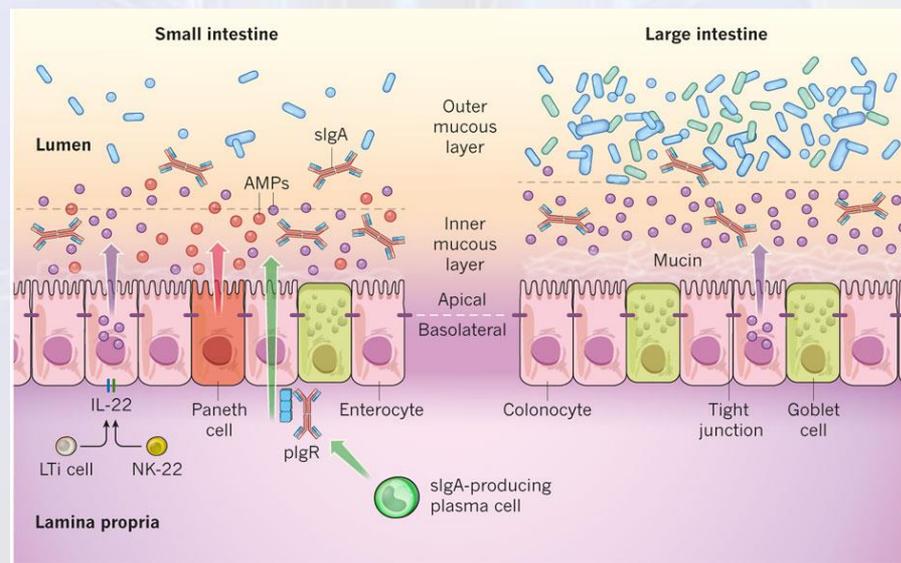
Gundry Retrograde Cardioplegia Cannula



“This is why, in 2002, I left my former position at California’s Loma Linda University Medical Center, and founded The Center for Restorative Medicine. I have spent the last 14 years studying the human microbiome”, developed a practice of Holobiotics

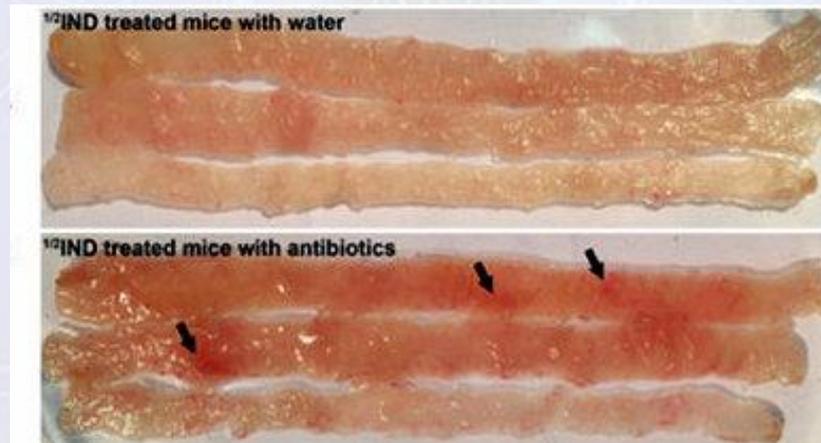
Nutrient Absorption & Healthy Colonization

- Provides the breakdown of food particles to nutrients that can transport across the intestinal lining, into the blood stream.
- Healthy intestine maintains healthy bacterial colonies in the mucosa along the gut lining , preventing pathogenic bacteria from attaching.



NSAID Treatment after Antibiotics Creating the Perfect Storm

Patients that undergo surgery usually receive a broad spectrum antibiotic which can decimate not only pathogenic bacteria, but our beneficial bacteria. Add the use of an NSAID over a period of days to weeks and you can weaken the mucosal layer of the intestinal lining enough to cause significant inflammation of the lining and leaky gut syndrome



Gut Microbiota Mediates Protection Against Enteropathy Induced by Indomethacin
, Xue Xiao, et al. *Scientific Reports* 7, Article number: 40317 (2017)

Anti-Nutrients = Lectins



Lectins – What do they do?

- A large protein found in most plants and animals.
- Plants use lectins as a defense mechanism
 - Just like all life, they do what they can to reproduce
 - Impacts animals from insects to humans
 - They bind to sugar molecules on surface cells – GI lining
 - Also can bind in the brain, between nerve endings, joints, blood vessel linings
 - Create toxic or inflammatory reactions
 - Facilitate the binding of viruses and bacteria to sites – increasing illness from these microbes.
- Wheat has a little known lectin – wheat germ agglutinin (WGA)

Little known gluten Inflammator

- Wheat Germ Agglutinin – attaches to joints causing inflammation –may be cause of most gluten sensitivity
 - Pain relievers like NSAIDs short term relief
 - Glucosamine supplements bind WGA & lectins to prevent them crossing the intestinal wall.
 - Best way to reduce lectin inflammation, stopping eating foods high in lectin

Key ingredients to most illness and disease is chronic higher levels of inflammation and oxidative stress – most initiates in the gut

Primary Foods with High Lectins

- Grains
 - Wheat, Oats, Quinoa, Rice, Corn
- Legumes
 - Peanuts, Peas, Soybeans, Beans, Lentils , Cashews
- Nightshade Vegetables
 - Tomatoes, Cucumbers, Squash, Eggplant, Peppers
- Nuts & Seeds
 - Pumpkin, Sunflower, Chia
- Dairy
 - Cows milk – casein A-1 protein = mucous (goats/sheep OK)
These food products were not part of our diet prior to 10,000 years ago. Our immune system has not adapted to these lectins. Our ancestors prior to the age of cultivation avoided these plants. They used their instincts, and listened to their GI system. They learned to use cooking and fermentation to reduce lectin levels

Lectin in high concentrations

- **Red kidney beans contain the toxic *phytohaemagglutinin* in a very high concentration.** Eating them raw or undercooked will lead to severe side effects 1 to 3 hours later, including vomiting and nausea. That poisoning will happen in anyone. Abdominal pain and diarrhea can result, too.
- To put it in perspective, here's how red kidney beans test out for their lectin content:
 - Raw = 20,000 to 70,000 hau (hemagglutinating unit)
 - Fully cooked = 200 to 400 hau
 - **That's a 99% or greater reduction from the heat of cooking.** By that simple act, you have turned them into a low lectin food.
 - To reduce the lectin levels in legumes, you can cook, boil, pressure cook or ferment them
 - Fermentation of soy can reduce lectins by up to 98%
 - To reduce lectin levels in vegetables – peel and de-seed them

How do we deal with the GI dis-ease caused by lectins?

Antacids, NSAIDS, other medications

Our Defense Against Lectins

- Bodies defenses against lectin
 - Mucous in mouth, nose, throat
 - Stomach acid – digests some lectins
 - Bacteria
 - The more lectin you eat, the more bacteria that consume those lectins – good to eat some lectins
 - Mucosal lining of the intestines

Bottom line:

The more lectins you consume the greater chance that they will make it to the GI cellular lining

Actions of Lectin

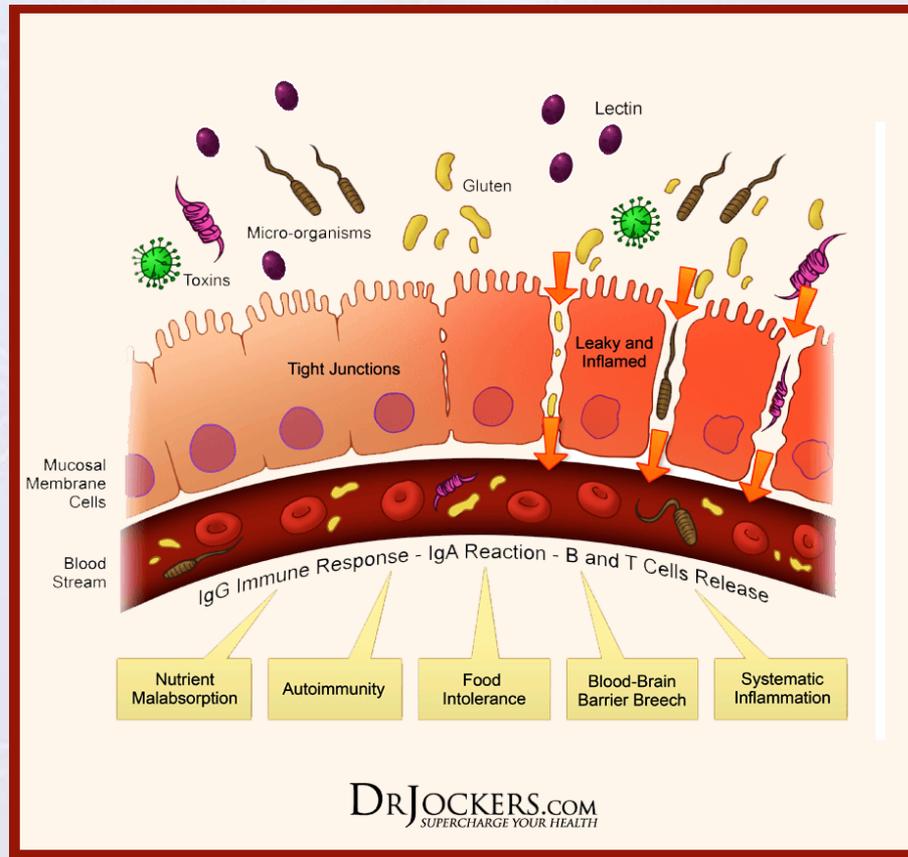
Attaches to lining

Releases Zonulin

Loosens tight junctions

Immune system response

Release inflammatory cytokines



Molecular mimicry

TLR (toll-like receptors) friend or foe

Disrupt Cell to Cell communication

Ex. Wheat lectin (WGA) attaches to fat, muscle or nerve cell mimicking insulin but doesn't let go.

Can traverse along nerve fibers – vagus nerve

Molecular Mimicry

- Lectin can mimic proteins in our body so the the TLR will leave them alone, allowing them to generate inflammation throughout our body.
- They can mimic our own proteins in so that the TLR sees our own mimicked protein as a foreign substance and generates a memory and immune response to it.
- Another name for an auto-immune response
 - Strep throat – Rheumatic fever – Rheumatic Heart disease
 - Immune system creates antibodies to streptococcus bacteria, which to some immune scanners look like the cells of heart valves
 - Leptins can mimic bacterial cells with their LPS (lipopolysaccharide) as they attach to cells throughout your body
 - The immune system reacts to your natural cells as though they are a foreign invader

A Shift to out of season produce

- Prior to WWII, most of our produce was local and seasonal. (within 50 miles)
 - With the ability to ship across country & internationally produce had to be adapted to survive the long journey
 - Hybrids were produced to last longer, biocides used to protect the plants, produce picked long before it was ripe, GMO lectins added to improve insect defense
 - Consequence is we are eating produce not local, that has higher levels of lectins and biocides
 - **Eat local organic produce that is in season**
- Should be avoid all lectins?**

Lectin benefits

- Toxic nature of lectins does educate your immune system
- Hormesis – toxins in lower levels allow the body to develop a protective response to larger levels
- Certain lectins have anti-microbial and other healing properties, like those found in garlic, bitter melon and certain herbs
- Strong argument for larger variety/diversity of foods
 - Estimated that hunter/gatherers were exposed to about 250 plant types in their travels, about 10x the number we experience

History of Lectins

- 10,000 years ago – Ag. Revolution
 - Grains and beans became our staple diets
- 2,000 years ago –
 - North european milk cow mutation
 - A-2 casein to A-1 casein, a lectin like protein
 - Attaches to beta cells on pancreas – immune attack on pancreas – Type 1 Diabetes
 - 500 years ago – Euro. Explorers return
 - Bring back legumes, nuts & seeds from new world

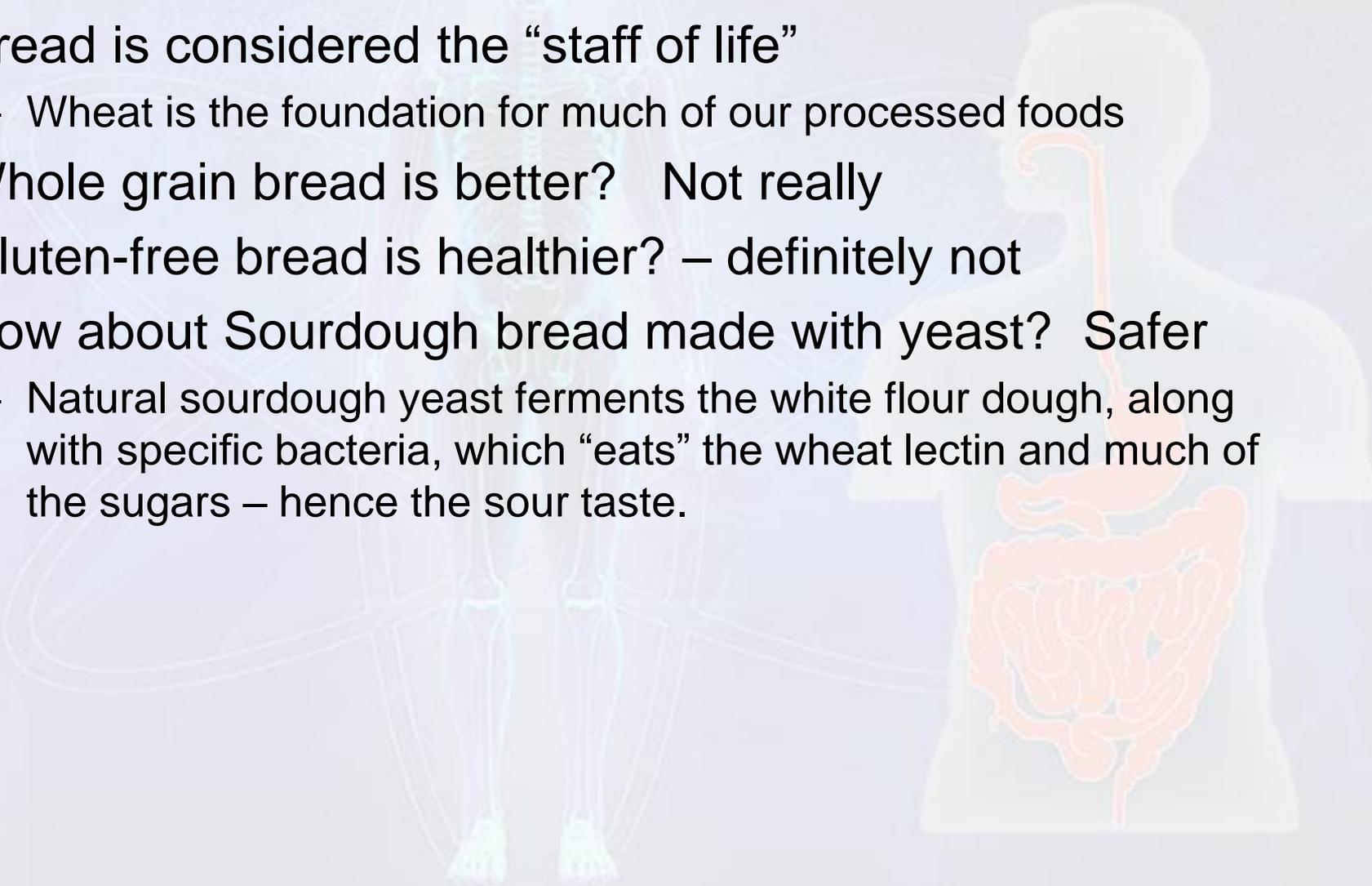
Taming Lectins

- Cooking
- Pressure cooking
- Fermentation
 - These methods will help to reduce the levels of lectins in many grains (not gluten grains)
- Peeling and deseeding nightshade veggies

You can't avoid lectins, only minimize them

Bread – friend or foe?

- Bread is considered the “staff of life”
 - Wheat is the foundation for much of our processed foods
- Whole grain bread is better? Not really
- Gluten-free bread is healthier? – definitely not
- How about Sourdough bread made with yeast? Safer
 - Natural sourdough yeast ferments the white flour dough, along with specific bacteria, which “eats” the wheat lectin and much of the sugars – hence the sour taste.

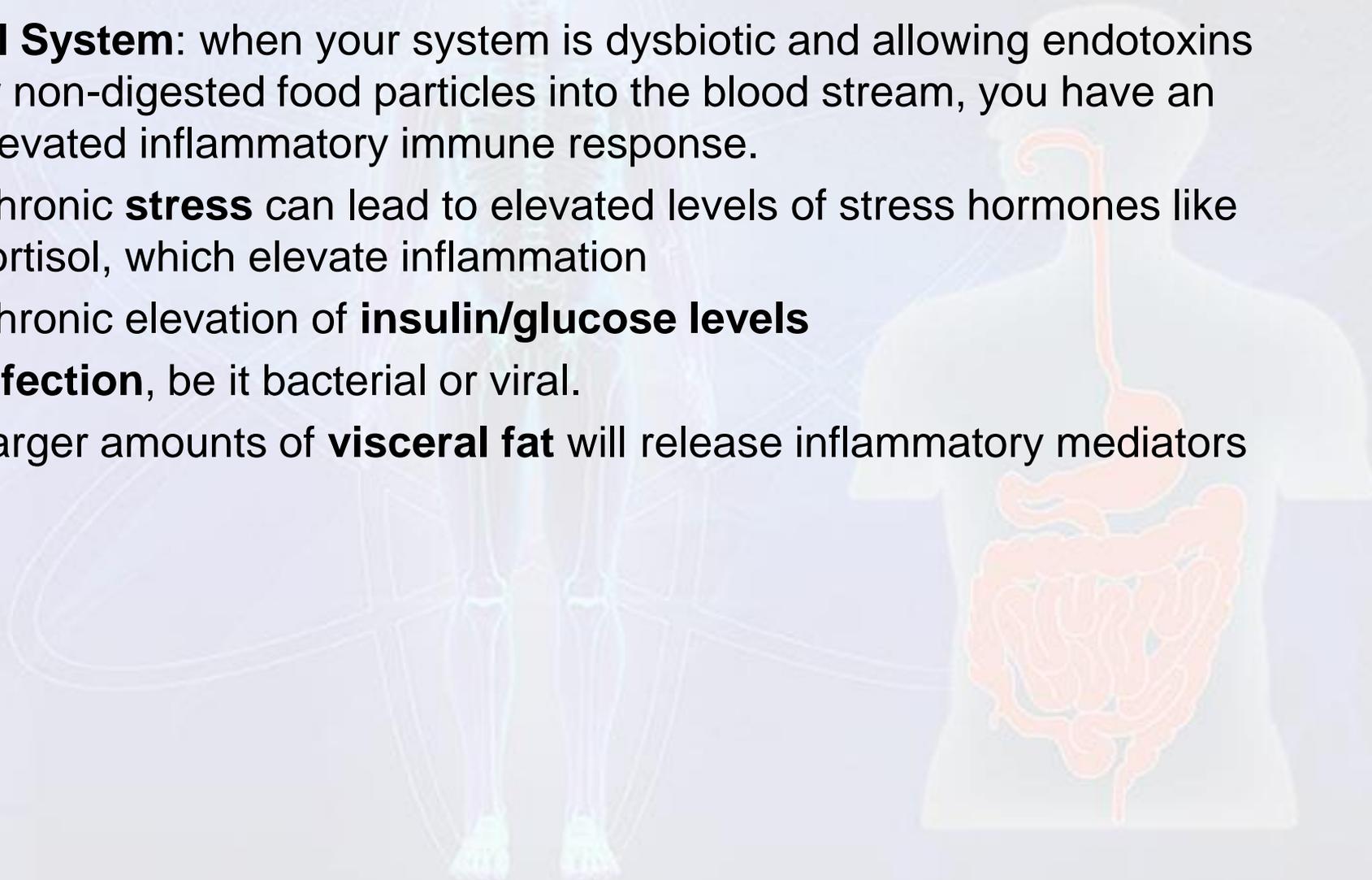


Alternative Yeast

- In the US, one problem... much of the gluten free breads and possibly other breads are made with a binder/rising agent – **transglutaminase**, which is also used as a “meat glue” in other animal products
 - Can have a neurotoxic action – easily crosses the blood brain barrier
 - Meat glued products have a much higher bacterial count, which can lead to high risk of food poisoning if not thoroughly cooked – FYI, will not find it on any food label.
 - This product is brought to you by the same company that makes aspartame and MSG, also neuro-excitatory toxins.

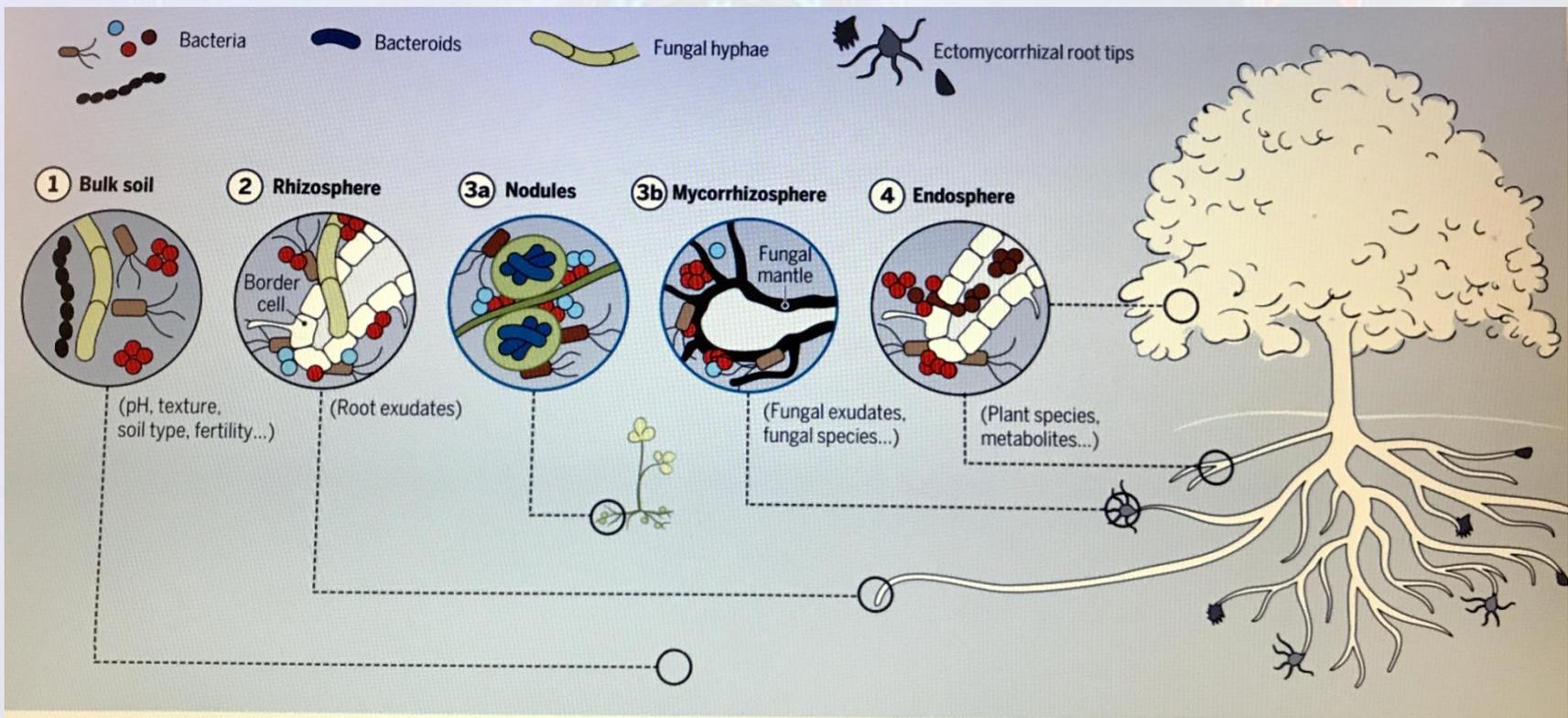
Key Inflammatory Sites & Factors

- **GI System:** when your system is dysbiotic and allowing endotoxins or non-digested food particles into the blood stream, you have an elevated inflammatory immune response.
- Chronic **stress** can lead to elevated levels of stress hormones like cortisol, which elevate inflammation
- Chronic elevation of **insulin/glucose levels**
- **Infection**, be it bacterial or viral.
- Larger amounts of **visceral fat** will release inflammatory mediators



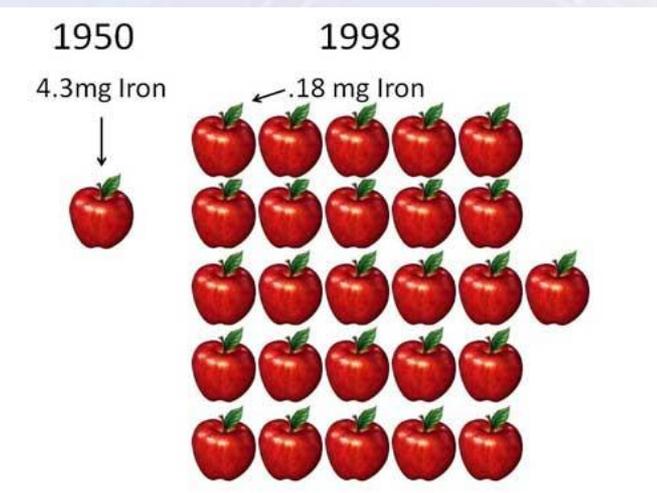
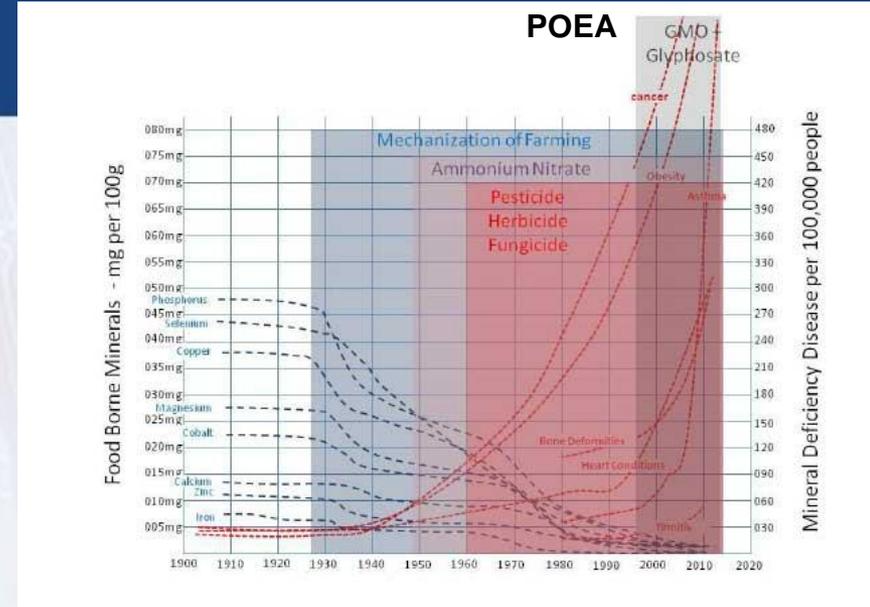
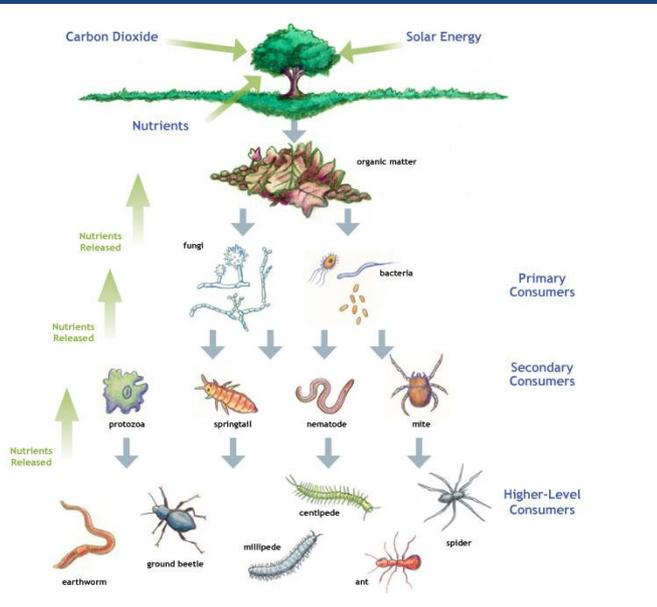
Plant microbiota

Soil microbiota such as fungi, bacteria and viruses play a key role in plant nutrient soil absorption and plant protection



Ancestral Alliances: Plant mutualistic symbioses with fungi and bacteria
Martin et al., Science 356, 819 (2017) 26 May 2017

Plant Nutrition



Minerals go down – Diseases go up

Changes in the Rates of Selected Reported Diseases per 100,000 US Population

Disease	1980	1994	2011	Rate of Increase 1980 – 2011	Mineral Deficiency Associated with Disease
Heart Conditions	75.40	89.47	310.90	412.3%	Chromium, Copper, Magnesium, Selenium, Potassium
Chronic Bronchitis	36.10	56.3	296.1	819.9%	Copper, Iodine, Iron, Magnesium, Zinc, Selenium
Asthma	31.2	58.48	1291.2	4137.8%	Magnesium
Tinnitus	22.6	28.24	45.0	203.0%	Calcium, Magnesium, Zinc
bone Deformities	84.9	124.7	295.0	347.4%	Calcium, Copper, Fluoride, Magnesium

Chelators & endocrine disruptors

Soil Managment

- Understanding the importance of our soil microbiome to the health and development of crops
- Work towards a sustainable farm and soil management practice will help support a healthier crop, supporting a healthier you
- The current organic farming practices of crop rotation, zero tillage, cover crops during off season, and composting back into the soil is similar to farming practices prior to WW II. Current science supports the earlier practices
- Our large production monoculture farming practices cannot sustain healthy soil and nutrient rich crops. They have no regard for the soil microbiome

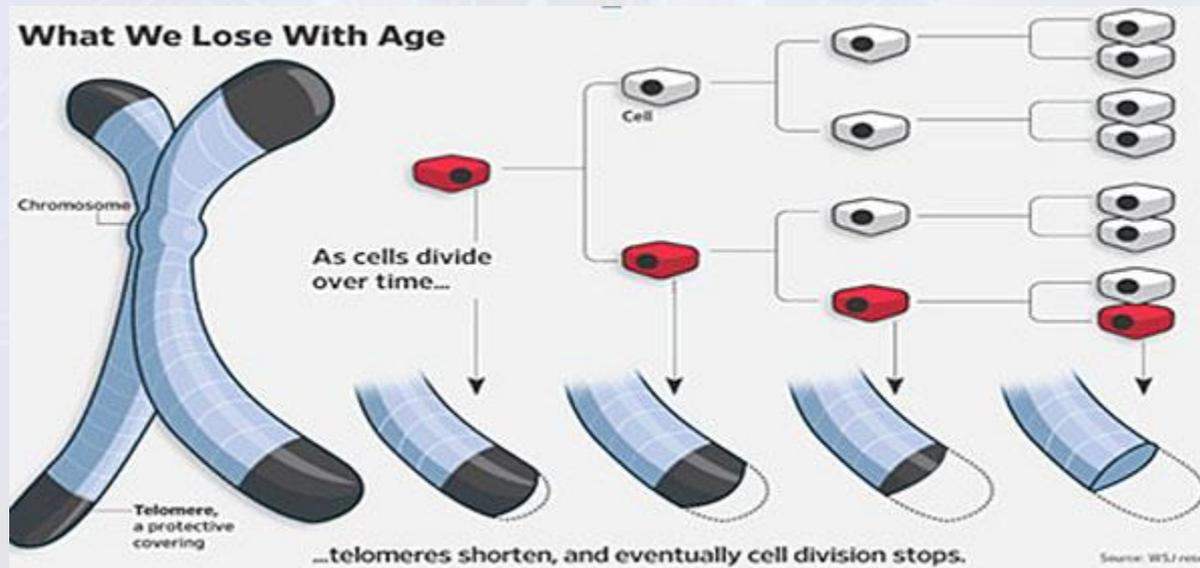
Microbial Genetic Testing

Can now field test microbe genetics



Telomeres

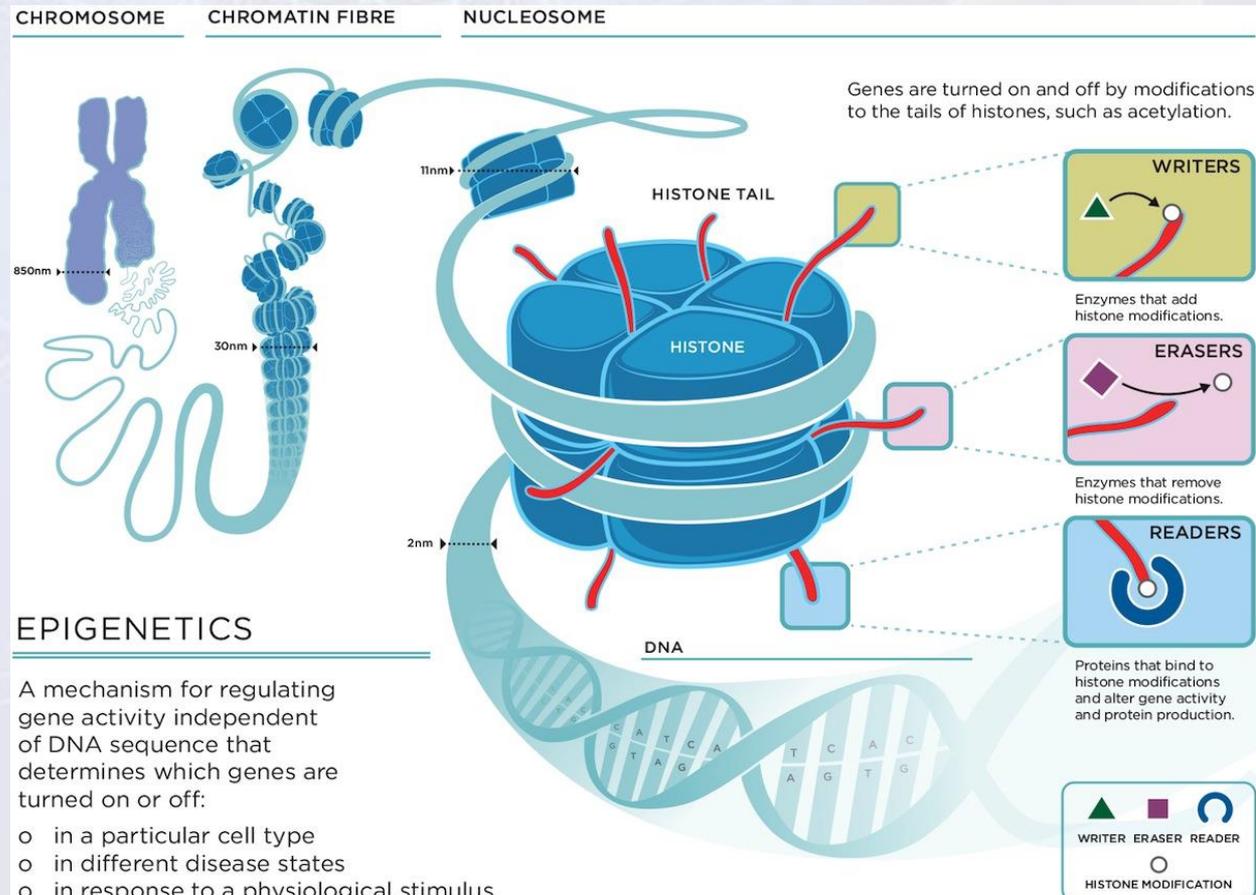
- Telomeres are the end points of a cell containing DNA that will provide DNA info when the cell divides.
- Telomeres shorten with every cell division
- Enzyme telomerase helps maintain length as we are young. As we age , telomerase activity weakens, shortening the telomere length, leading to cell senescence



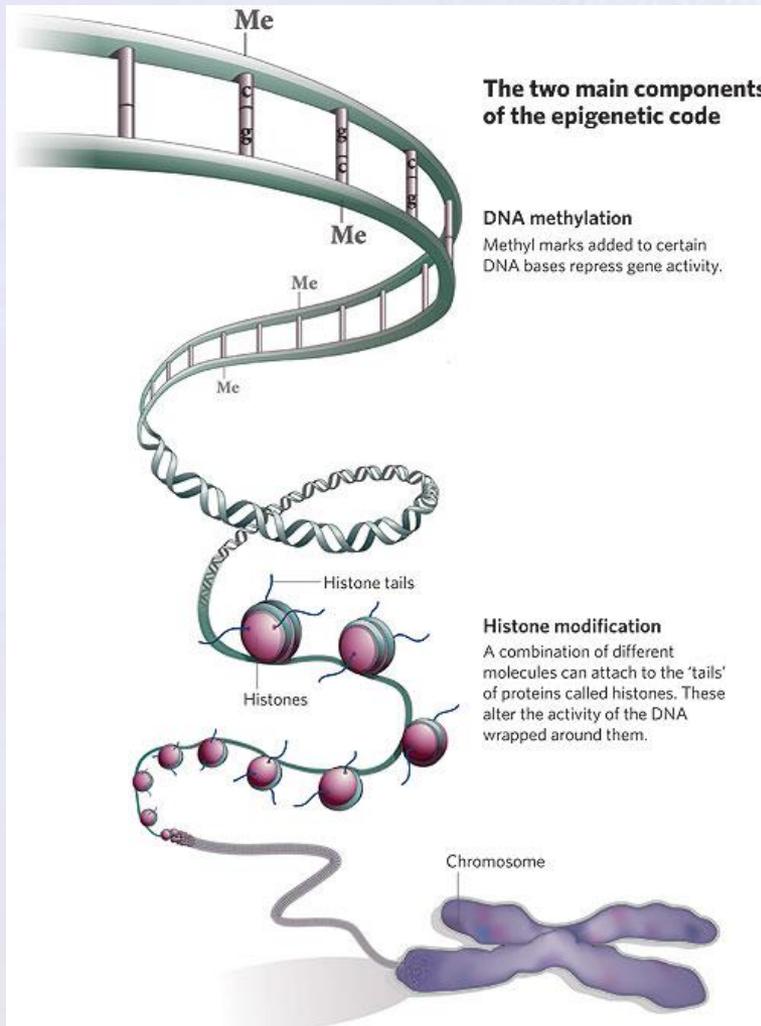
Telomeres and Health

- Adults with telomeres shorter than normal for their age are at higher risk of early death.
- Adults with major diseases, such as diabetes, heart disease and cancers have shorter telomeres than healthy adults of the same age
- Telomerase is 80-90% more active in cancer cells than in normal cells
- Short term stress can strengthen telomeres when stress is seen as a challenge. Long term stress that is seen as threats or burdens will seriously shorten telomeres and reduce telomerase activity
- Chronic inflammation and oxidative stress from poor nutritional habits impact the health of your telomeres

Epigenetics- our cellular functions



Environmental Effects on our Genes



- **Example**

- An environmental signal causes a hormone like estrogen to bind to a receptor site on a breast cell.
- The receptor and hormone move into the nucleus of the cell and find a specific gene sequence site that fits their geometry
- They alter the epigenetic histone modification at that site, causing that gene sequence to turn on
- **Everything we ingest, along with our intestinal microbiome converting our food to nutrients and communicating with our immune system, can have a profound effect on how our genes express themselves**

Endocrine Disruptors

Hormone Mimicry



Water, a precious resource

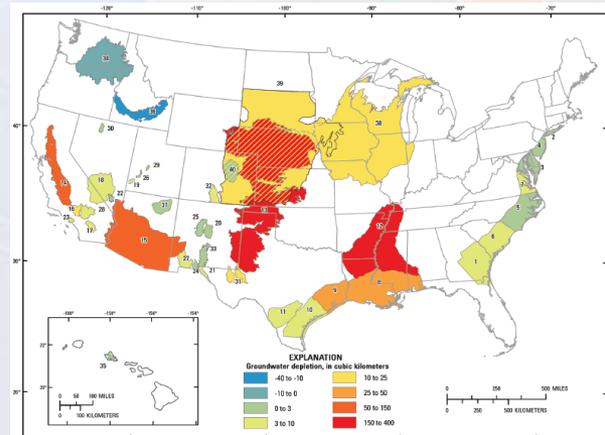
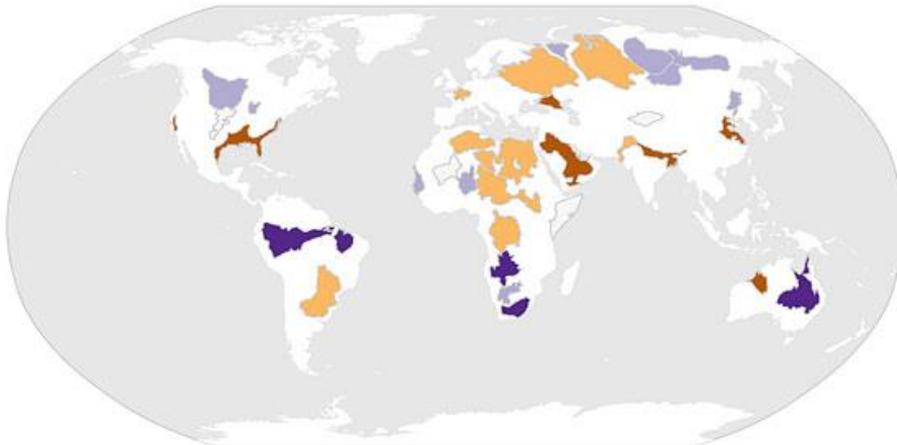
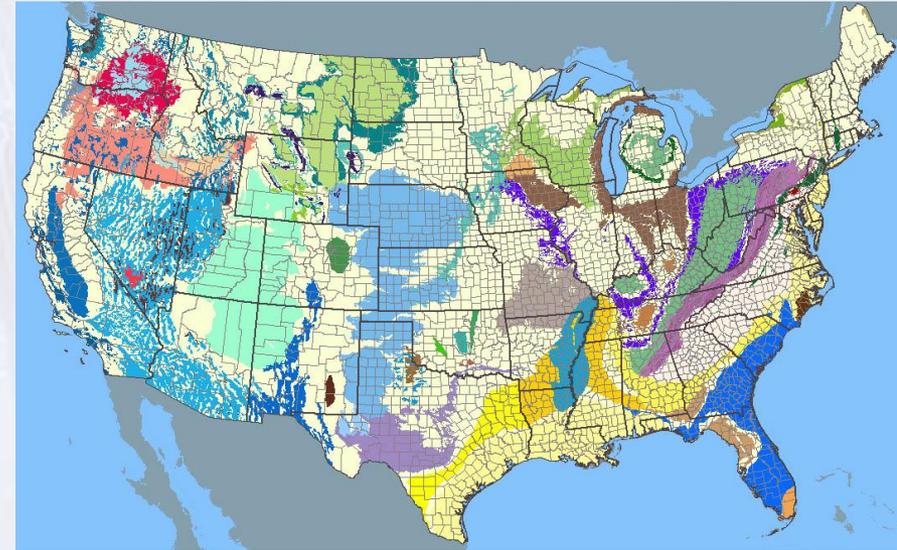
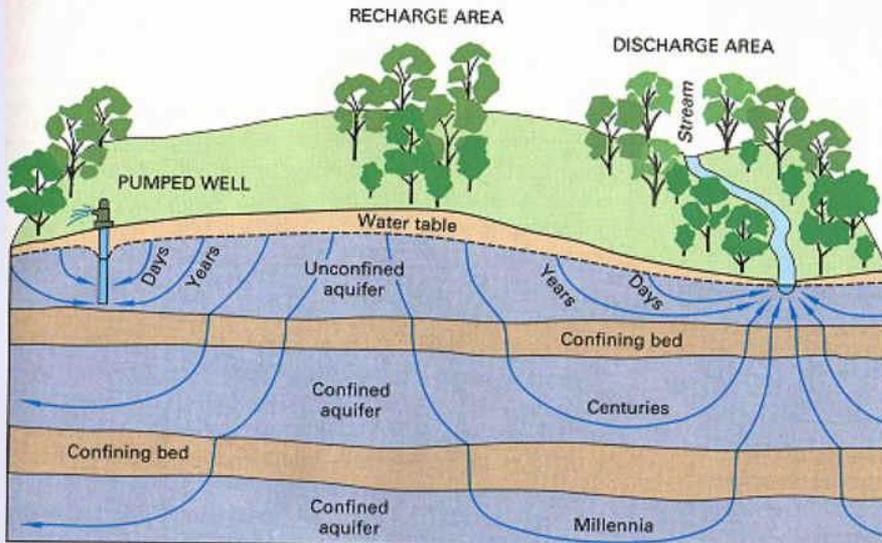
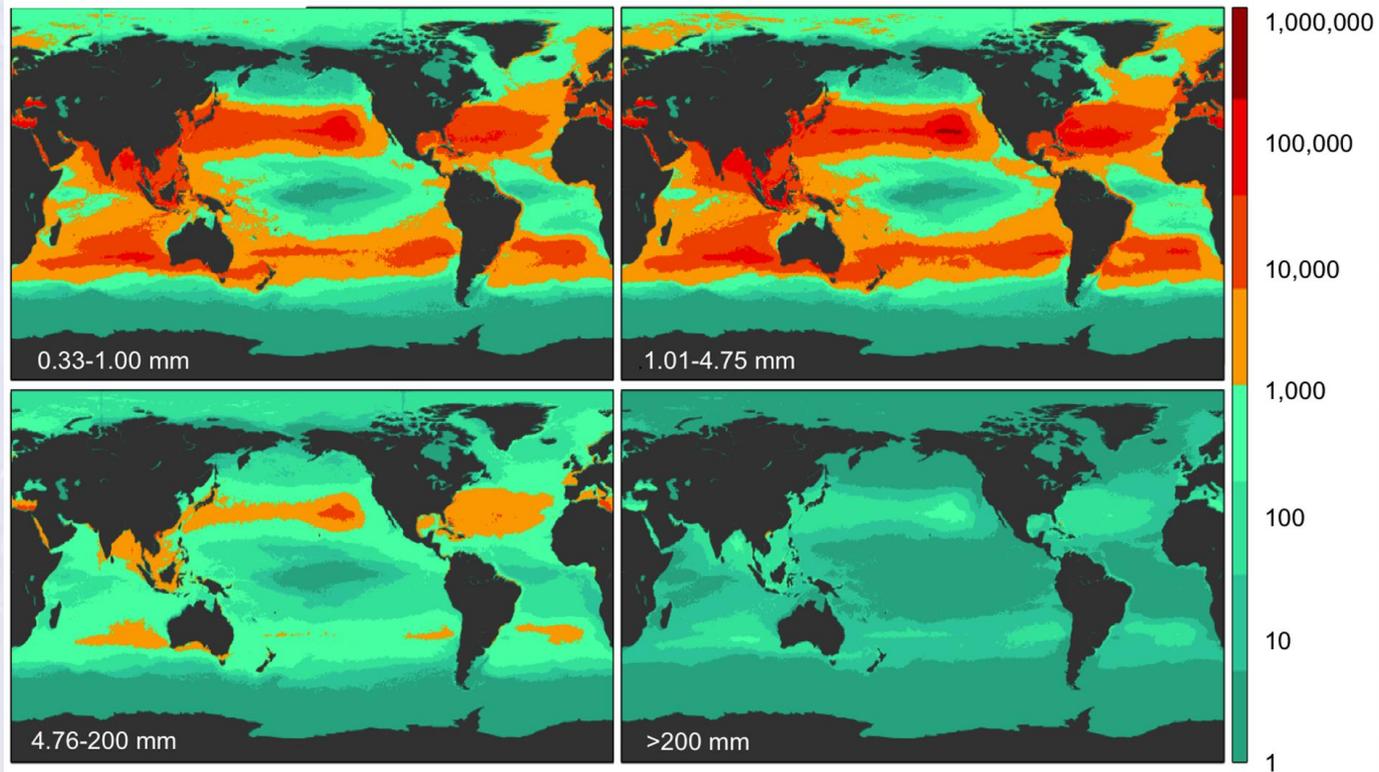


Figure 2. Map of the United States (excluding Alaska) showing cumulative groundwater depletion, 1900 through 2008, in 40 assessed aquifer systems or subareas. Index numbers are defined in table 1. Colors are hatched in the Dakota aquifer (area 39) where the aquifer overlaps with other aquifers having different values of depletion.

Global Ocean Plastic Pollution

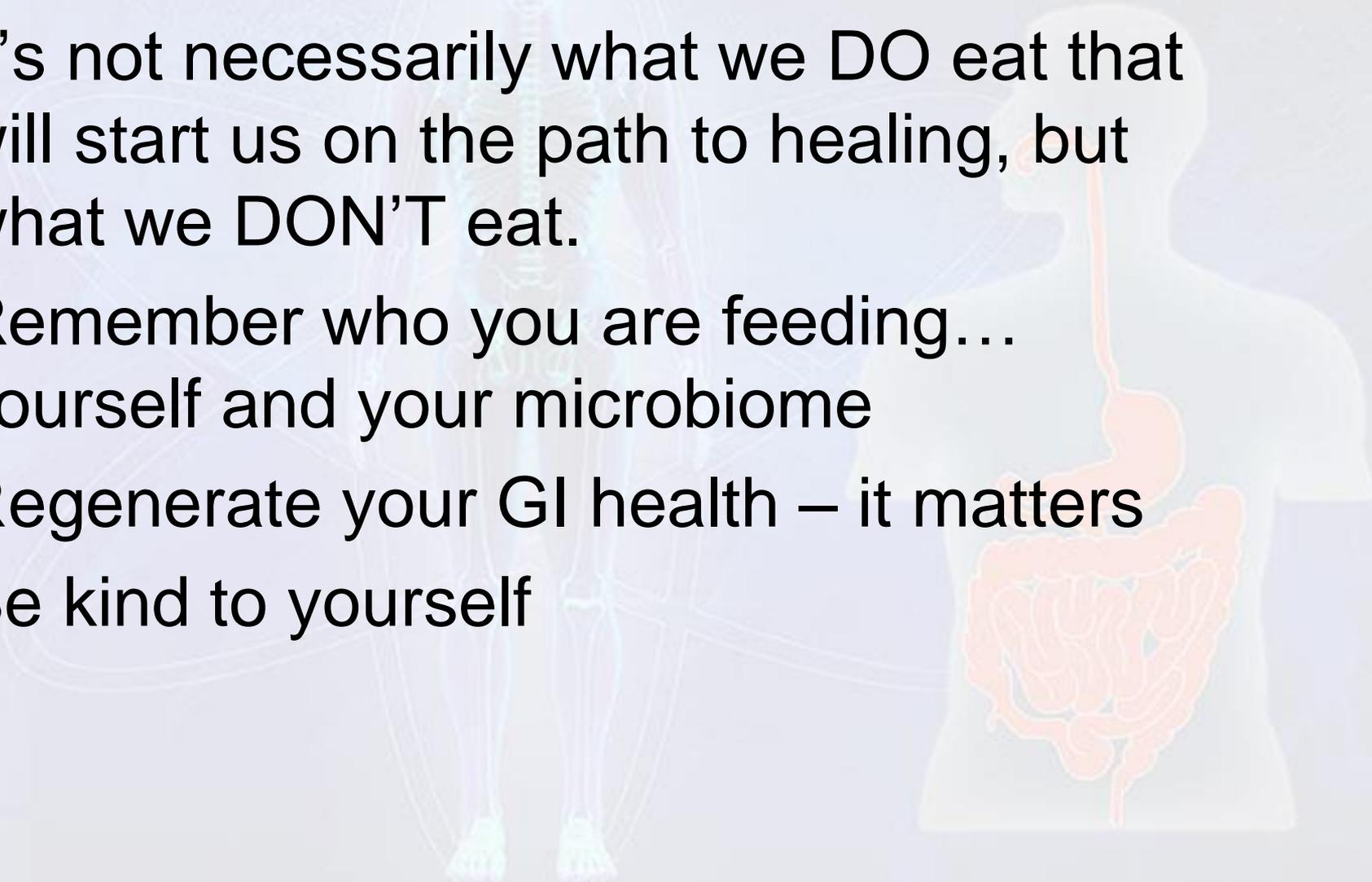
Most of the near surface ocean plastic is < 5mm , making it easier for ocean life to ingest. Some ocean microbes appear to break down the plastic hydrocarbons



These microplastics can concentrate pollutants or act as a microbial haven that can have dire consequences to marine life when ingested

How to Heal

- It's not necessarily what we DO eat that will start us on the path to healing, but what we DON'T eat.
- Remember who you are feeding... yourself and your microbiome
- Regenerate your GI health – it matters
- Be kind to yourself



Make Healthy Choices

Excellent Steward

