

DR. HYMAN+

Functional Medicine and Inflammatory Bowel Disease

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Inflammatory Bowel Disease



Crohn's
Disease

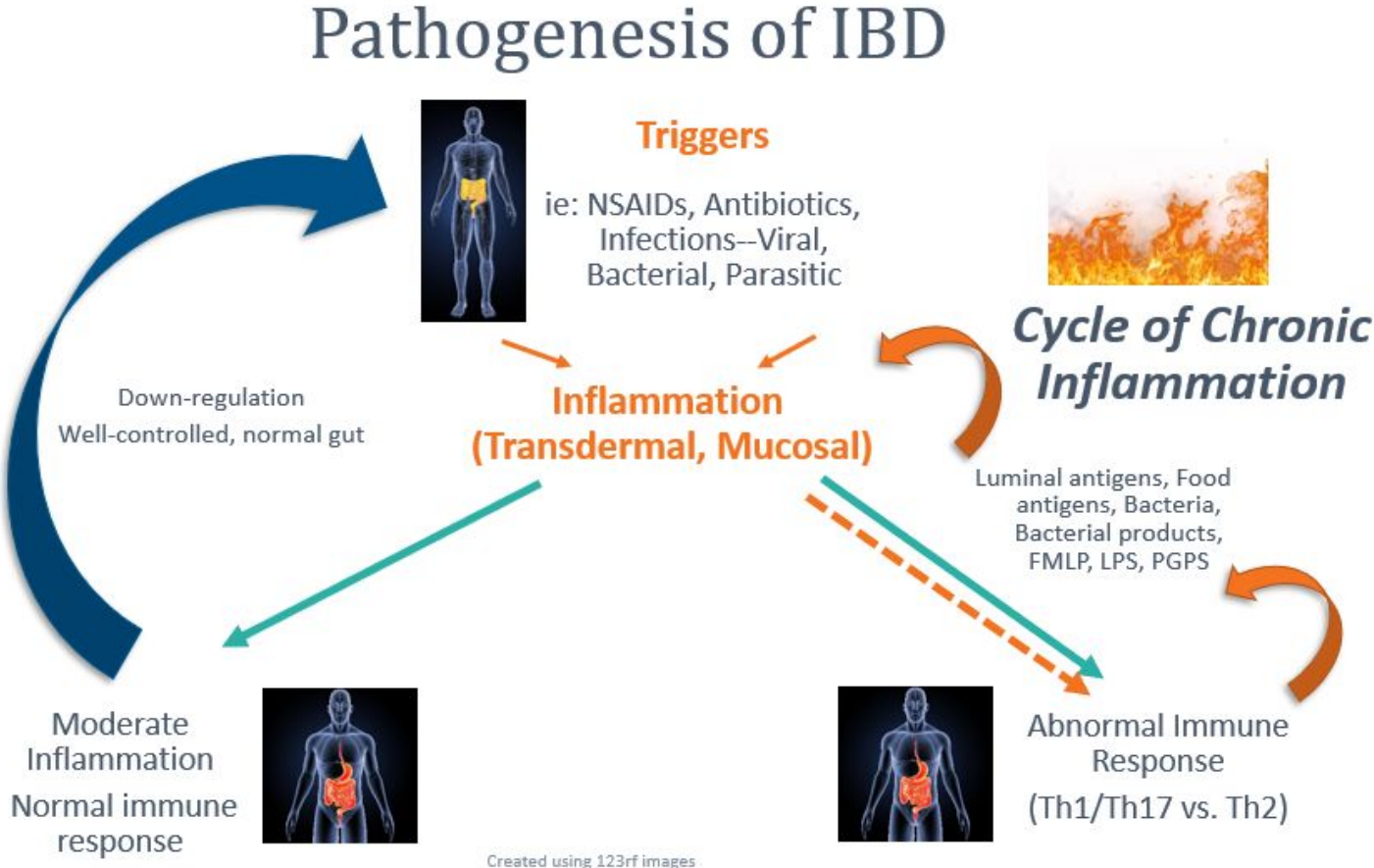
Ulcerative
Colitis

Indeterminate
Colitis*

*10-20% of
IBD patients

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IBD- Cycle of inflammation that can not be stopped



Clinical symptoms of IBD

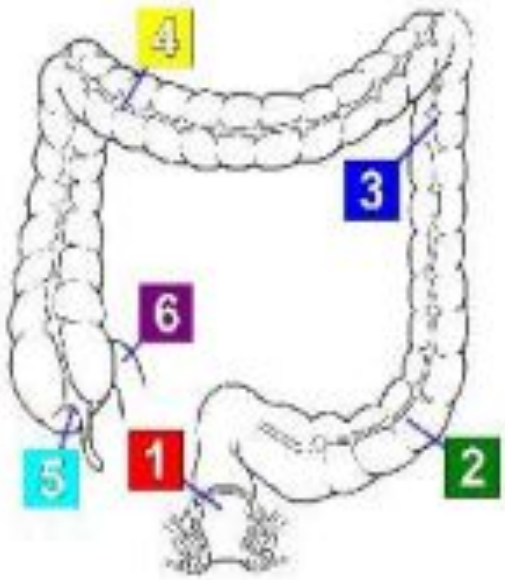
Signs and Symptoms of Uncontrolled IBD:

- Weight loss
 - Fatigue
 - Diarrhea
- Abdominal pain
 - EIMs
 - Fever

Features Associated with High Risk for Disease Progression:

- Young age at diagnosis
 - Extensive bowel involvement
 - Perianal CD
- Strictureing, fistulizing CD

Ulcerative Colitis



1 Rectum

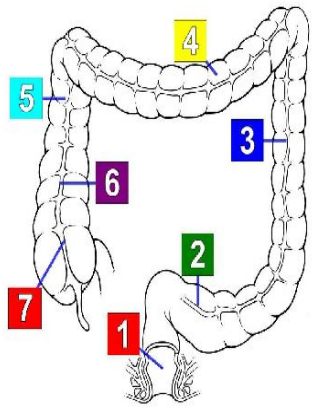


2 Sigmoid Colon



3 Descending Colon

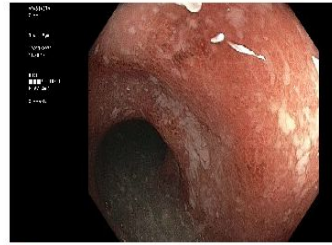
Crohn's Disease



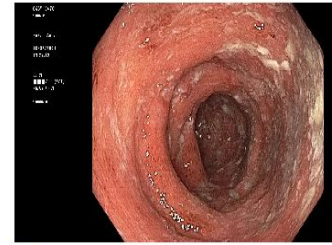
The Colon



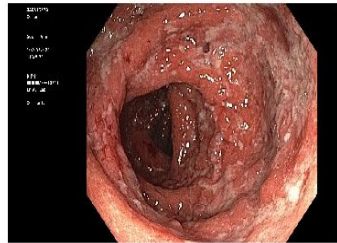
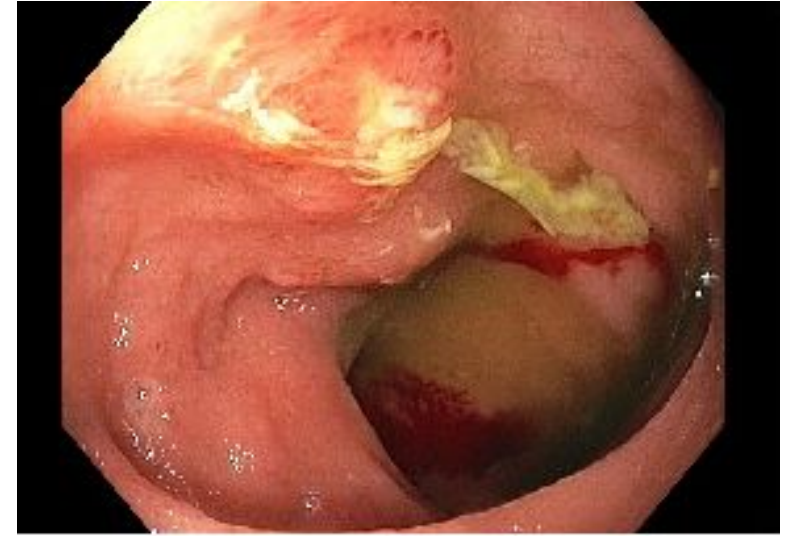
1 Rectum



2 Sigmoid Colon



3 Descending Colon



4 Transverse Colon



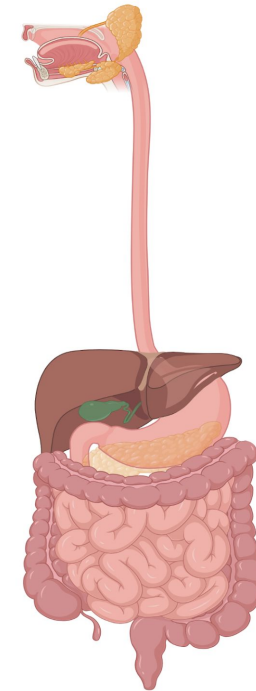
5 Hepatic Flexure



6 Ascending Colon



7 Cecum



Functional Medicine Deep Dive

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Crohns Disease vs Ulcerative Colitis- how are they similar ?

- Both diseases often develop in teenagers and young adults although the disease can occur at any age.
- Ulcerative colitis and Crohn's disease affect men and women equally.
- The symptoms of ulcerative colitis and Crohn's disease are very similar.
- The causes of both UC and Crohn's disease are not known and both diseases have similar types of contributing factors such as environmental, genetic and an inappropriate response by the body's immune system.

How are CD and UC different?

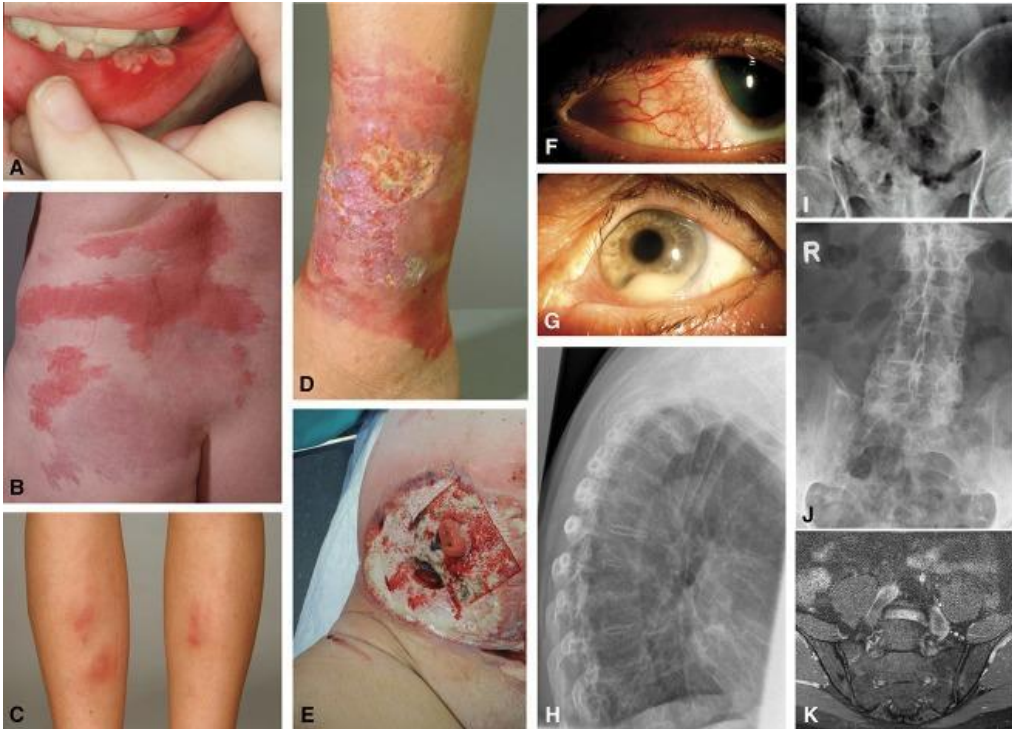
Ulcerative Colitis (UC)

- **Limited to the colon**
- **Continuous inflammation** of the colon that starts in the rectum.
- Affects the **inner most lining of the colon.**

Crohn's Disease (CD)

- **Occurs anywhere between the mouth and the anus.**
- There are healthy parts of the intestine **mixed in between inflamed areas.**
- Can occur in **all the layers of the bowel walls** (transmural inflammation).
- Perianal disease

IBD- not just in your GI tract

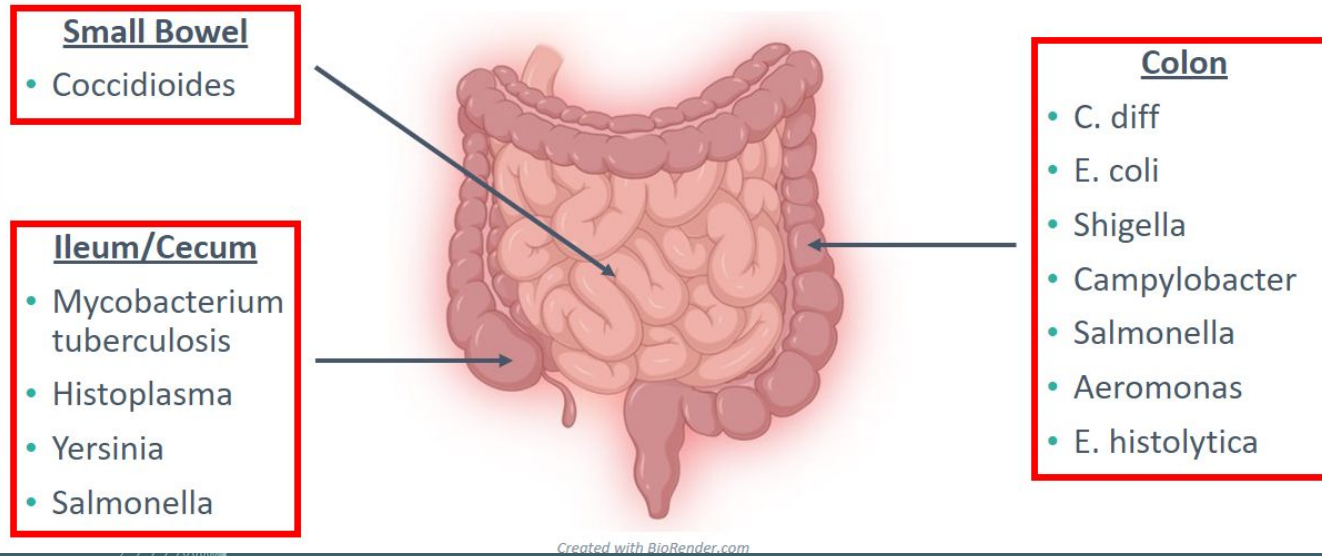
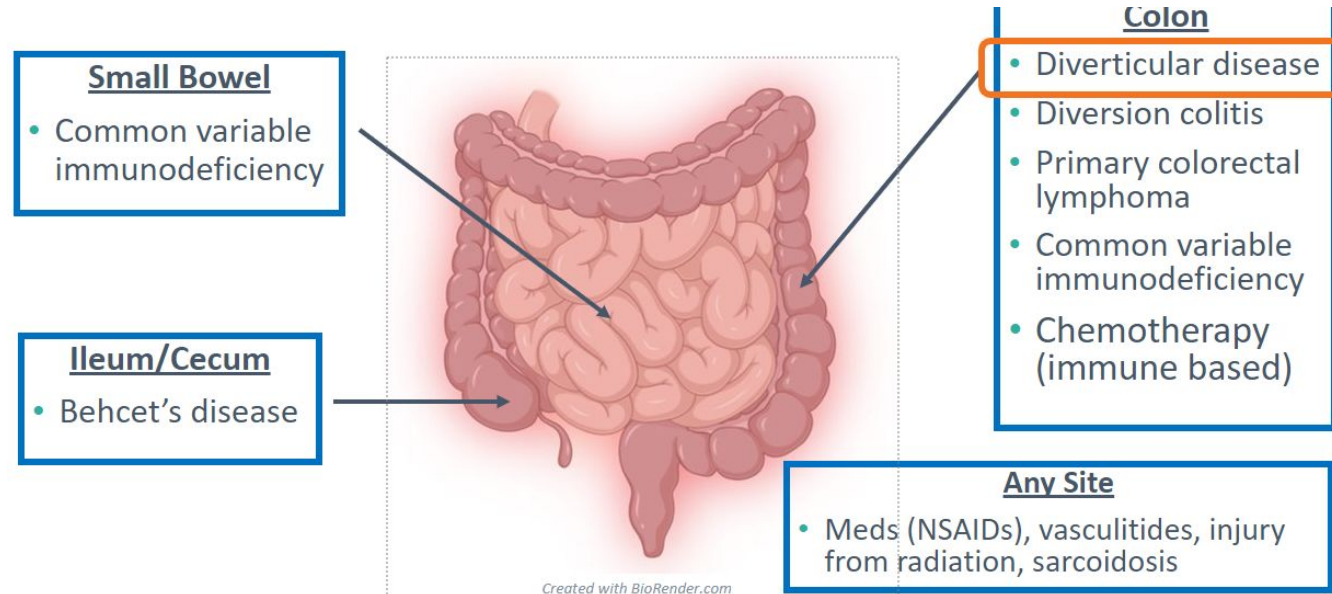


Extraintestinal manifestations (EIM)

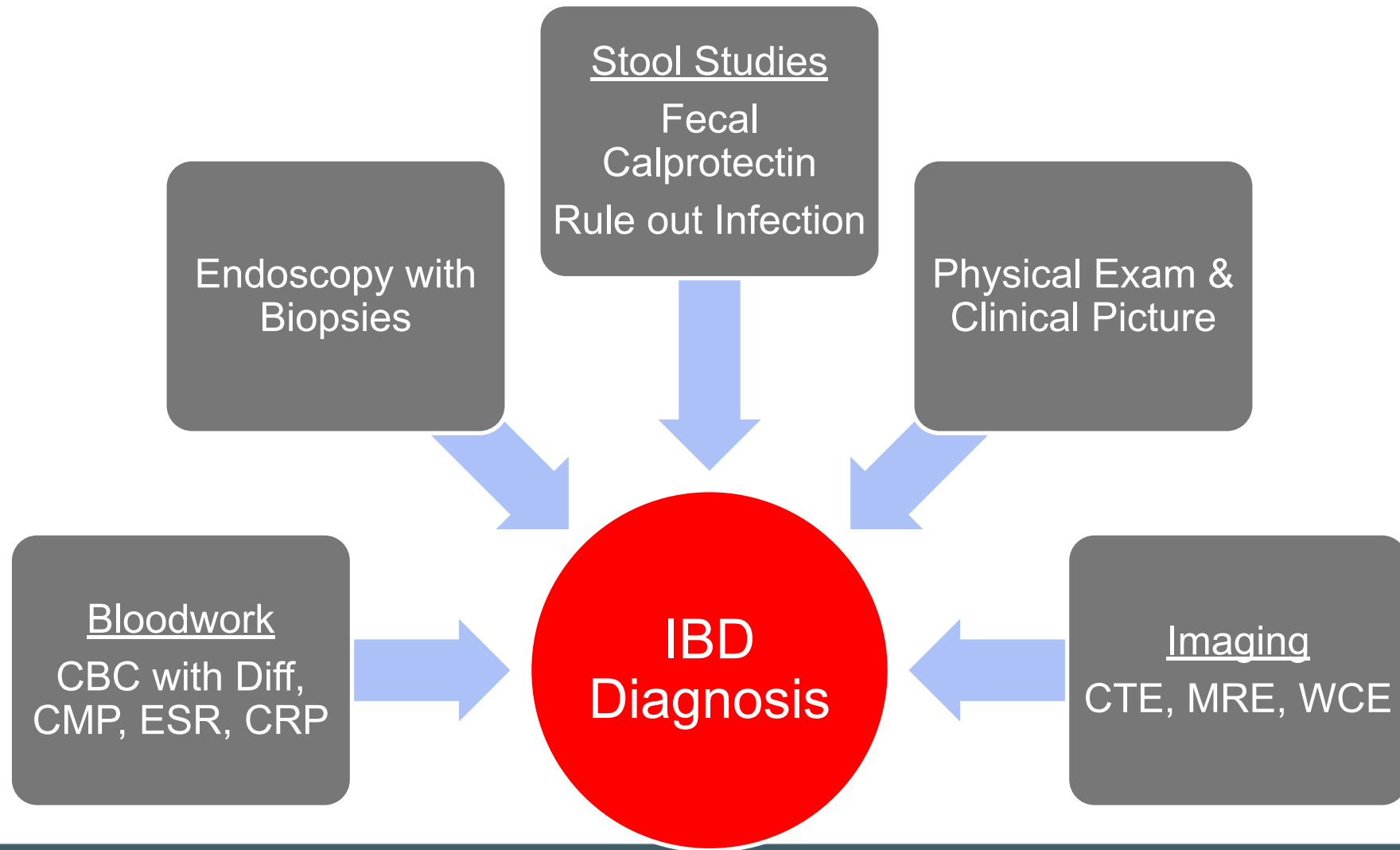
- Skin
- Eyes
- Joints
- Kidney
- Liver
- Blood

Vavricka, S. R., Schoepfer, A., Scharl, M., Lakatos, P. L., Navarini, A., & Rogler, G. (2015). Extraintestinal Manifestations of Inflammatory Bowel Disease. *Inflammatory bowel diseases*, 21(8), 1982–1992. <https://doi.org/10.1097/MIB.0000000000000392>. Licensed under CC BY 4.0.

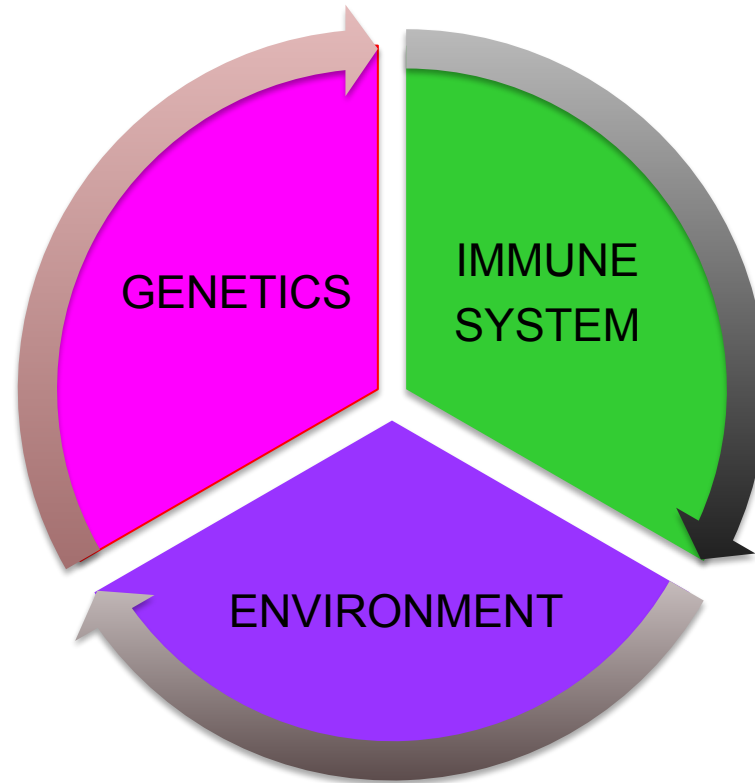
Other disease states can mimic IBD

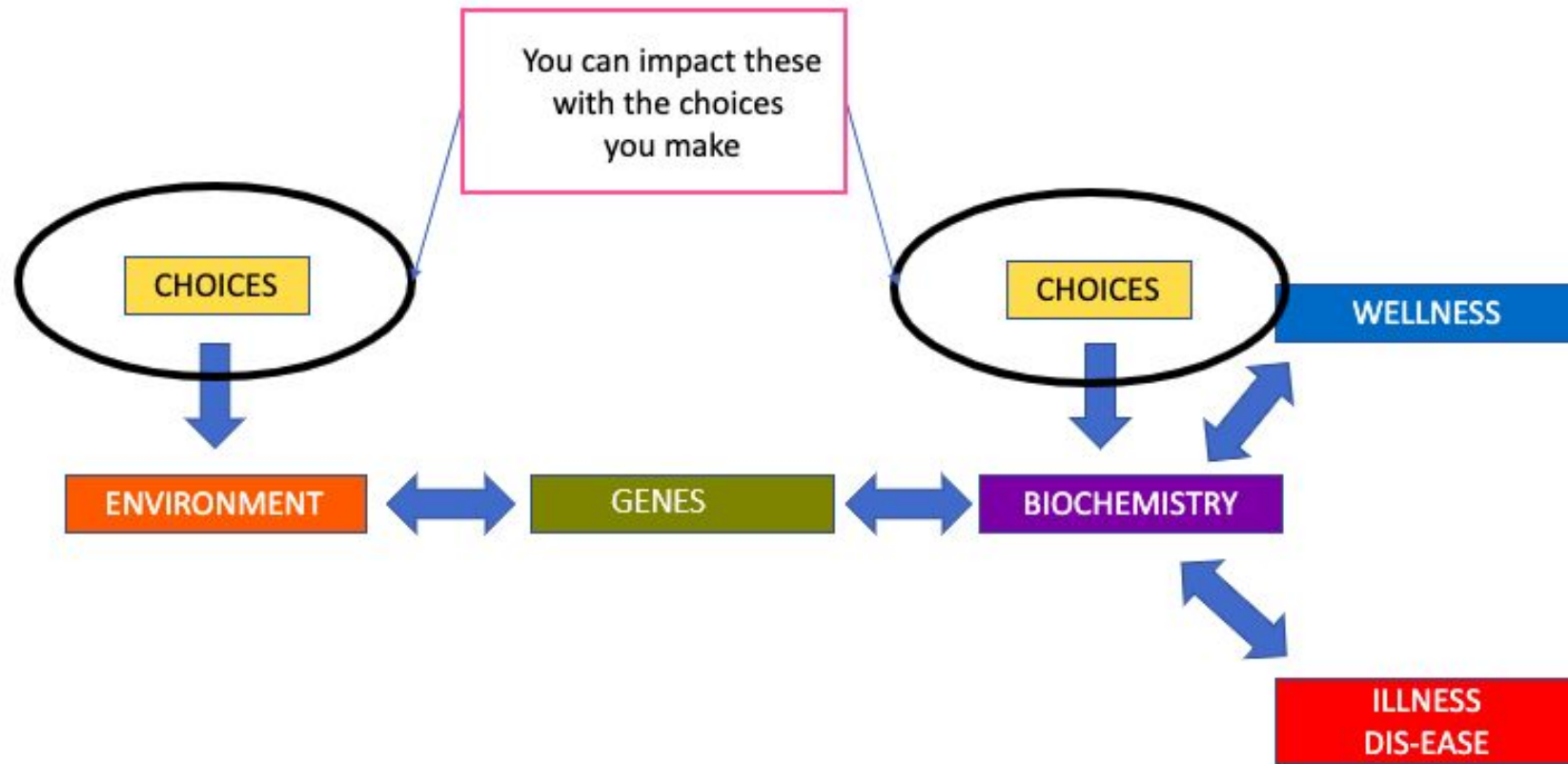


Diagnosing IBD

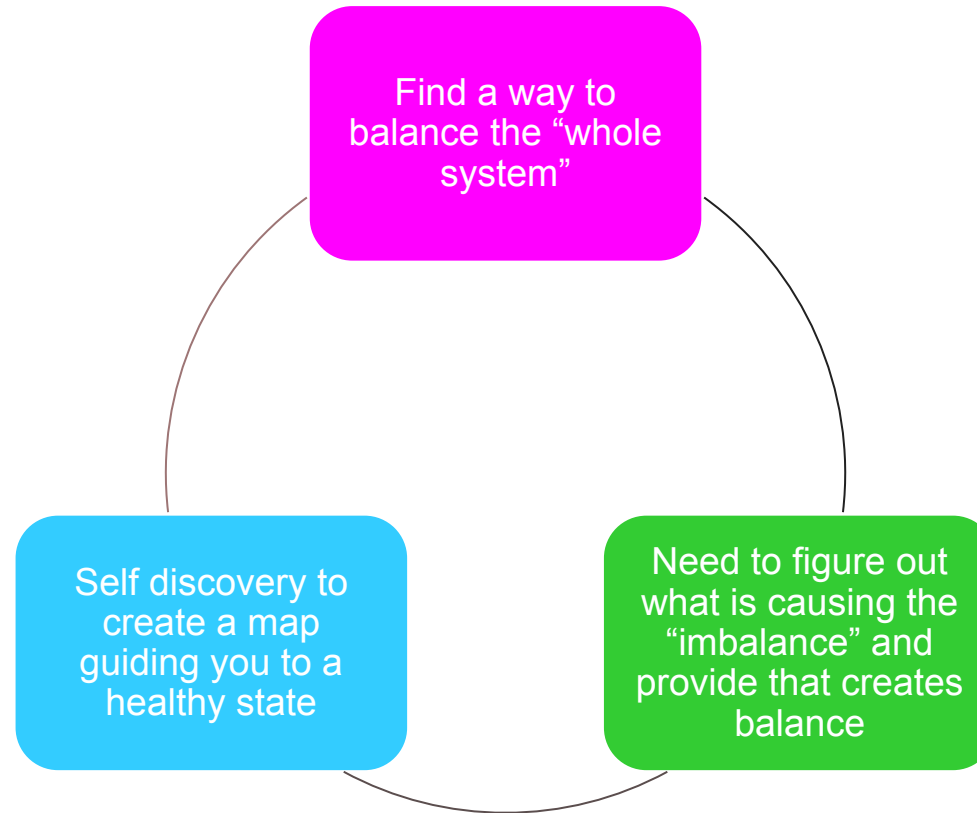


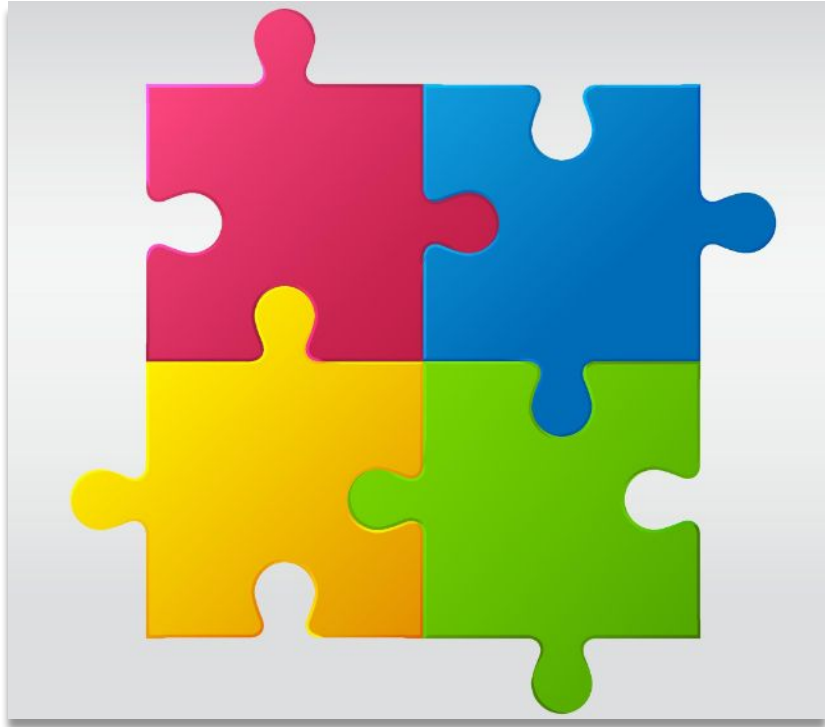
IBD: An interplay of 3 domains- No one factor alone is sufficient





Goals of Functional Medicine





IBD and Functional Medicine..

A perfect fit

Functional Medicine

Functional Medicine STARTS with good Medicine

It is not a substitute for conventional medicine.

It is a model to use for chronic complex disease.

Functional Medicine is not for acute care

Functional Medicine is not as good as conventional medicine for acute and end stage care (Trauma, Acute MI, Acute CVA, Sepsis).

Environmental Modifications and IBD Disease Activity

Table 1 | Intervention studies examining effect of environmental modifications on disease activity in IBD

Factor	Population	Intervention	Outcome
Smoking			
Smoking ¹⁷⁸	Crohn's disease (n=474)	Counselling to stop smoking	Over 29 months, risk of flares, need for steroids and immunosuppressive therapy was lower in quitters than those who continued smoking
Diet—macronutrients and dietary patterns			
Low microparticle diet ¹⁹⁹	Active Crohn's disease (n=20)	Low microparticle diet or control diet	Progressive decrease in CDAI was noted with intervention diet compared to control diet
Low microparticle diet ²⁰⁰	Active Crohn's disease (n=83)	Low microparticle diet or control diet	No difference in Crohn's disease activity between the two groups
Fish oil (Cochrane review) ²⁰¹	Quiescent Crohn's disease (n=1,039)	n-3 PUFA or placebo	Slightly lower risk of relapse at 1 year with fish oil than with placebo
Fish oil (Cochrane review) ²⁰²	Quiescent ulcerative colitis (n=148)	n-3 PUFA or placebo	No difference in risk of relapse between n-3 PUFA and placebo
Milk-free diet ²⁰³	Active ulcerative colitis (n=77)	Milk-free, low-fibre diet compared to dummy diet	Fewer relapses on milk-free diet than on dummy diet
Fibre-rich diet ²⁰⁴	Inactive or mildly active Crohn's disease (n=352)	Unrestricted sugar and low-fibre diet compared to no sugar and high unrefined carbohydrate	No difference in disease activity, outpatient treatment, surgery or hospitalizations
Highly restricted diet (bread and red meat) ²⁰⁵	Active Crohn's disease (n=18)	Restricted diet (based on bread and red meat) compared with control diet (low fibre, low fat, high carbohydrate)	Radiological and endoscopic improvement in 3 of 4 patients in active group and 1 of 9 patients in the control group (P=0.027); no difference in CDAI improvement between the two groups
Semi-vegetarian diet ²⁰⁶	Quiescent Crohn's disease (n=22)	Semi-vegetarian diet or omnivorous diet	Remission was maintained in 94% with semi-vegetarian diet compared with 33% with omnivorous diet
Enteral nutrition (Cochrane review) ²⁰⁸	Active Crohn's disease (n=192)	Enteral nutrition or corticosteroids	Enteral nutrition was less effective than corticosteroids in induction of remission; no difference between elemental and nonelemental diets (n=334 patients)
Diet—micronutrient supplementation			
Vitamin D ¹⁸⁷	Quiescent Crohn's disease (n=94)	Vitamin D3 1,200IU daily or placebo	Relapse rate was lower among patients treated with vitamin D3 (13% than placebo (29%) (P=0.06)
Lifestyle—stress, depression, and anxiety			
Stress (Cochrane Review) ²⁰⁹	IBD (n=1,745)	Psychotherapy (multimodality)	No difference in quality of life, proportion in remission or emotional status
Stress ¹⁹⁰	IBD (n=24)	Supportive outpatient psychotherapy from an IBD counsellor	Treated patients had fewer relapses and outpatient attendances, steroid use and relapse-related use of IBD medications
Stress ²⁰⁷	IBD with continuous	Stress management	No difference in disease activity or relapses



The Institute for Functional Medicine

Ananthkrishnan AN. Epidemiology and risk factors for IBD. *Nat Rev Gastroenterol Hepatol.* 2015 Apr;12(4):205-17. doi: 10.1038/nrgastro.2015.34. Epub 2015 Mar 3. PMID: 25732745.

Early life exposures affect clinical course of Crohns Disease in children



LINDOSO L, MONDAL K, VENKATESWARAN S, SOMINENI HK, ET AL,. THE EFFECT OF EARLY-LIFE ENVIRONMENTAL EXPOSURES ON DISEASE PHENOTYPE AND CLINICAL COURSE OF CROHN'S DISEASE IN CHILDREN. *AM J GASTROENTEROL*. 2018 SEP 28. DOI: 10.1038/s41395-018-0239-9.

Factors and exposures from early life (smoking, breastfeeding, etc.) may influence disease risk and progression in CD patients. Disruption of the microbiome and development of immunologic tolerance likely play a role.

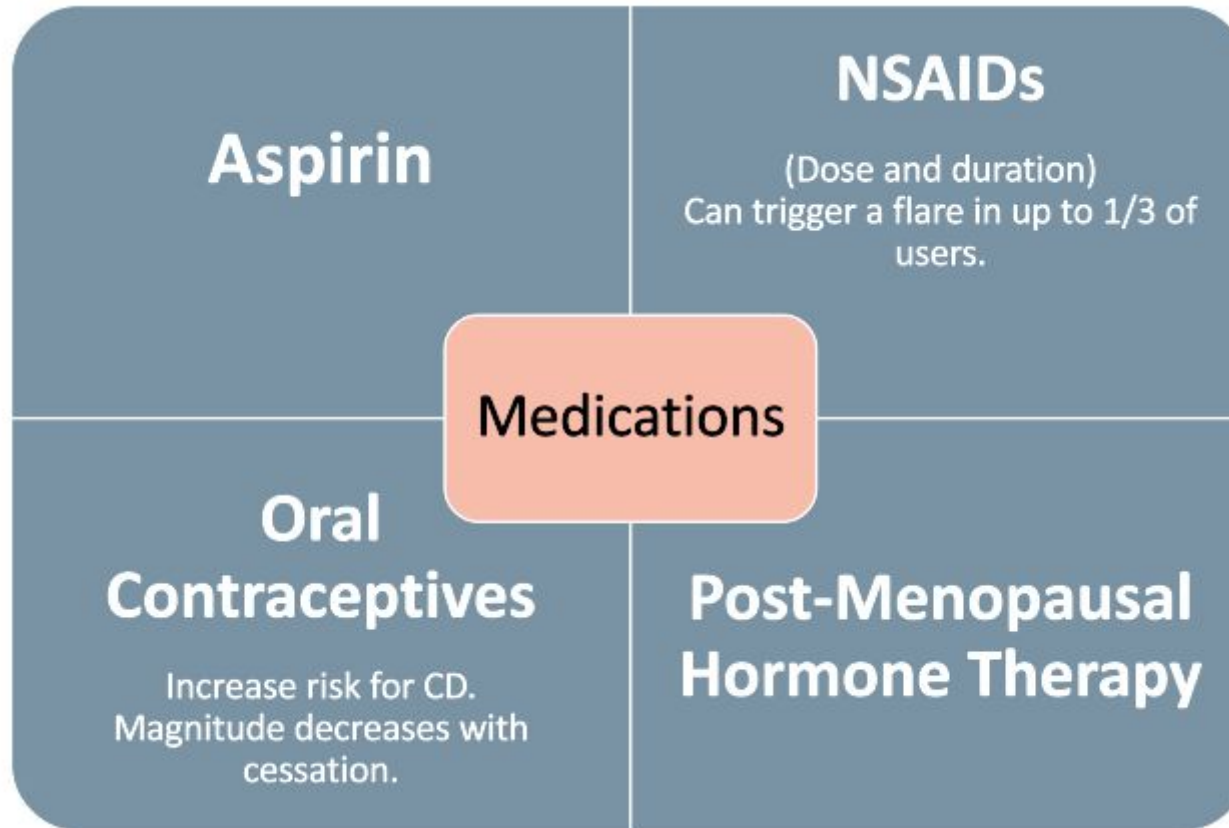
Hygiene hypothesis

- First proposed to explain the rising incidence of autoimmune diseases in the developed world
- Number of siblings
- Larger family size
- Drinking unpasteurized milk
- Living on a farm
- Exposures to pets (early childhood)

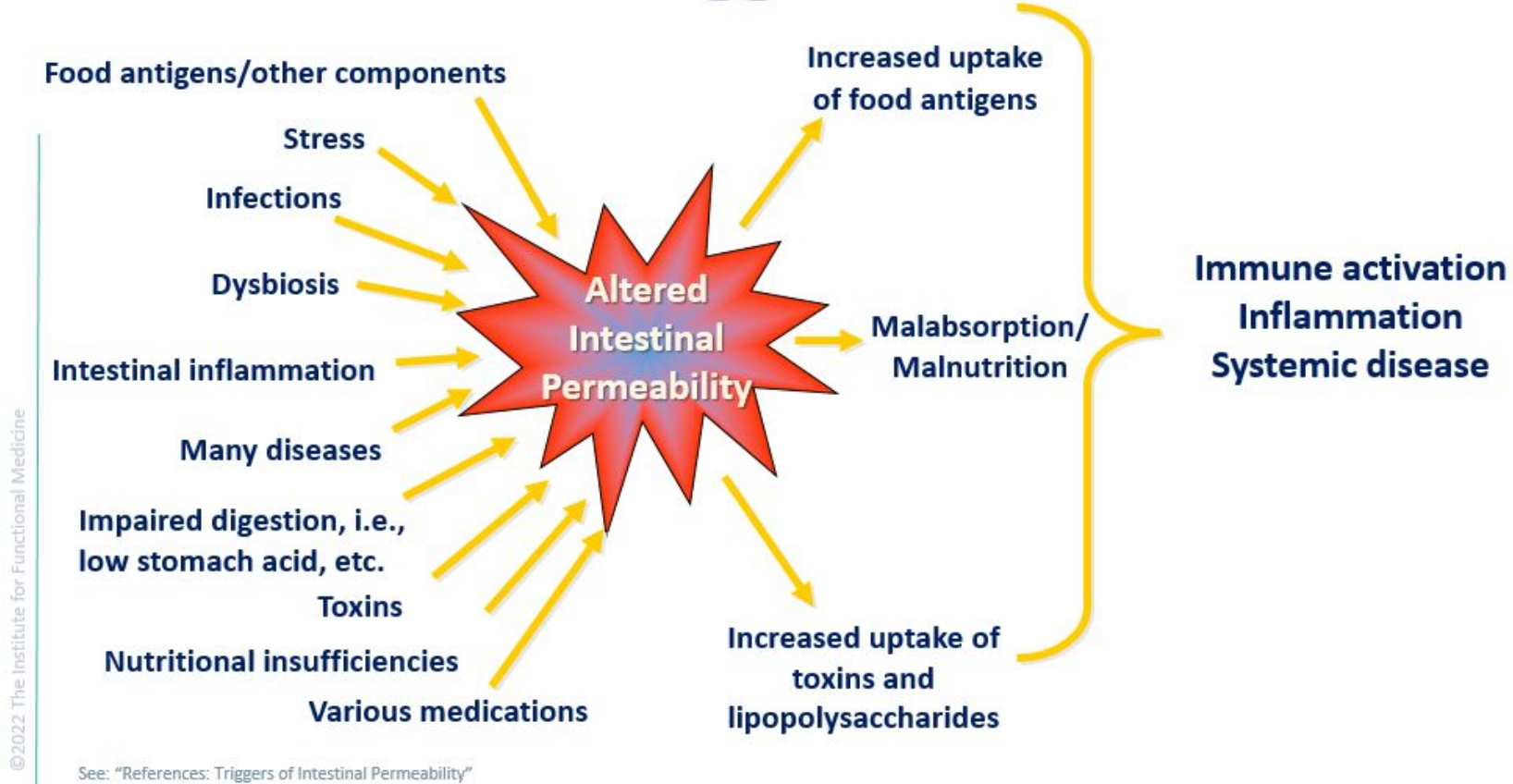


Sood A, Amre D, Midha V, et al. Low hygiene and exposure to infections may be associated with increased risk for ulcerative colitis in a North Indian population. *Ann Gastroenterol.* 2014;27(3):219-223.

Medications associated with IBD



What Are The Triggers of Increased IP?





5 R's

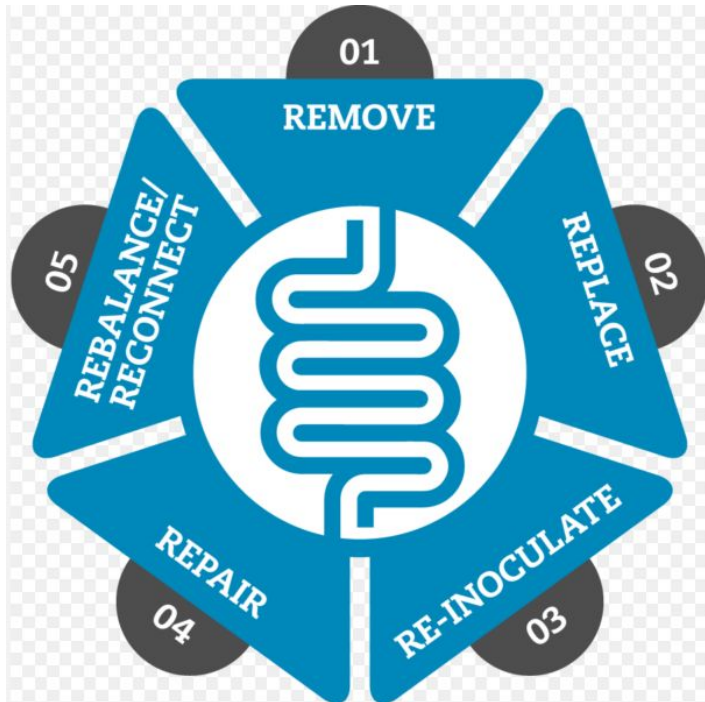
- **R**emove
- **R**eplace
- **R**einoculate
- **R**epair
- **R**e-Balance

5 R Treatment plan
for IBD

... our Functional
medicine roadmap



1- REMOVE



Remove known triggers

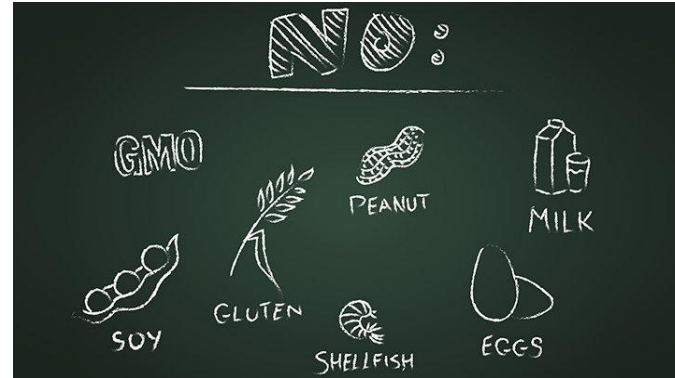
Diet/Nutrition changes

Botanicals

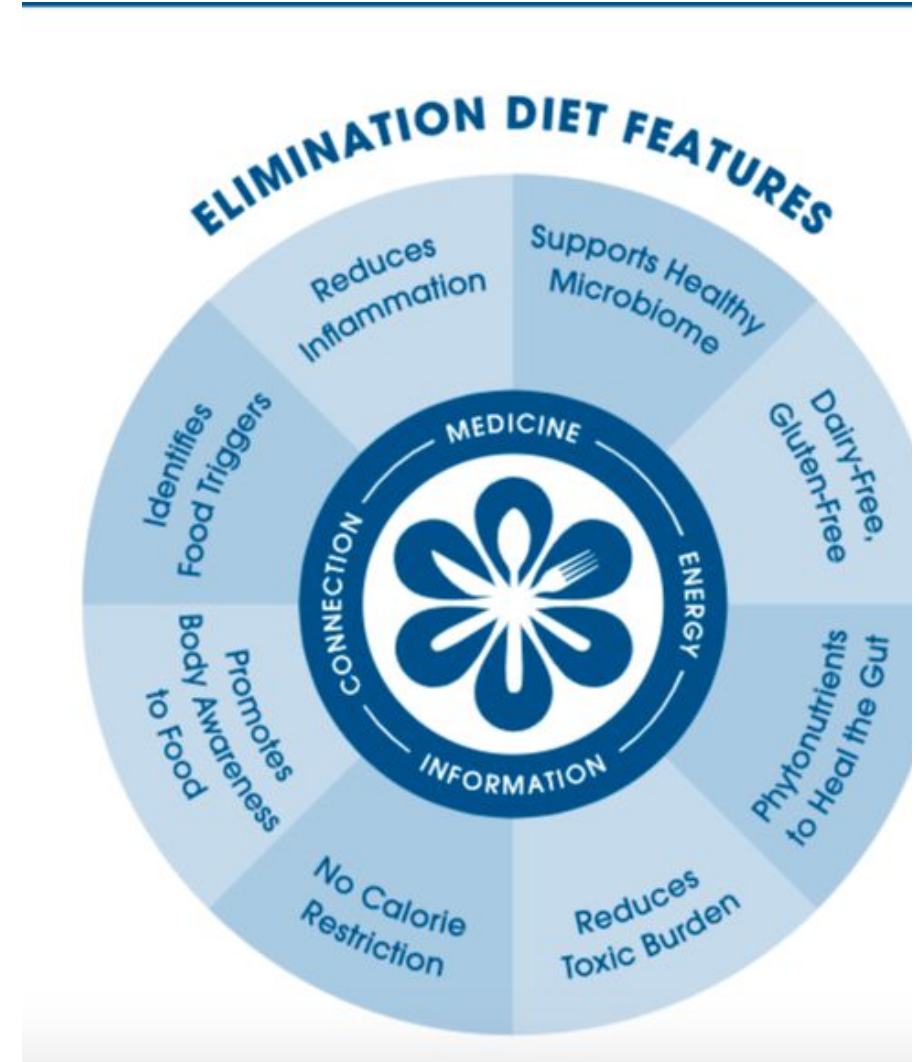
Remove medications that trigger inflammation/dysbiosis

Remove dietary and lifestyle factors that promote dysbiosis

Elimination diet



- Dairy
- Eggs
- Gluten
- Peanuts
- Shellfish
- Beef/red meat (and processed meats)
- Soy
- Corn
- Refined sugar
- Coffee/caffeine (besides green tea)
- Alcohol



Why elimination diet ?

Identify	Identify food triggers
Reduce	Reduce inflammation
Repair	Repair intestinal permeability
Introduce	Introduce phytonutrients to heal the gut
Reduce	Reduce toxic burden
Promote	Promote body awareness of foods

2- REPLACE

Support digestion

Replace what is
needed

Nutrients

Focus on dietary and
lifestyle factors that
promote health

Nutritional deficits and IBD



Anemia

- Anemia occurs in up to 20% of ambulatory patients and up to 68% of hospitalized patients with IBD
- Iron deficiency anemia (IDA) is the most common anemia
- Inflammation + impaired iron absorption = anemia of chronic disease
- 5ASA, sulfasalazine = hemolysis
- BM suppression= AZA, 6MP
- Think about.. Poor oral intake, malabsorption, blood loss

Nocerino, A., Nguyen, A., Agrawal, M. *et al.* Fatigue in Inflammatory Bowel Diseases: Etiologies and Management. *Adv Ther* **37**, 97–112 (2020). <https://doi.org/10.1007/s12325-019-01151-w>

Vitamin D

Muscle fatigue has been associated with low serum vitamin D and magnesium

vitamin D deficiency is associated with worse disease activity and reduced health-related quality of life in patients with IBD

Macro/Micronutrient deficiencies

- Restrictive diets (self restricted- Anorexia; prescribed – FODMAP, gluten free, SCD)
- Inadequate intake of calcium, folate, iron rich foods
- Increased metabolic demand related to inflammation
- Malabsorption
- Medications
- Excess losses (B6, Mg, Zinc)

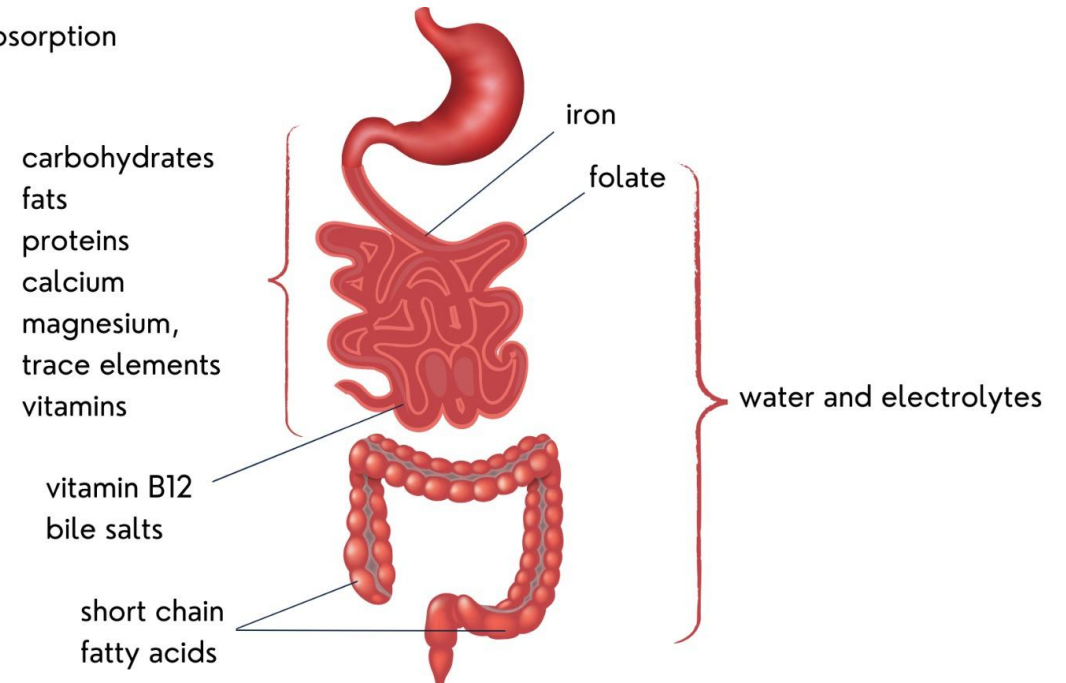
B12 and folate deficiency

- Can be linked to weakness and fatigue
- MTX= Folate deficiency □ macrocytic anemia
- Ileal resection/ SIBO= B12 def □ macrocytic anemia

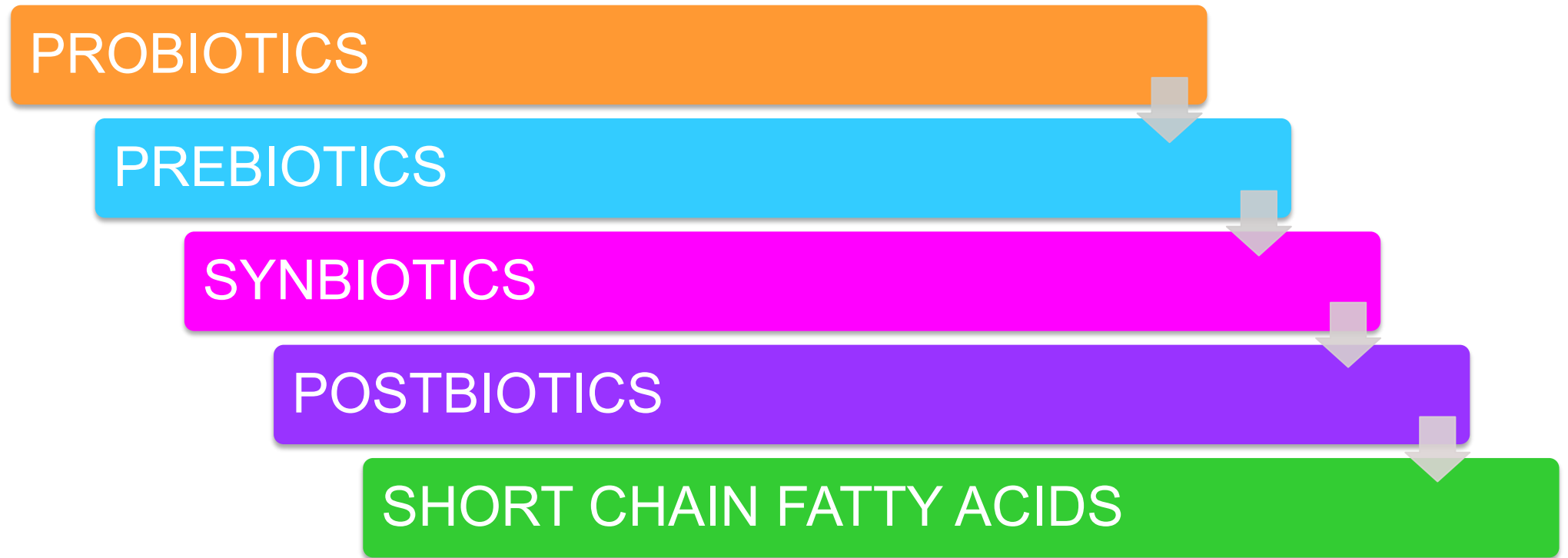
Micronutrient deficiency

Deficiency	Manifestations
Iron, copper, folate, vitamin B12	Anemia
Iron, B vitamins	Chelitis
Vitamin D	Bone loss
Vit B12, copper, Vit E	Paresthesia, neuropathy, ataxia
Zinc	Dermatitis, dysgeusia
Magnesium, calcium	Tentany, paresthesia
Vit A	Night blindness
Vit K	Ecchymosis, bleeding
Selenium	Heart disease
Calcium	Bone loss

Sites of Absorption

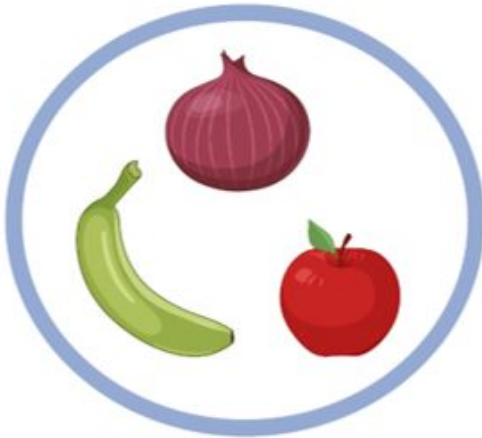


3- REinoculate

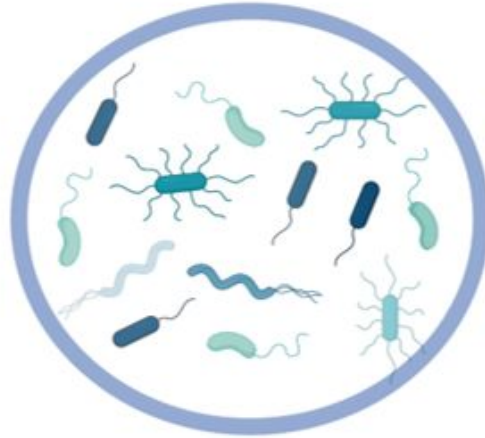


Prebiotics + Probiotics = Synbiotics

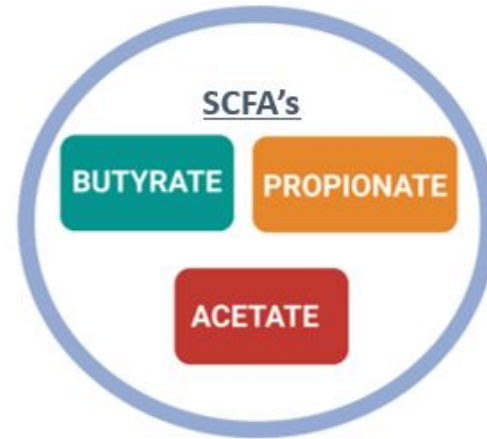
Prebiotics



Probiotics



Postbiotics



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4- REPAIR

(anti- inflammatory, herbs, spices, nutraceuticals, botanicals)

Vitamin D

L-Glutamine

Curcumin

Botanicals: QD,
Boswellia

Immunoglobulins

Phytonutrients

- Aim for at least 9 servings of phytonutrient- rich foods daily
- Americans typically get 2-4 servings of fruits and vegetables a day
- Try to focus on 3 servings at every meal
- Eat the rainbow (watch your colors)
- Goal of 7 colors



Botanicals

Bioflavonoids

Quercetin

Rutin

Wheatgrass

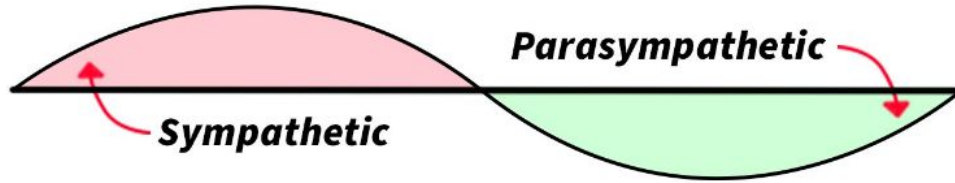
Ginger

Turmeric

Green tea

Boswellia

5- REBALANCE



Mindfulness based interventions

Stress management

Hypnotherapy

Relaxation training

Acupuncture/Acupressure

Yoga nidra

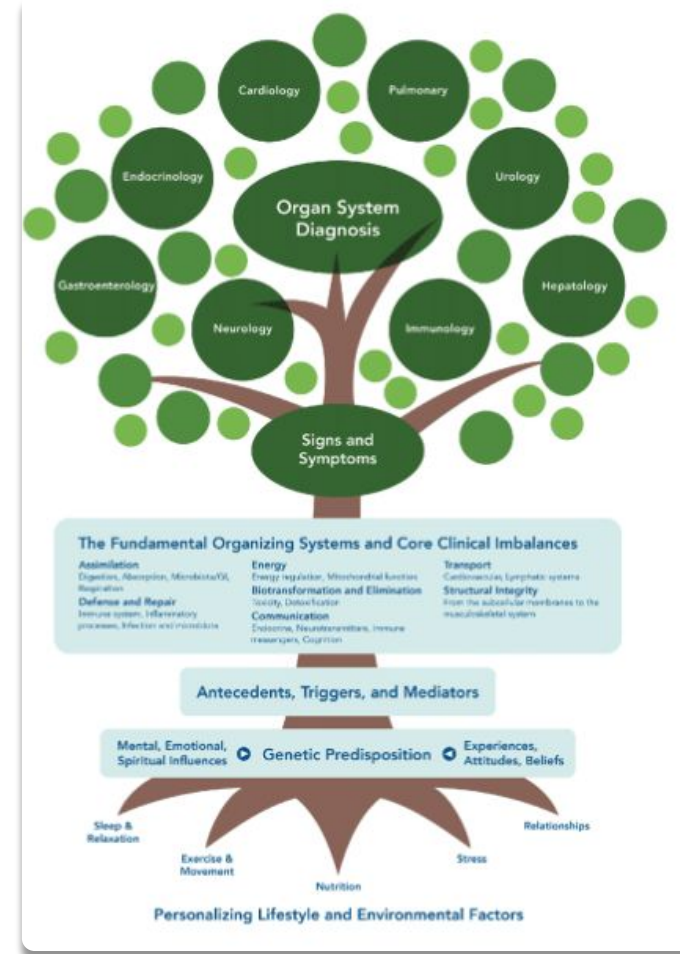
Heart math

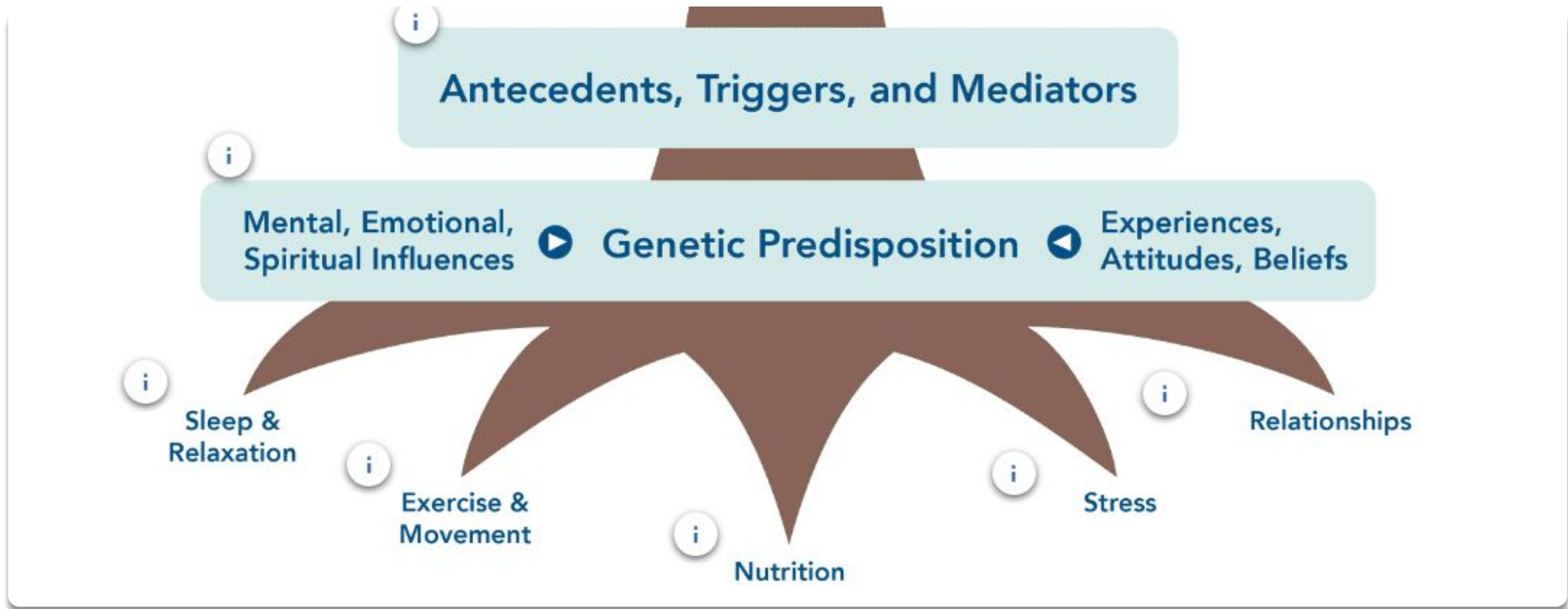
Tai chi

Cognitive Behavioral Therapy (CBT)

Functional medicine tree

Framework for functional medicine care





What can you do...

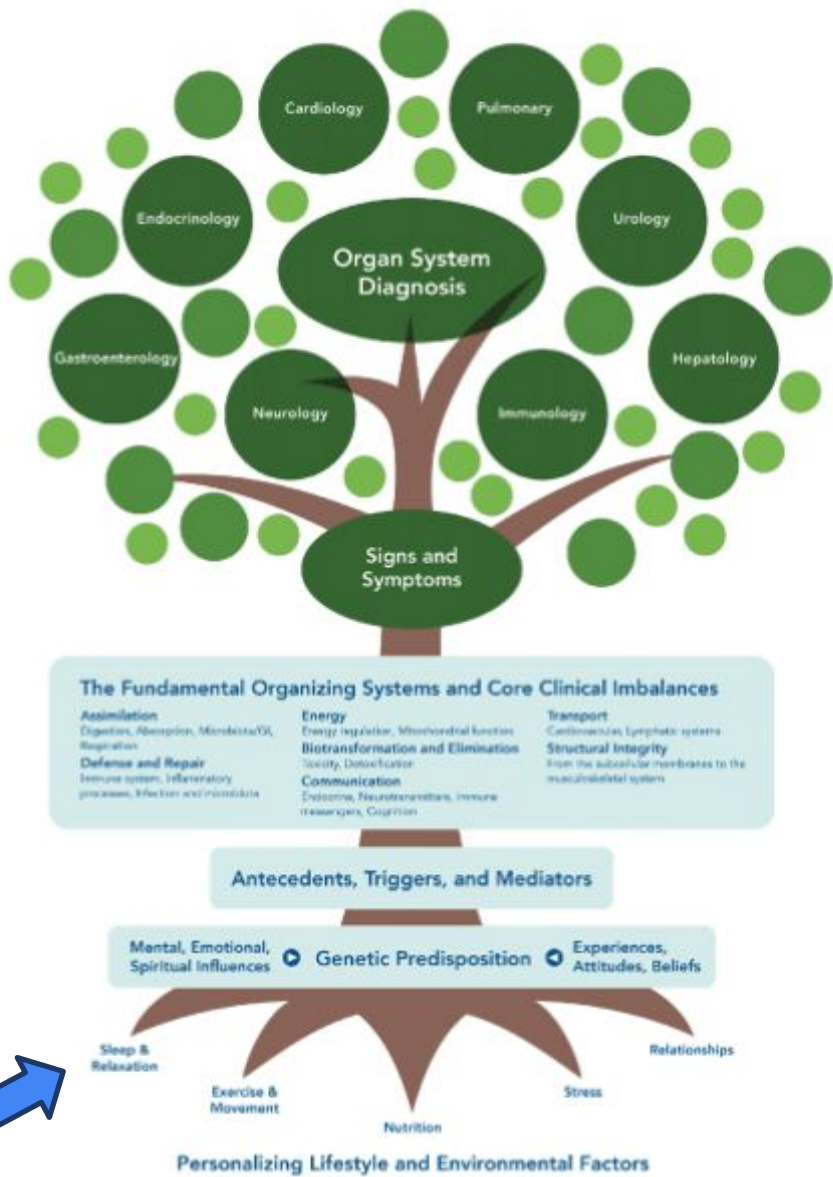
Start simple.. Focus on the base of the tree-
foundational work to support health and wellness

“Engaging in positive lifestyle factors are the most cost effective and safe treatment that we have”



Personalizing Lifestyle and Environmental Factors

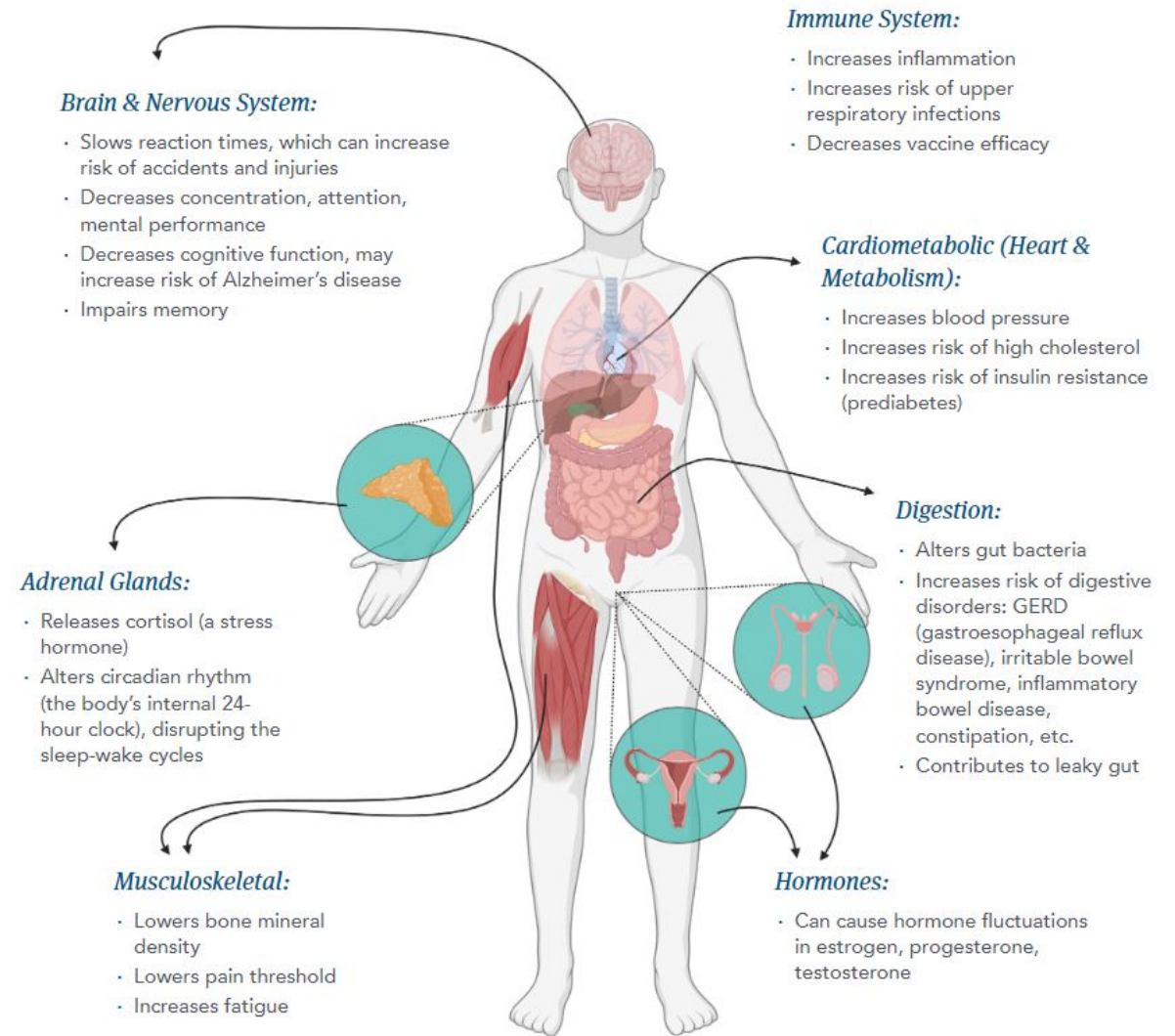
Remember... how **YOU LIVE** is more important than any time a patient spends with a practitioner



SLEEP & RELAXATION

Physiologic effects of SLEEP:

- regulates CV function
- endocrine function
- keeps inflammation in check
- maintains neuro
- maintains digestive processes



Gut health and SLEEP

Sleep loss appears to be associated with changes in the microbiota

Insomnia has been shown to alter the gut microbiome

Dysbiosis may be associated with altered sleep patterns

Presence of sleep disorders has been independently associated with delayed gastric emptying

Poor sleep quality and duration has been associated with constipation

OSA is associated with biomarkers of increased intestinal permeability

Shift work

Increased estradiol

Decreased HDL

Decreased serotonin

Increased incidence
of thyroid disease



Sleep quality is influenced by



EXERCISE



NUTRITION



SLEEP



RELATIONSHIPS

SLEEP

Between 47% and 82% of patients with IBD report disrupted sleep, night-time awakenings, and nonrestorative sleep compared with 1/3 of the general population

RISK factors= depressive symptoms, active disease, female sex, smoking , CD

Sleep

- Poor sleep = worsening pain and fatigue in inflammatory diseases
- Strong association between IBD and sleep
- Sleep loss and insomnia alters the microbiota
- Dysbiosis associated with altered sleep patterns
- Patients with IBD report worse sleep than healthy controls, and subjects with active IBD report poorer sleep than those in remission
- Ranjbaran *et al.* found that subjects with IBD identified prolonged sleep latency, increased fragmentation, use of sleeping aids, and decreased energy as factors associated with poorer overall sleep
- GI pain, nighttime symptoms, steroids, narcotics = Poor restorative sleep
- Rule out obstructive sleep apnea (Keefer *et al.* 13% of IBD pts; 20% gen pop)

Ranjbaran Z, Keefer L, Stepanski E, Farhadi A, Keshavarzian A. The relevance of sleep abnormalities to chronic inflammatory conditions. *Inflamm Res.* 2007;56(2):51–7.

Keefer L, Stepanski EJ, Ranjbaran Z, Benson LM, Keshavarzian A. An initial report of sleep disturbance in inactive inflammatory bowel disease. *J Clin Sleep Med.* 2006;2(4):409–16.

Young T, Peppard PE, Gottlieb DJ. Epidemiology of obstructive sleep apnea: a population health perspective. *Am J Respir Crit Care Med.* 2002;165(9): 1217–39.

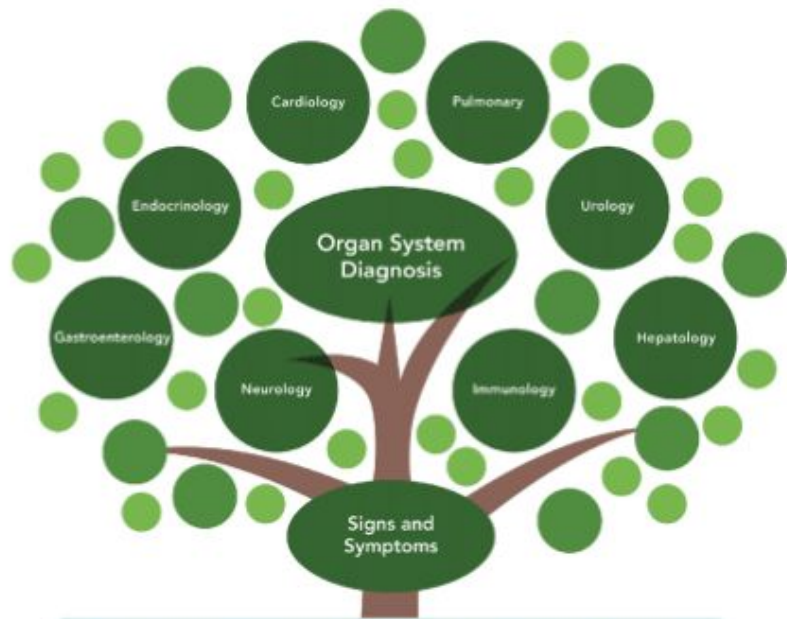
The Science of Sleep

- Important environmental factor that may contribute to disease flares
- Sleep deprivation/sleep disturbances = Increase in CRP and IL-6
- Sleep deprivation is associated with an increase in circulating pro-inflammatory cytokines such as TNF- α and IL-6
- Shift workers (irregular hours and sleep patterns) = inc estradiol, dec HDL, dec serotonin, increase incidence of thyroid disease
- Ananthakrishnan *et al.* found a higher incidence of UC in individuals with less than 6 h of sleep or more than 9 h of sleep
- In experimental models of rodents with colitis and sleep deprivation, sleep deprivation worsened the degree of dextran sulfate (DSS)-induced colitis in animals
- Interestingly administering IL-6 and TNF α to animals resulted in suppression of REM

Nocerino, A., Nguyen, A., Agrawal, M. *et al.* Fatigue in Inflammatory Bowel Diseases: Etiologies and Management. *Adv Ther* **37**, 97–112 (2020) Shoham S, Davenne D, Cady AB, Dinarello CA, Krueger JM. Recombinant tumor necrosis factor and interleukin 1 enhance slow-wave sleep. *Am J Physiol.* 1987;253(1 Pt 2):R142–9; Ananthakrishnan AN, Khalili H, Konijeti GG, et al. Sleep duration affects risk for ulcerative colitis: a prospective cohort study. *Clin Gastroenterol Hepatol.* 2014;12(11):1879–86.

Suggestions for better sleep

- Minimize and avoid stimulants (no caffeine after 2pm, no ETOH within 3 hours of bedtime, aerobic exercise completed at least 3 hours before bed)
- Minimize nighttime tension and anxiety (watching the news, paying bills, journal, yoga, breathwork)
- Sleep planning and preparation (train your biological clock, avoid bedtime after 11 pm, no naps > 45 mins, stop eating 3-4 hours before bedtime, create a routine)
- Don't stay in bed longer than 20-30 min if you can't fall asleep
- Optimize light, noise, temp and environment
- Expose to light first thing in the morning (30 min)
- Supplements: Melatonin, 5HTP, Taurine, Magnesium (200-400 mg), Ashwagandha, phosphorylated serine, L-theanine



The Fundamental Organizing Systems and Core Clinical Imbalances

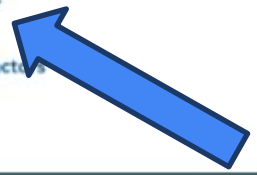
Assimilation Digestion, Absorption, Mitochondria/OX, Respiration	Energy Energy regulation, Mitochondrial function	Transport Cardiovascular, Lymphatic systems
Defense and Repair Immune system, Inflammatory processes, Infection and microbiome	Biotransformation and Elimination Toxicity, Detoxification	Structural Integrity From the subcellular membrane to the musculoskeletal system
	Communication Endocrine, Neurotransmitters, Immune messengers, Cognition	

Antecedents, Triggers, and Mediators

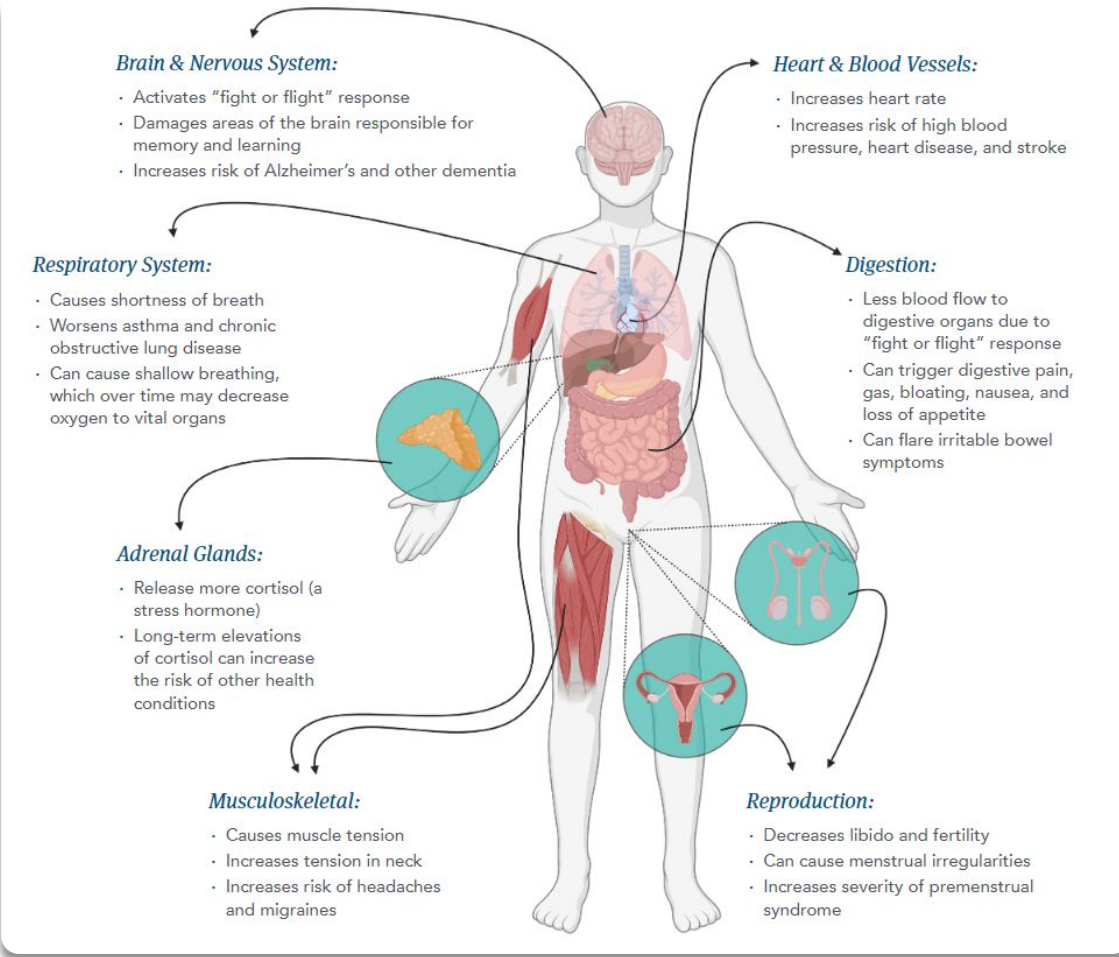
Mental, Emotional, Spiritual Influences Genetic Predisposition Experiences, Attitudes, Beliefs

Sleep & Relaxation Exercise & Movement Nutrition Stress Relationships

Personalizing Lifestyle and Environmental Factors

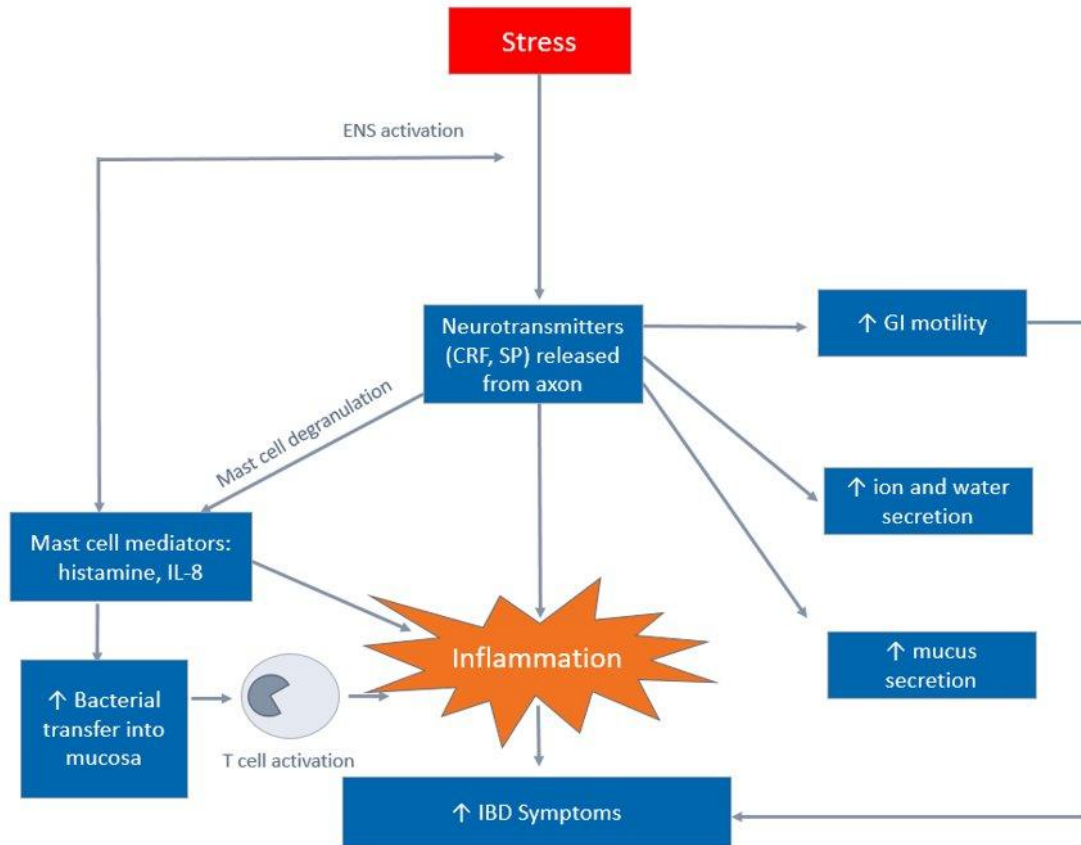


STRESS



Physiologic effects of STRESS

Stress and Gut health



- Contributes to intestinal permeability in autoimmune conditions and IBS by involving corticotropin releasing hormone- mediated mast cell activation/degranulation
- Impairs gut motility in terms of gastric emptying and colonic contractions
- Chronic stress is associated with increased cortisol levels has been impaired digestion function (can counter act with mindful eating)
- Relaxation based mind- body interventions have been demonstrated to improve IBS and IBD severity scores
- Mediators of stress (interpersonal, caregiver, financial, work related, discrimination related) have been associated with increased CRP

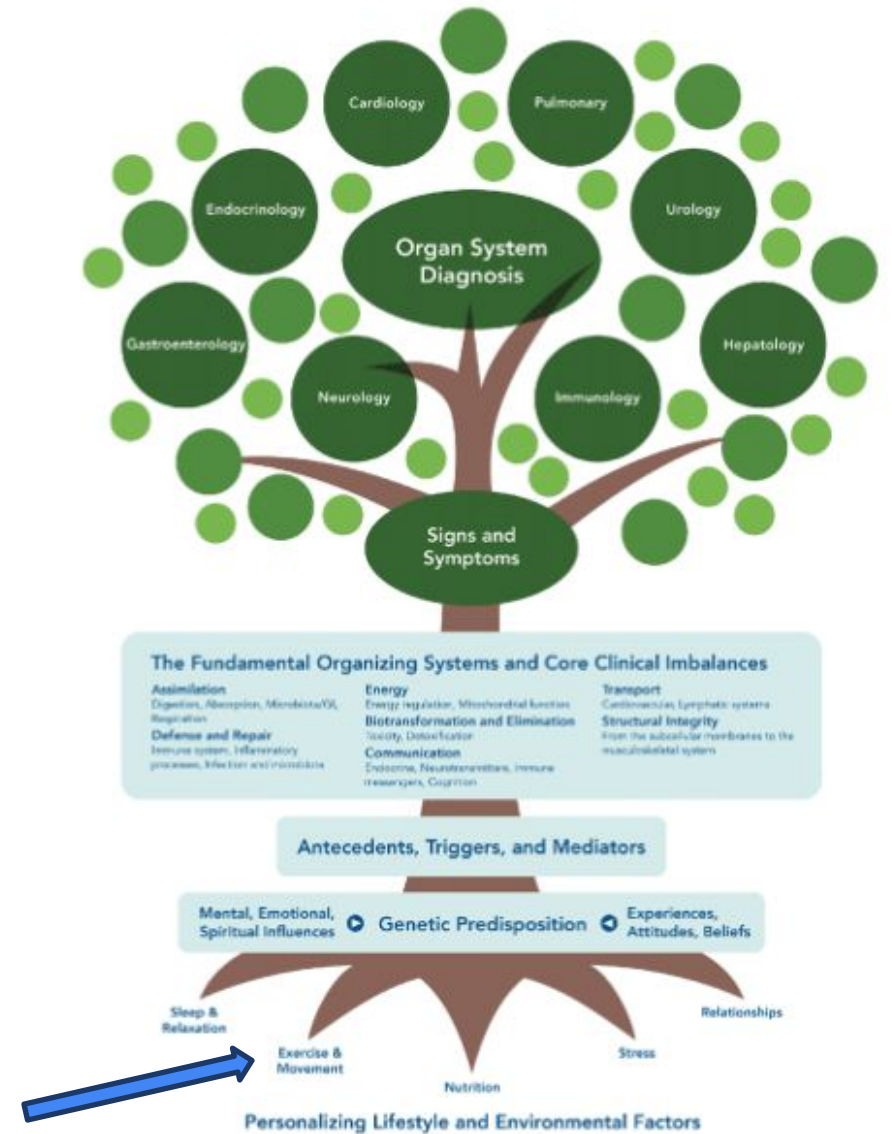


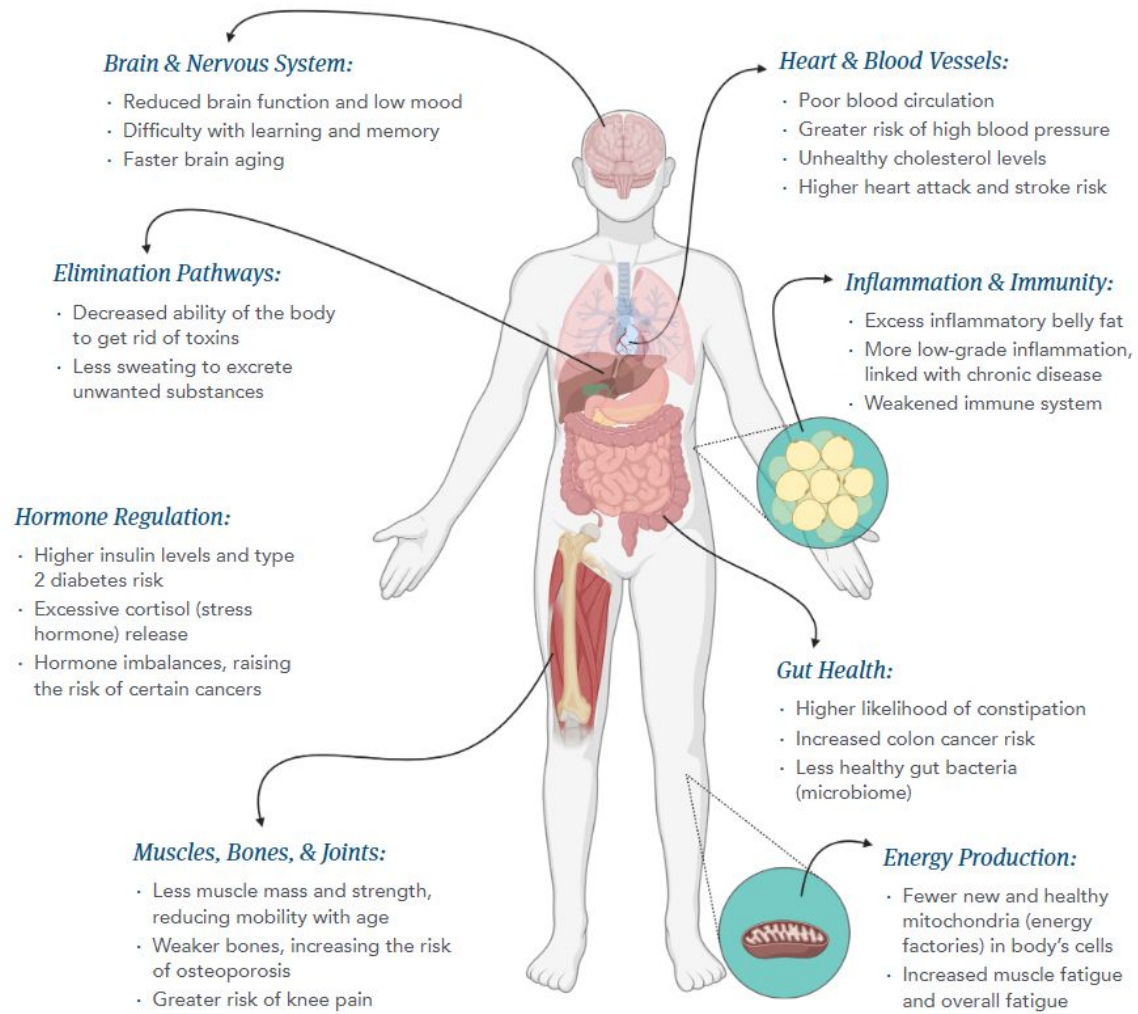
Stress management helps increase resilience and optimize immune function

EXERCISE & MOVEMENT

embracing an active lifestyle can benefit overall health

From physical to mental health, exercise helps promote and maintain balance





Effects of physical INACTIVITY

Exercise and Gut Health

- Exercise interventions sustained over weeks to months have been observed to improve biomarkers of BBB integrity, improve gut motility
- Has beneficial effects on gastric emptying
- Improves post prandial glycemic control and insulin levels
- Over exercise may have adverse effects on intestinal permeability
- May improve gut microbial diversity
- Single bouts and weeklong programs have all been shown to improve gut motility



Move, move, move..

Physical exercise can decrease inflammatory cytokine activity levels

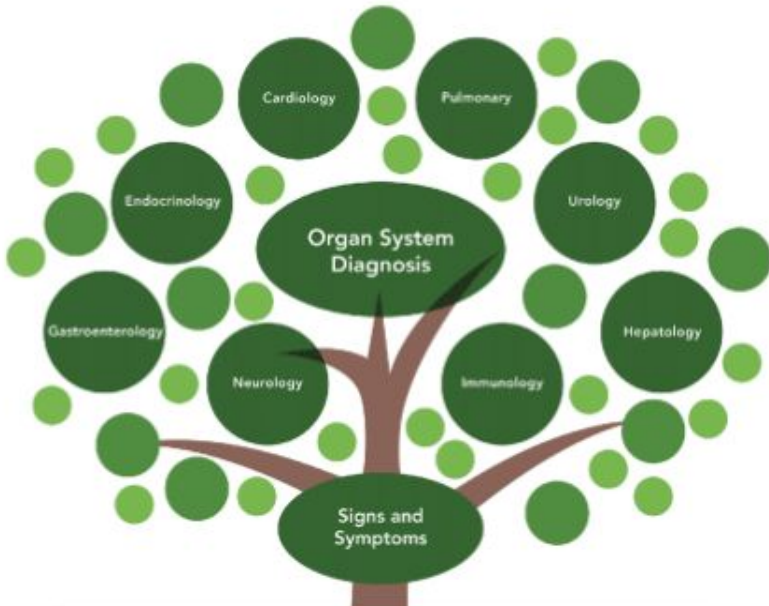
Higher levels of physical activity have also been associated with lower physical and mental fatigue levels

Dedicated exercise intervention in 2 randomized controlled trials demonstrated improved fatigue measures

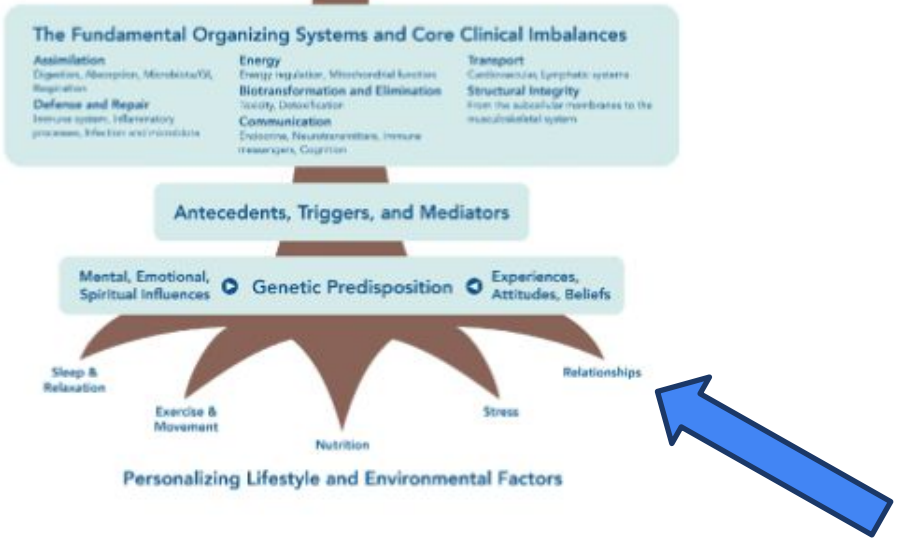
Exercise

- Boosts immune response
 - Reduces pro-inflammatory cytokines
- In animal models of colitis, exercise has decreased symptoms and inflammatory burden
- Jones *et al.* observed that higher level of exercise was independently associated with 24-32% lower risk of symptomatic relapse over 6 months in pts in remission

Rozich JJ, Holmer A, Singh S. Effect of Lifestyle Factors on Outcomes in Patients With Inflammatory Bowel Diseases. Am J Gastroenterol. 2020 Jun;115(6):832-840. doi: 10.14309/ajg.0000000000000608. PMID: 32224703; PMCID: PMC7274876.

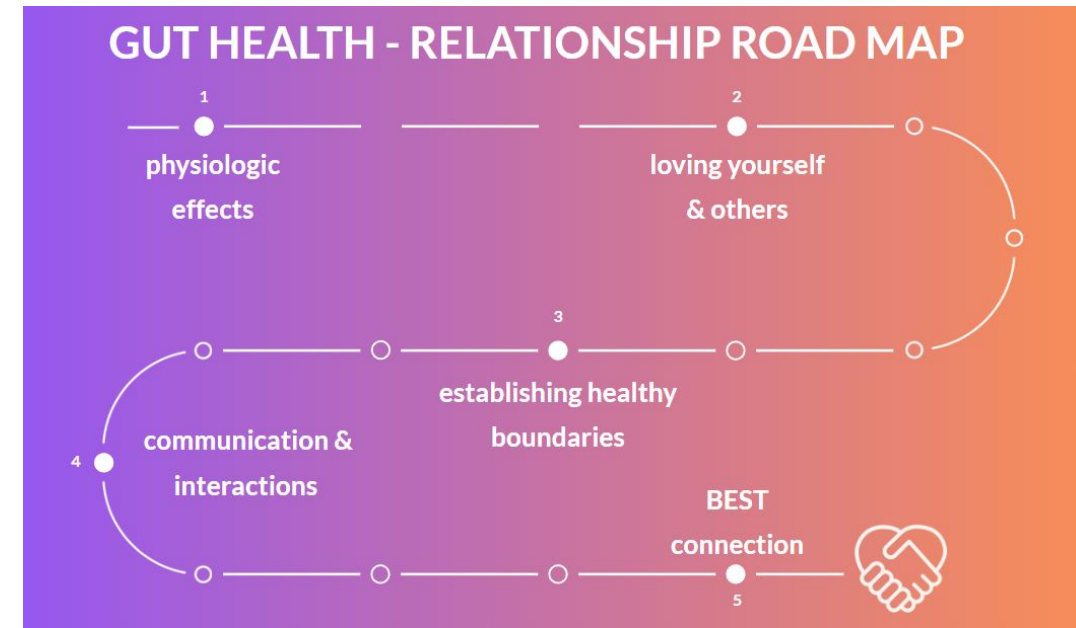


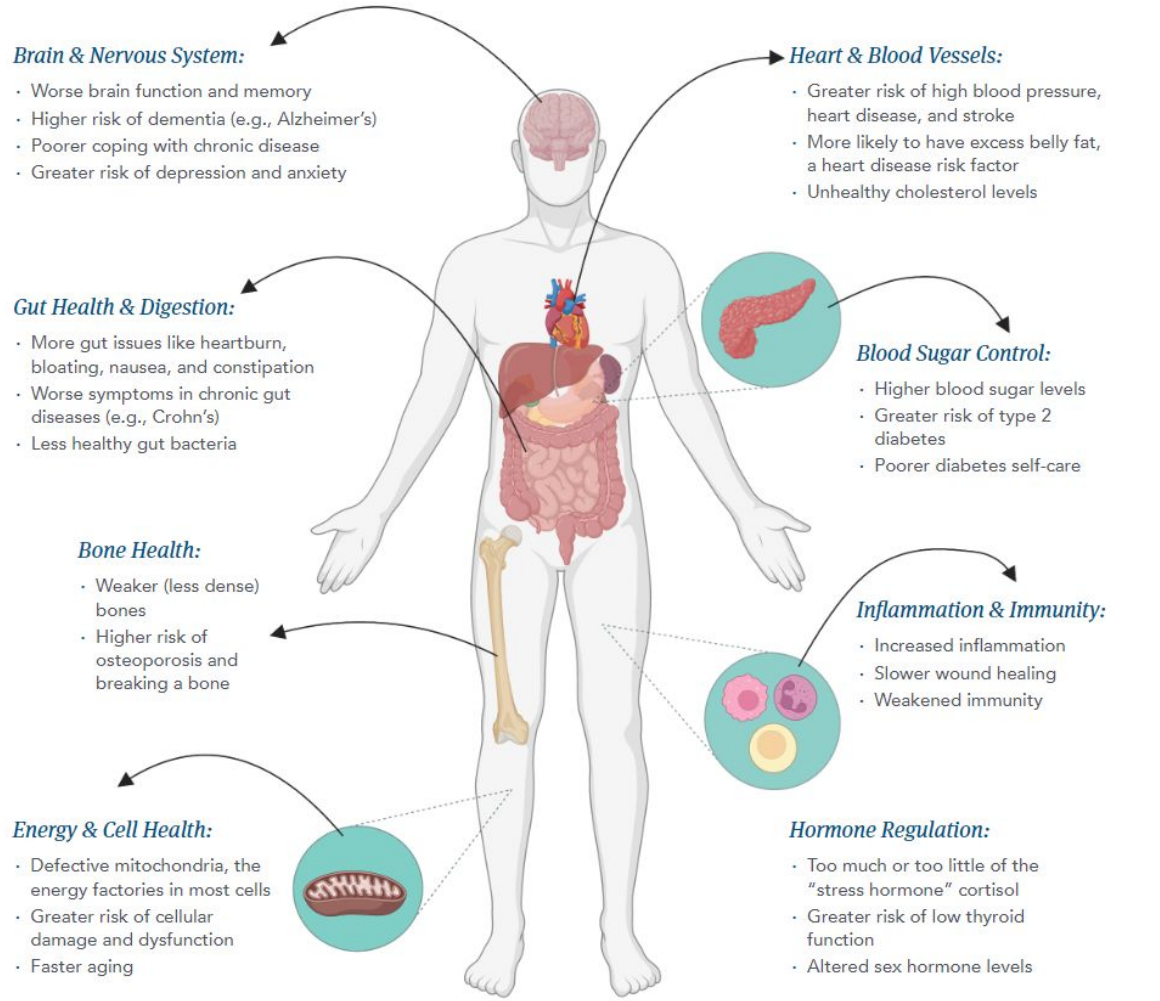
RELATIONSHIPS



Relationships

- Human relationships play a profound role in human biology
- Affects all the foundational physiological systems
- science around socio genomics is quite profound.... human connections, our social relationships impact our gene expression
- more important is that we need to activate behavior change, not just biology change
- Christakis' at Harvard, “ You're 171% more likely to be overweight if your friends are overweight, and about 40% more likely to be overweight if your family members are overweight
- the social threads that connect us are often more impactful and powerful than the genetic threads.





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Version 2 (Image created with BioRender.com)

Physiological effects of loneliness, isolation and supportive relationships

Gut Health & Digestion

- Higher degree of **loneliness** has been correlated with greater CD activity
- Marital stress and **hostile behavior** between spouses has been correlated with an increased level of biomarkers of intestinal permeability
- **Greater microbiome diversity and richness correlated with = higher levels of social support, close social relationships, and lower levels of loneliness**
- Large survey data indicate that **loneliness** is correlated with higher levels of CRP, IL-6, and fibrinogen
- Individuals with greater **loneliness** scores have been shown to have upregulated inflammatory genetic profiles



50%

Those with strong social relationships have a 50% increased likelihood of survival against chronic disease.¹



27%

In post-menopausal women, social isolation and loneliness may increase cardiovascular disease risk by up to 27%.²



29%

Poor social relationships are associated with a 29% increased risk of heart disease and a 32% increased risk of stroke compared to those with strong social connections.³



59%

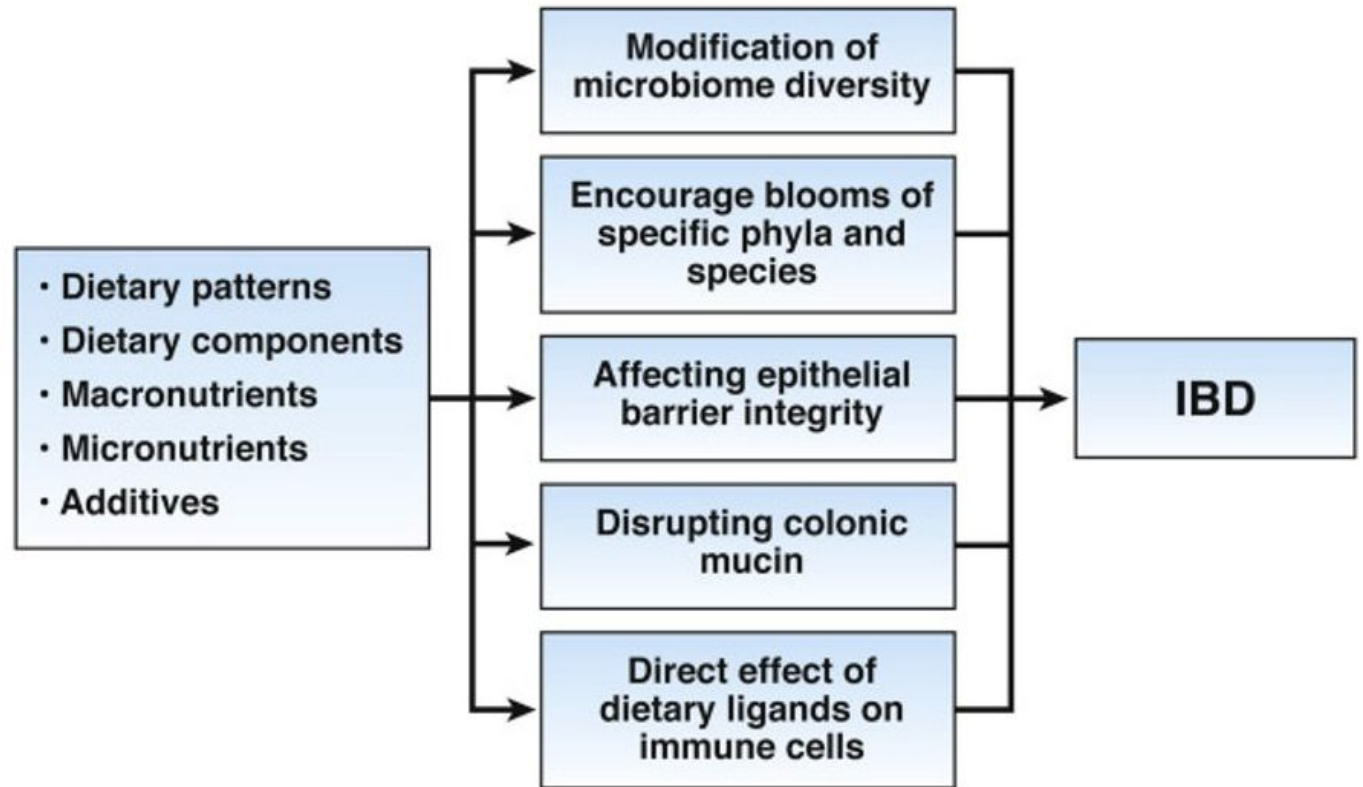
Aging adults with lower social engagement are 59% more likely to experience cognitive decline and impairment.³



Nutrition

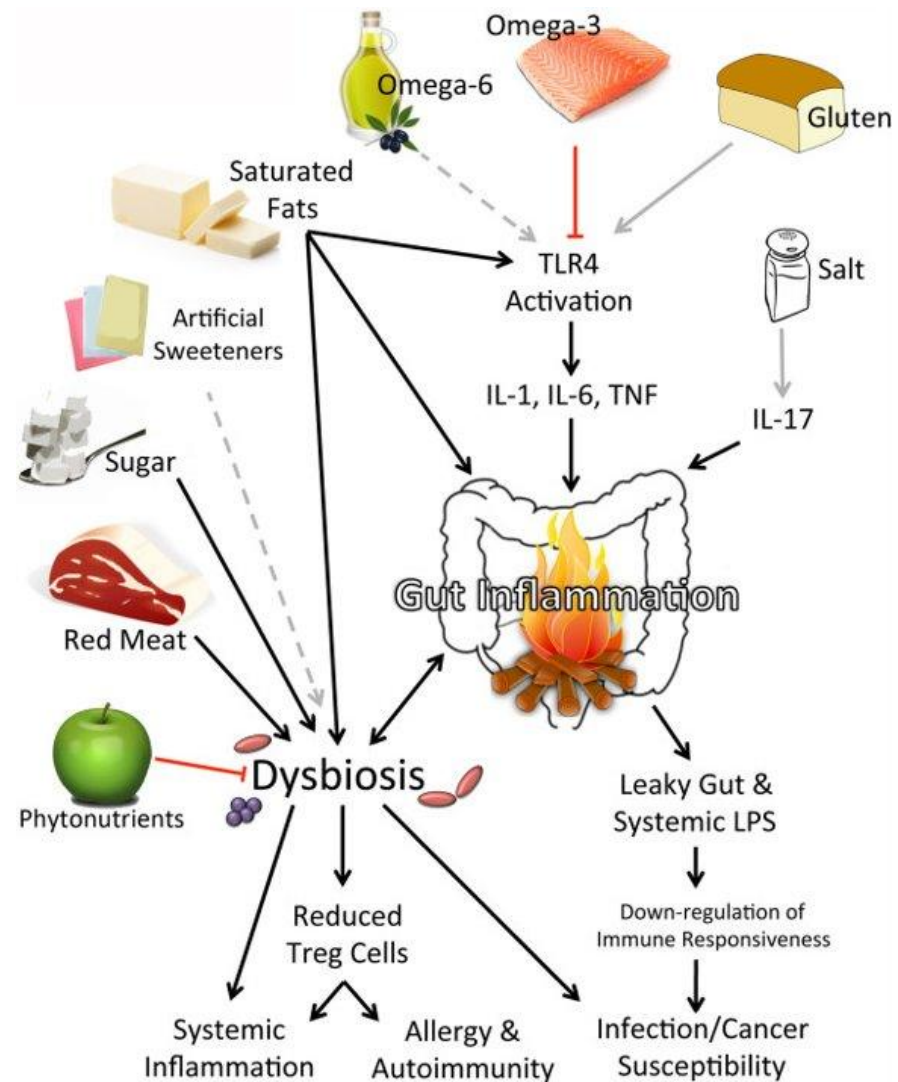
it is important to think about what you eat, but also when you eat, and how you eat in a social and environmental context

Potential mechanisms of influence of dietary components on the pathogenesis of IBD



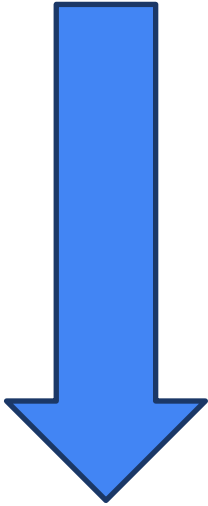
Reprinted from Clinical Gastroenterology and Hepatology, Vol. 19, Author(s), Sasson, A. N., Ananthakrishnan, A. N., & Raman, M., Pages 425-435.e3, Copyright 2021, with permission from AGA Institute

Diet, Dysbiosis & IBD



Myles, I.A. Fast food fever: reviewing the impacts of the Western diet on immunity. *Nutr J* 13, 61 (2014). <https://doi.org/10.1186/1475-2891-13-61>. Licensed under CC BY 4.0.

Dietary components can influence IBD risk



Fiber



Fruit



Vegetables



High omega
fatty acids



Animal
protein



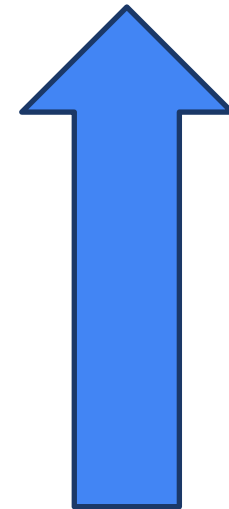
Heme iron,
Sulfur



Refined
sugars



High trans fat



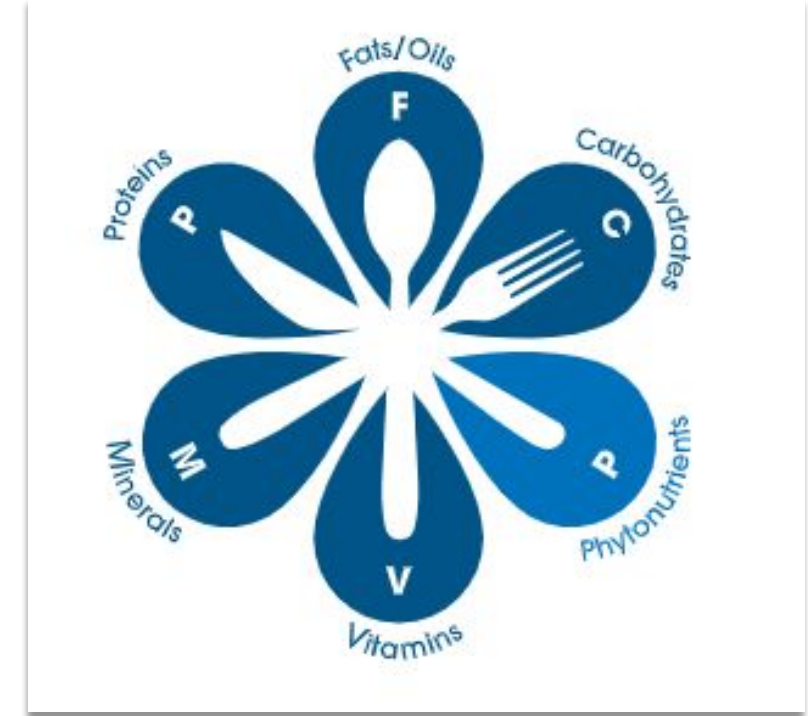
Adapted from Owczarek, D., Rodacki, T., Domagała-Rodacka, R., Cibor, D., & Mach, T. (2016). Diet and nutritional factors in inflammatory bowel diseases. *World journal of gastroenterology*, 22(3), 895–905. <https://doi.org/10.3748/wjg.v22.i3.895>. Licensed under CC BY-NC 4.0.

Nutrition

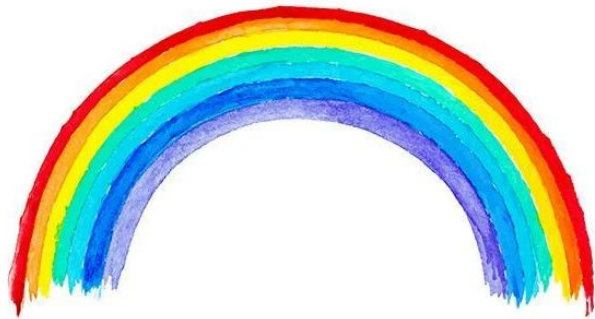
- **Soluble fiber** (from fruits and vegetables) is metabolized by the intestinal bacteria to short-chain fatty acids that inhibit transcription of proinflammatory mediators
- **Fiber** helps maintain the integrity of the epithelial barrier
- Most consistent macronutrient association has been an inverse association with **dietary fiber**.
- High consumption of **n-6 polyunsaturated fatty acids (omega-6 PUFA)** and low consumption of n-3 PUFA (or a high n-6:n-3 ratio) has been associated with an increased risk of both Ulcerative Colitis and Crohn's disease.
- In mice, deficiency of 1,25-dihydroxy **vitamin D3** (1,25(OH)₂ D₃) or knockout of vitamin D receptor is associated with an increased risk of colitis.
- Administration of 1,25(OH)₂ D₃ resolves this inflammation and suppresses expression of proinflammatory genes including TNF.
- Low levels of **vitamin D** (<20 ng/ml) were associated with increased risk of Crohn's-disease-related surgery and hospitalization.
- **Zinc** inhibits transcription of inflammatory mediator

Phytonutrients

- More than 25,000 phytonutrients are found in plant foods
- Fruits and vegetables are rich sources of phytonutrients, as well as whole grains, legumes, herbs, spices, nuts, seeds, and teas.
- It is important to eat a variety of colorful phytonutrient-rich fruits and vegetables each day
- Phytonutrients and their health benefits are associated with specific colors of foods



Aim for 1 or 2 of
each color per
day



Red Foods: anti-bacterial, anti-cancer, anti-inflammatory, blood vessel health, brain health, cell protection, heart health, prostate health

Orange Foods: anti-inflammatory, blood vessel health, brain health, cell protection, heart health, reproductive health

Yellow Foods: anti-inflammatory, cell protection, digestive health, eye health, heart health, immune health

Green Foods: anti-cancer, anti-inflammatory, blood vessel health, bone health, brain health, cell protection, heart health, hormone health, metabolic health

Blue/Purple/Black Foods: anti-inflammatory, blood vessel health, bone health, brain health, cell protection, digestive health, heart health, liver health

White/Tan/Brown Foods: anti-cancer, anti-inflammatory, blood vessel health, bone health, brain health, cell protection, digestive health, heart health, immune health, metabolic health



Red Foods

- ▶ May help reduce the risk for certain cancers
- ▶ Protects the brain, blood vessels and heart
- ▶ Support prostate health
- ▶ Anti-inflammatory and anti-bacterial benefits
- ▶ Lycopene (tomatoes (cooked) , watermelon, pink grapefruit, guava), fat soluble

Orange foods

- ▶ Ant-inflammatory
- ▶ Source of vitamin A
- ▶ May protect heart and eyes
- ▶ Support immune system
- ▶ Support healthy digestion
- ▶ Betacarotene-converted to vitamin A in the body ; butternut squash, carrots, grapefruit, oranges, apricots





Yellow foods

- ▶ May protect heart and eyes
- ▶ Support digestion
- ▶ Support immune system
- ▶ Lutein= corn (corn on the cob, whole kernel)



Blue/Purple/Black Foods

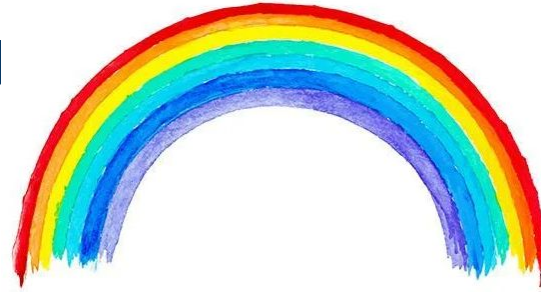
- ▶ May protect heart, bone, liver and blood vessels
- ▶ Protecting the brain from aging
- ▶ Anthocyanins= blackberries, blueberries, (strawberries, onion)
- ▶ Research supports risk reduction of heart attack, improved blood vessel health and improved cognition

White/Tan/Brown Foods

- ▶ Nuts, fruits, vegs, legumes, spices, seeds, whole grains
- ▶ Anti-cancer and anti-inflammatory
- ▶ Can also be found in coffee, tea and cacao
- ▶ Lignans= flax, sesame, sunflower seeds, cashews, peanuts



Spectrum checklist



Blue/Purple



Foods

Blackberries	Dates	Plums
Blueberries	Eggplant	Potatoes (<i>purple</i>)
Cabbage (<i>purple</i>)	Grapes (<i>purple</i>)	Raisins
Carrots (<i>purple</i>)	Kale (<i>purple</i>)	Rice (<i>black or purple</i>)

White/Tan



Foods

Bean dips	Nuts	Shallots
Garlic	Onions	Tahini
Hummus	Refried beans	
Legumes	Seeds	

Red



Foods

Apples	Pomegranate	Sweet red bell peppers
Applesauce	Radishes	Tomato
Cherries	Strawberries	
Kidney beans		

Orange



Foods

Apricots	Cantaloupe	Nectarine
Bell peppers	Carrots	Orange
Butternut squash	Mango	Sweet potato

Yellow



Foods

Bell peppers	Popcorn	Succotash
Corn	Spaghetti squash	Yellow squash
Lemon	Starfruit	

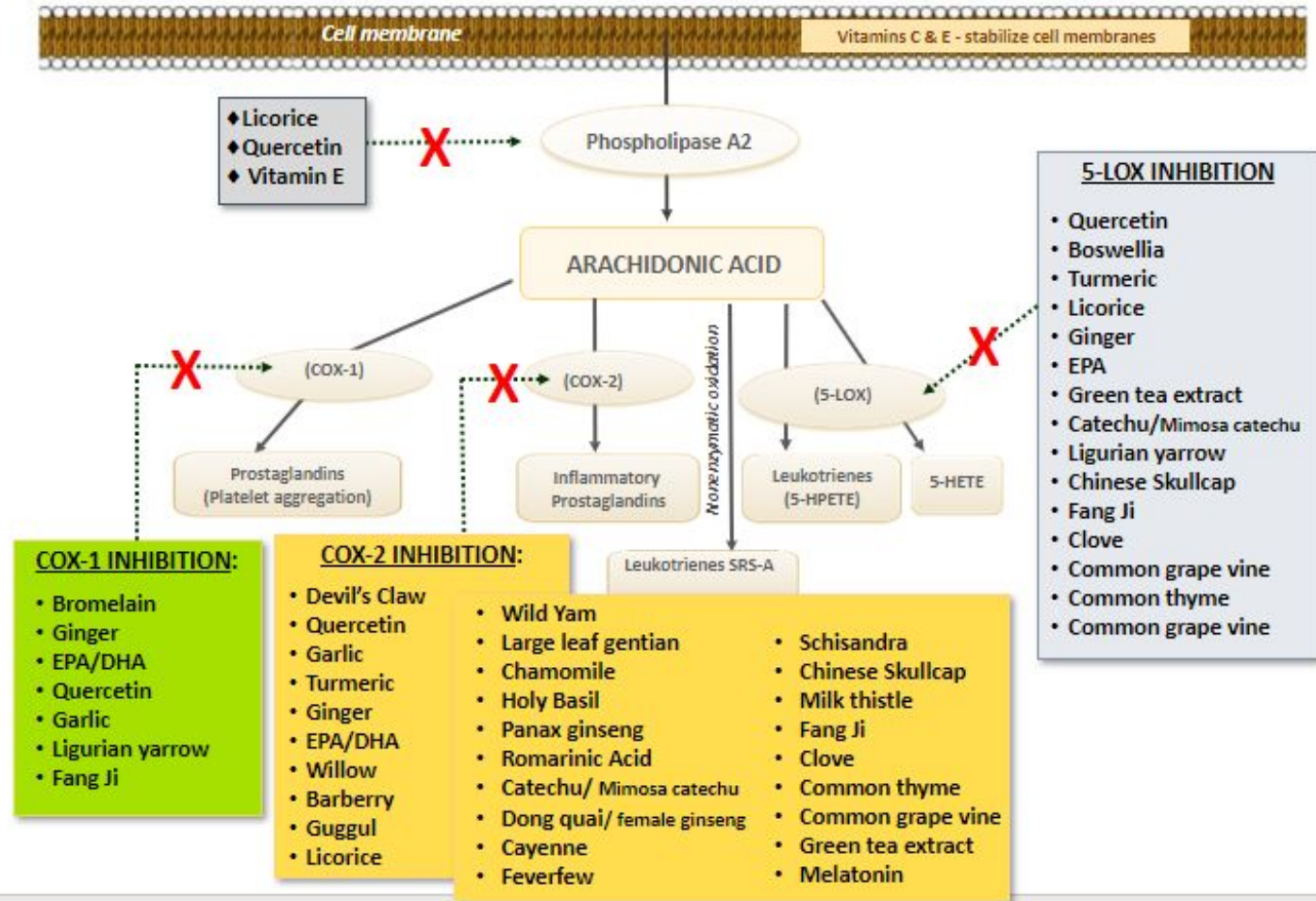
Green



Foods

Asparagus	Cabbage	Greens (<i>beet, dandelion, collard, mustard, turnip</i>)
Avocado	Celery	Kale
Bean sprouts	Chard	Lettuce
Bell peppers	Cucumbers	Olives
Broccoli	Green beans	Snow peas
Brussels sprouts	Green peas	

Food is Medicine



Slide Courtesy of IFM

Mindful eating and Intuitive eating

- Mindful eating is the process of paying attention to your eating without judgement.
- Mindful eating helps you become aware of the reasons behind your hunger (emotions, lack of food, tradition, boredom, schedule, etc.)
- Intuitive eating is a broader concept that includes mindful eating and it emphasizes the connection and strengthens the relationship between mind, body, and food
- Are both mindsets that require you to trust your instincts and listen to your body's natural hunger and fullness cues



Prepare- cook your own food

Put away electronics

Sit down- breath, center, gratitude

Develop a mealtime ritual

Be still

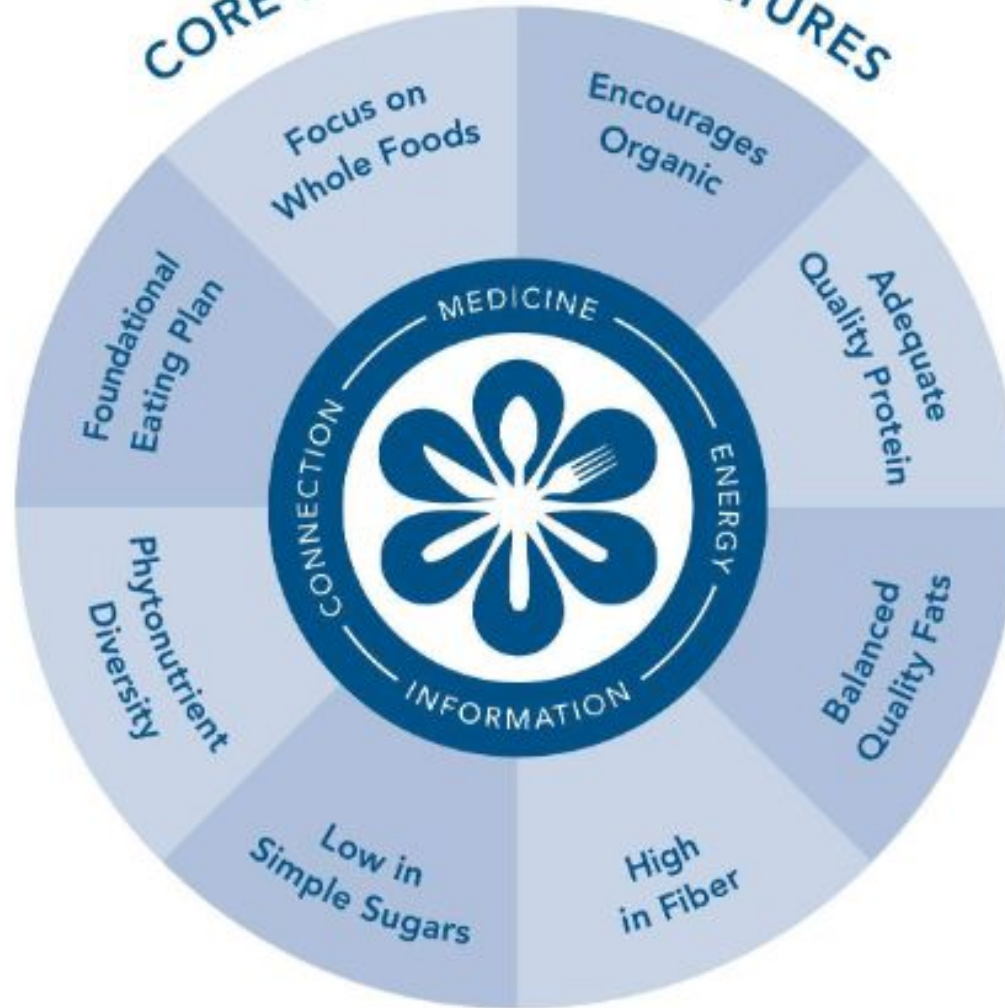
Connect

Use all your senses

Listen to your body- honor internal cues

Tips for Mindful and Intuitive eating

CORE FOOD PLAN FEATURES



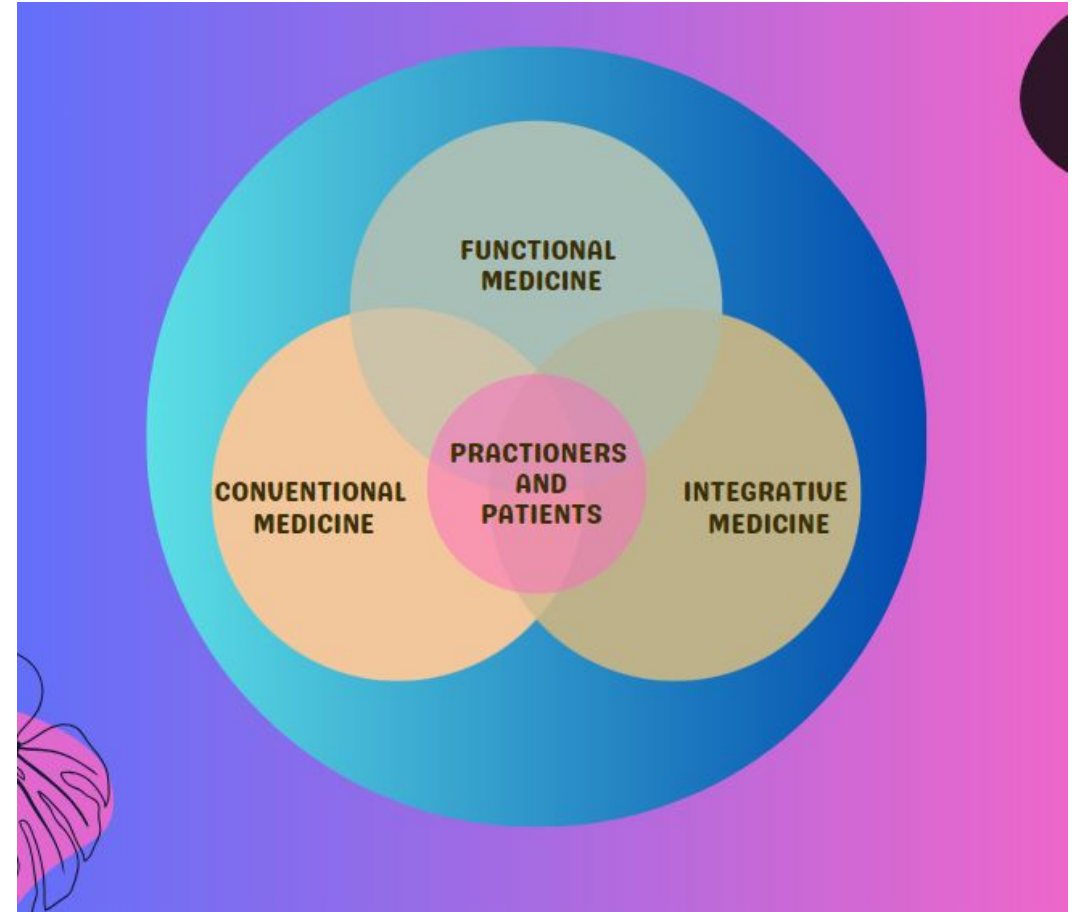
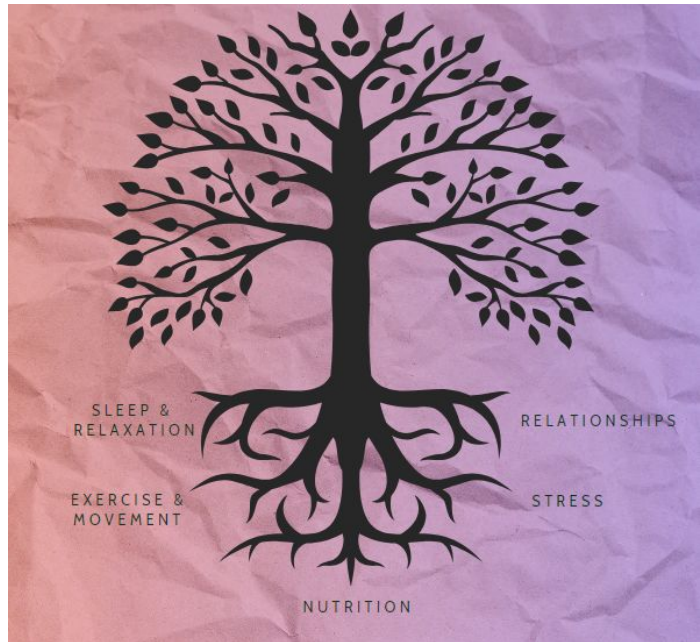
Every day YOU
engage in
activities that
affect your
health...

LISTEN TO YOUR
BODY and MIND

- What is a day in your life like ?
- If you wanted to focus on one LS behavior which one, would you want to start with first ?
- How and when do you do the above ?
- How can incorporate these changes into your day ?



Vanderbilt IBD Functional Medicine Clinic



Functional Medicine Approach to Patient Care Improves Sleep, Fatigue, and Quality of Life in Patients with Inflammatory Bowel Disease

Design: 15 patients completed a 10-week Functional Medicine Program comprised of five 2-hour sessions every 2 weeks. Sessions were led by a certified Functional Medicine provider and dietician.

Multidisciplinary Educational Sessions

Nutrition
1. Intro to the Elimination Diet
2. Elimination Diet: How to
3. Challenges and Successes
4. Food Recipes
5. Re-introduction

Mind/Body
1. Intro to Modifiable Lifestyle Factors
2. Exercise and Movement
3. Sleep and Relaxation
4. Stress and Resilience
5. Relationship and Networks

Findings: Improvement in all validated patient-reported outcome measures: FSS, PSQI, MSQ, and SIBDQ.



Conclusion: A Functional Medicine program used as an adjunct to traditional care improved patient-reported outcomes in patients with IBD.

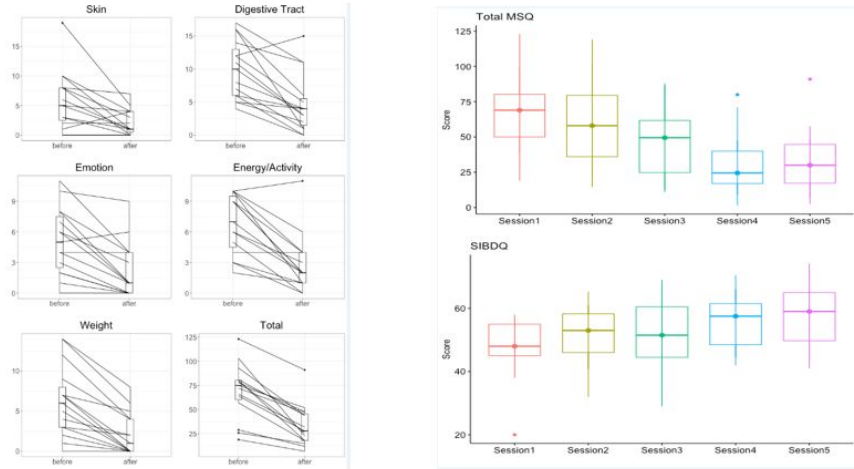
IBD = Inflammatory Bowel Disease, FSS = Fatigue Severity Scale, PSQI = Pittsburgh Sleep Quality Index, SIBDQ = Short Inflammatory Bowel Disease Questionnaire. Icons: flaticon.com

Wilcoxon matched pairs signed rank test. $P < 0.001$

Strobel TM, Nguyen C, Riggs T, et al. Functional medicine approach to patient care improves sleep, fatigue, and quality of life in patients with inflammatory bowel disease. *Crohn's & Colitis* 360. September 2022. doi:10.1093/crocol/atac032

IBD and functional medicine real world data

Tracking Patient Reported Outcomes



Strobel TM, Nguyen C, Riggs T, et al. Functional medicine approach to patient care improves sleep, fatigue, and quality of life in patients with inflammatory bowel disease. *Crohn's & Colitis* 360. September 2022. doi:10.1093/crocol/otac032

Functional Medicine Approach to IBD Care

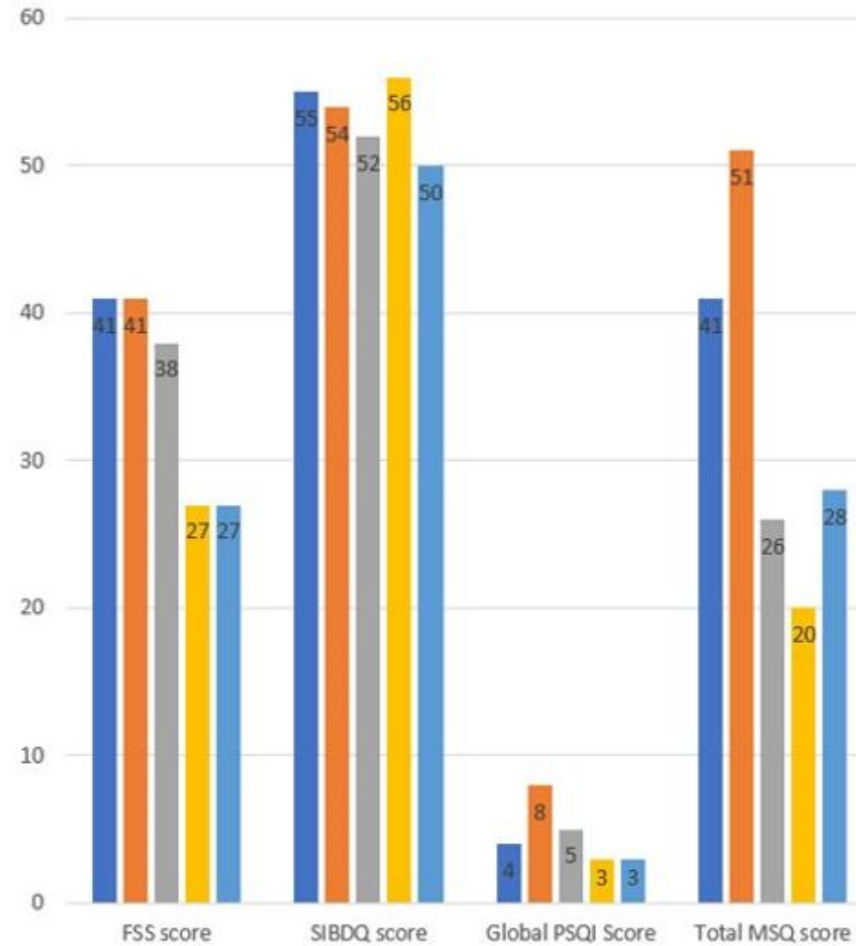
Module	1	2	3	4	5
Nutrition Session	Introduction to the Elimination Diet	Elimination Diet: How to	Challenges and Successes	Food Recipes	Re-Introduction
Education Session	Introduction to modifiable lifestyle factors	Exercise and Movement	Sleep and Relaxation	Stress and Resilience	Relationship and Networks

	Session1 (N=15)	Session5 (N=15)	P-value
FSS	43.0 [37.0, 53.5]	27.0 [18.0, 45.0]	<0.001
Global PSQI	6.00 [5.50, 11.0]	4.00 [2.00, 6.00]	<0.001
SIBDQ	48.0 [46.5, 55.0]	58.0 [52.0, 64.5]	<0.001
Total MSQ	75.0 [60.5, 80.5]	28.0 [18.0, 45.5]	<0.001

Strobel TM, Nguyen C, Riggs T, et al. Functional medicine approach to patient care improves sleep, fatigue, and quality of life in patients with inflammatory bowel disease. *Crohn's & Colitis* 360. September 2022. doi:10.1093/crocol/otac032

Functional medicine and IBD

10 weeks of diet changes and lifestyle modifications



FMC program- elimination diet can improve fecal calprotectin levels a small case series

Table:

<i>Case</i>	<i>Before</i>	<i>After</i>
1	413	16
2	713	137
3	3000	11

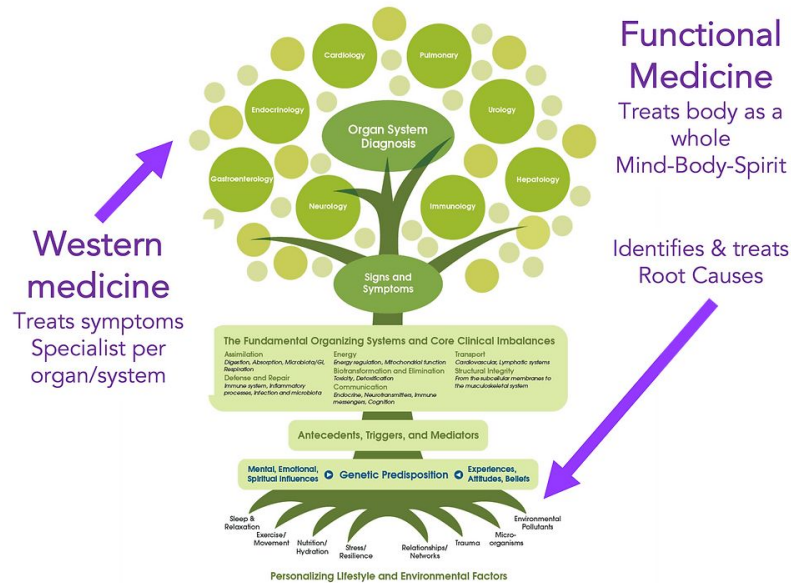
Table 1: Fecal Calprotectin levels in mcg/gm prior to and after completion of a 6-week Functional Medicine program (upper limit of normal ≤ 49 mcg/gm).

- Case 1: 27-year-old woman with symptomatic Crohns colitis. Felt worse on Vedo and no change on UST. Colonoscopy with moderate left sided inflammation
- Case 2: 41-year-old woman with symptomatic pan UC, failed 5ASA, AZA, 6MP, MTX, ADA, IFX and Vedo. Symptomatic improvement on Tofa with persistent endoscopic inflammation
- Case 3: 45-year-old woman with left sided UC. Failed 5ASA enemas. Could not afford oral 5ASA. Colonoscopy with mild to moderate rectal and sigmoid inflammation.

Conventional medicine vs. Functional medicine

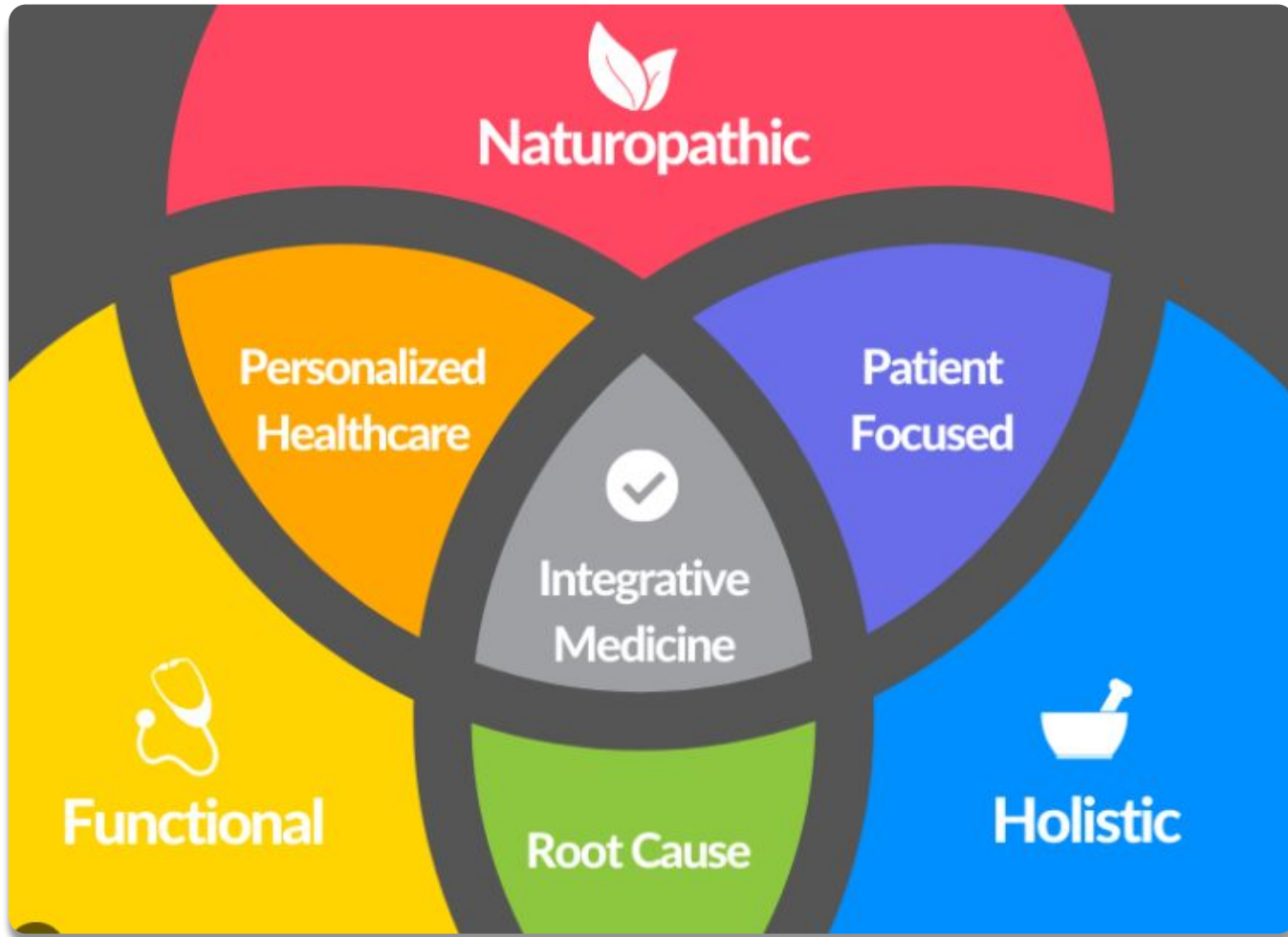
Functional medicine

- ✓ Health oriented
- ✓ Patient centered
- ✓ Looks at underlying root cause of illness/disease
- ✓ Systems biology
- ✓ Prevention focused approach
- ✓ Treats the whole body

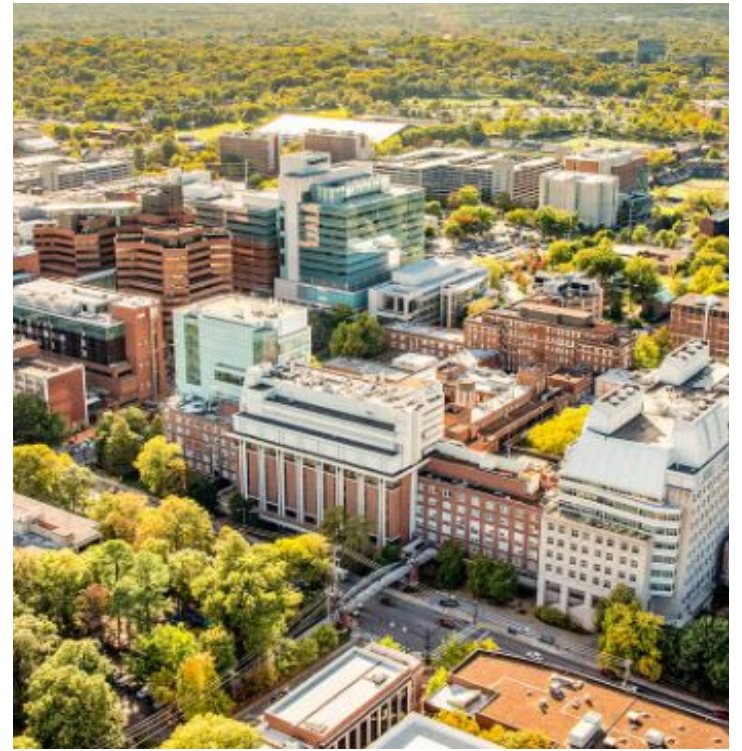


Conventional medicine

- ✓ Disease oriented
- ✓ Physician centered
- ✓ Symptom based treatment
- ✓ Specialized for a particular disease process



All
medicine is
good
medicine..
work
together
with your
provider



Thank you
@DRDAWNBEAULIEU