

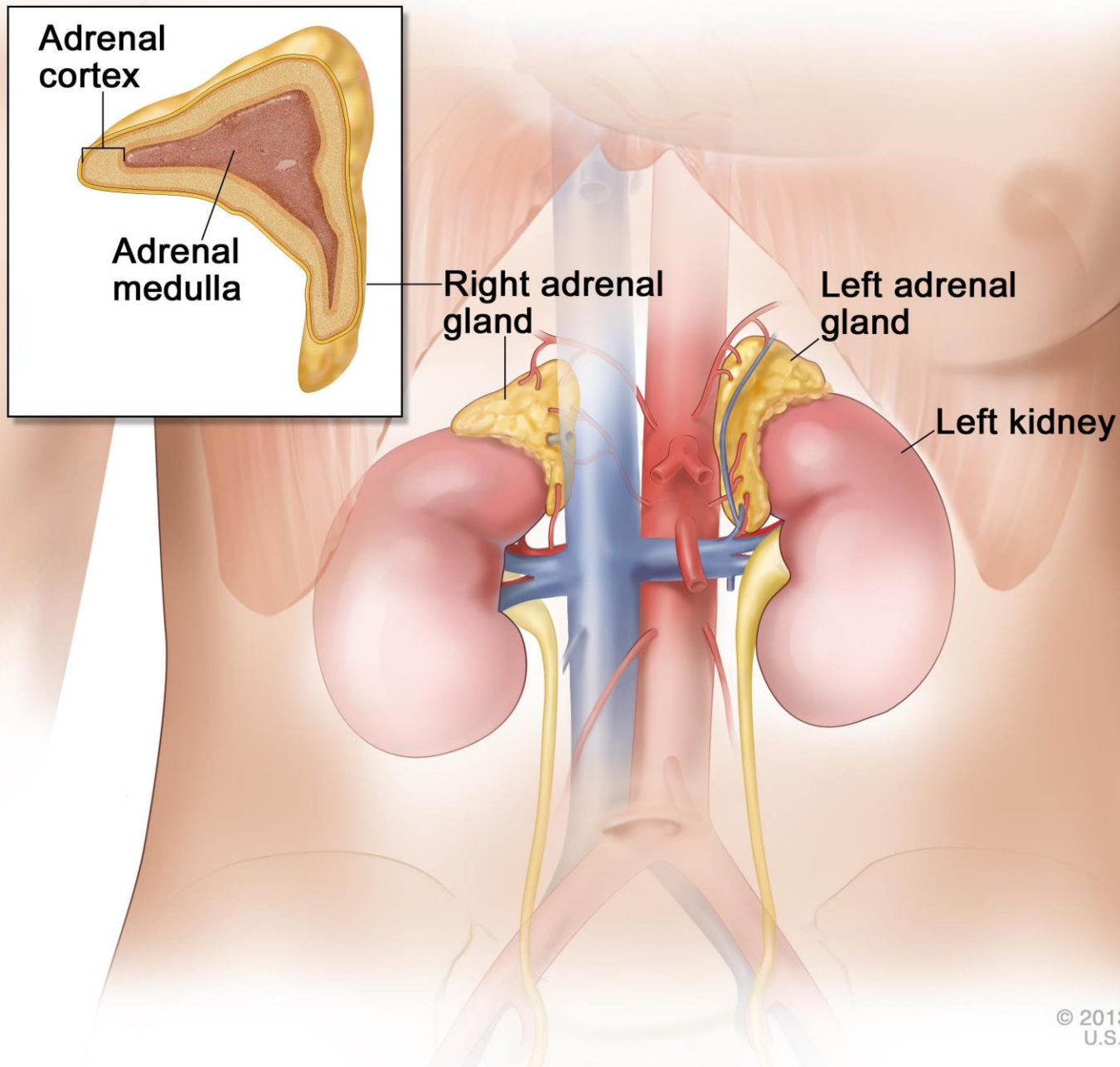
STRESS AND THE HEALTH OF THE BODY



What is Stress

- It is a physical response that occurs in our body when we are “stressed”
- Physiologically, it is a series of actions in the body that are regulated by specific hormones made by the adrenal glands
- The adrenals glands sit on top of the kidneys
- They are made up of two distinct parts:
- The adrenal medula and the adrenal cortex

Anatomy of the Adrenal Gland

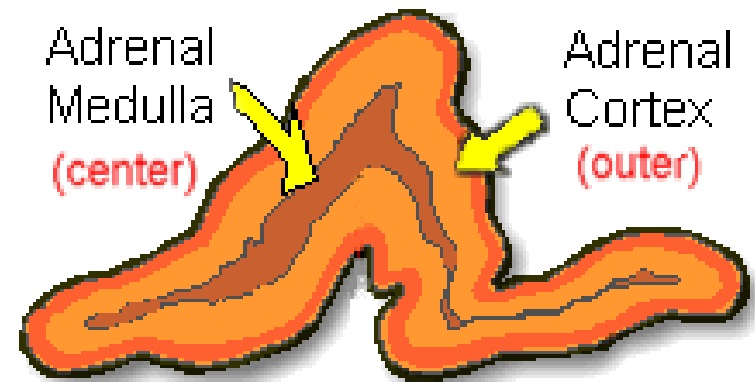


Adrenal Cortex

- Adrenal cortex – outer part- produces hormones that are essential to life such as cortisol and aldosterone
- Role of Cortisol: Essential for the maintenance of homeostasis and maintaining life, helps regulate blood sugar, immune response, anti-inflammatory response, blood pressure, heart muscles contractions, nervous system function, fat, protein and carbohydrate metabolism, keeps you awake
- Aldosterone: Plays a central role regulating blood pressure, also helps with conservation of sodium and potassium from the kidneys

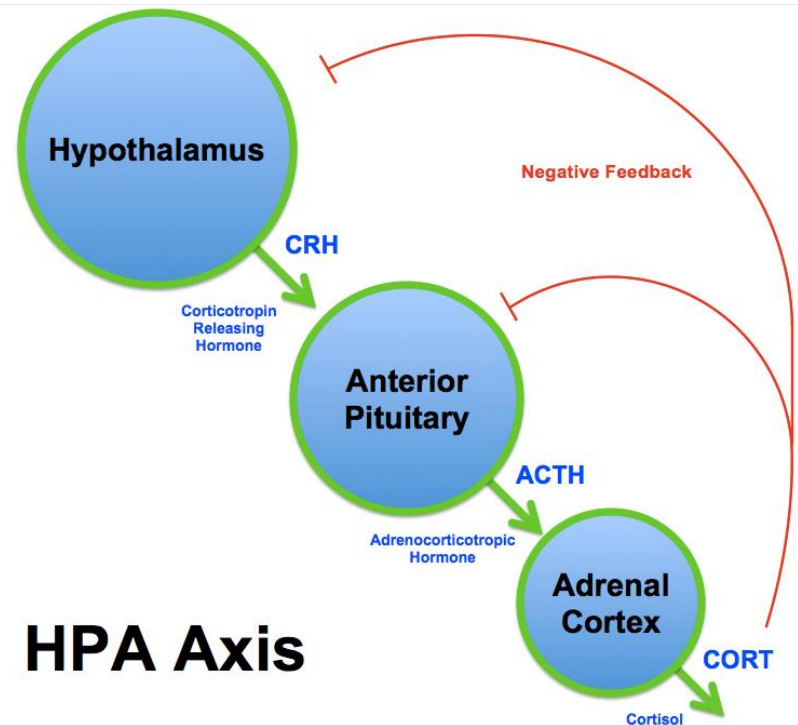
Adrenal Medulla

- Inner part of the gland – produces non-essential hormones such as adrenaline and noradrenaline
- Hormones from the adrenal medulla are released after the sympathetic nervous system is stimulated during times of stress
- Addison's Disease: failure to produce cortisol (autoimmune)
- Cushing's Disease: Too much cortisol (often due to a tumor)



The HPA-Axis

- The hypothalamus releases CRH (corticotropin –releasing hormone which signals the pituitary to release ACTH.
- The adrenals are stimulated by ACTH to produce glucocorticoids - cortisol and corticosterones (anti-inflammatory)
- The adrenal, in turn tells suppress the hypothalamus and the pituitary to suppress glucocorticoid production
- The adrenals rule the roost



Fight or Flight Response

- Our body's defense response to danger
- Designed for physical threats – to protect us from danger
- Adrenaline works with cortisol to increase the body's ability for immediate energy and strength. It causes blood vessels to contract. It increases heart rate and tells your brain to put more cortisol
- The purpose is so you can fight or run from danger i.e. if being chased by a bear.



The Problem

- Our bodies do not know the difference between running from a bear and or being yelled at by a boss or being stuck in traffic
- As a result we are secrete excess cortisol and adrenaline too much and our bodies were not designed for this
- Flight or flight is supposed to be short term
- Chronic use of this response, causes all kinds of problems in the body including the digestive and intestinal system



Issues With Excess Cortisol

- Weight gain (around the middle)
- Sleep issues
- Catch colds and flu easily
- Headaches and backaches
- Low sex drive
- Food cravings (because of blood sugar)
- Depression, mood swings
- High blood pressure (low blood pressure also has an adrenal factor)
- Accelerated tissue loss for joints (cartilage) and bones



Excess Cortisol

- Fatigue
- Poor concentration
- Weaken muscles or muscle loss
- Weight gain
- Can interfere with the production of thyroid hormones
- Disrupts the reproductive system and may be involved in infertility and miscarriage
- Testosterone levels and progesterone go down and estrogen can go up
- Immune system is weakened by deregulated T and B cells
- Can shut down enzyme needed for maintaining telomeres



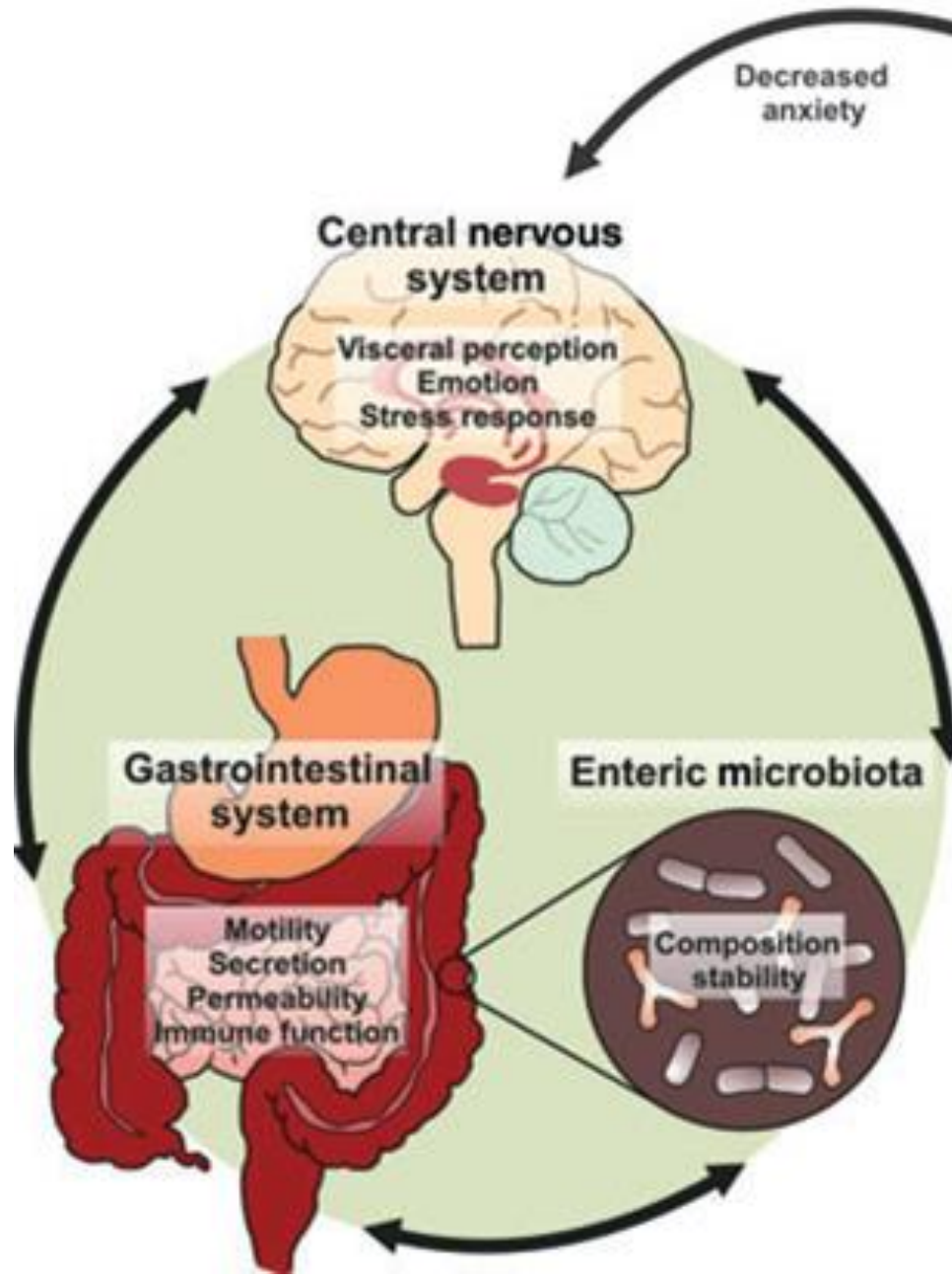
Excess Cortisol

- Can decrease stomach acid (during fight or flight)
- Nausea, heartburn, abdominal cramps, constipation or diarrhea
- Cortisol controls the recycling of bile acids. Excess cortisol cause the production making excess bile which is sent to the gall bladder, it becomes overloaded. This causes excess bile to dump into the small intestine and start reflux back towards the stomach (often mistaken for excess acid).
- This will cause heat or burning across the lower ribcage, as bile moves backwards through the small intestines and into the stomach

Steps That Help

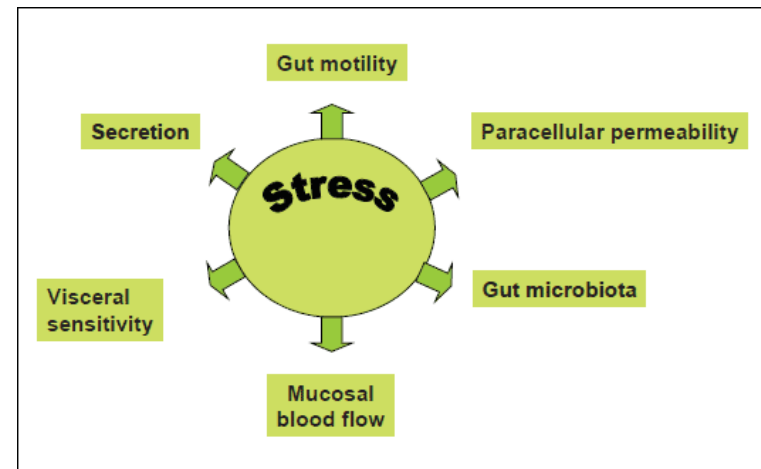
- Fiber can help prevent the recycling of bile acids and cause bile to be excreted and can prevent excess bile
- Good bacteria developed in early life effects how the stress system develops
- Prebiotics and probiotics suppress excess cortisol function and lower anxiety (a symptom of excess cortisol and adrenaline)
- Modulating gut bacteria can affect the stress response – exact mechanism is not known





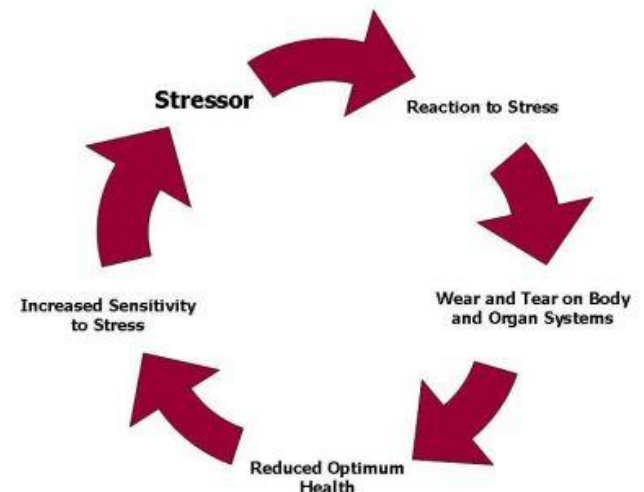
Stress and Gut

- The gut lining is loaded with nerve cells and these are influenced by the brain
- Corticotrophin hormones (as we saw in the HPA axis) affect inflammation, increase leaky gut, increase the perception of pain and affect the movement of food in the GI tract
- Stress affect physiological function but also lowers diversity of the microflora and lowers good bacteria and increase specific strains of bad bacteria



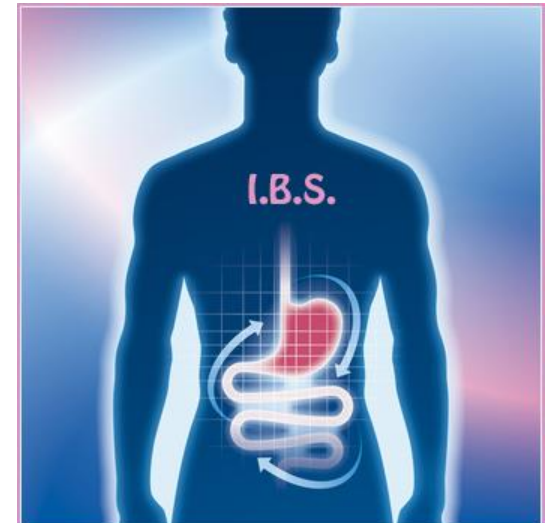
Bowel Issues

- Exposure to chronic stress leads to IBS, IBD, ulcer, acid reflux and food allergies
- Can also play a role in Crohn's and colitis
- Focusing on gut health can improve outcomes and help prevent some of the disruptions to the GI tract caused by stress



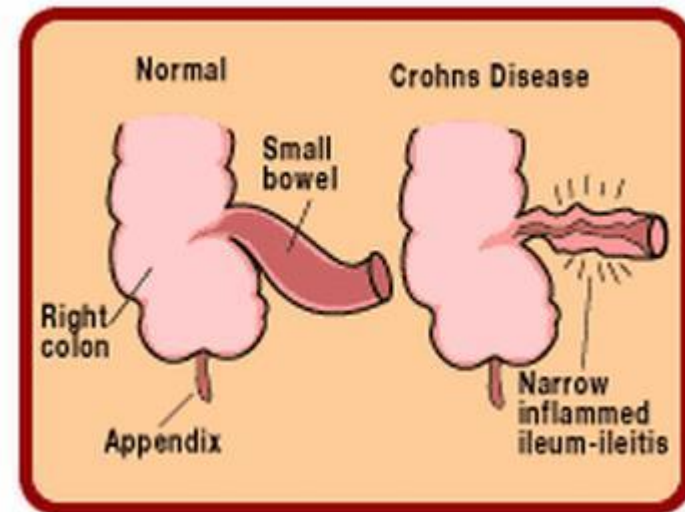
IBS

- Irritable Bowel Syndrome: catch-all phrase when nothing else can be diagnosis
- Constipation or diarrhea or alternating between the two are the most common symptoms
- No known cause but research is focused on the gut
- Stress has always been a known contributor – symptoms worse during times of stress
- Dysbiosis always present with IBS



Crohn's Disease

- Inflammation in the GI tract especially the lower part of the small intestines and the colon
- Inflammation can occur between health sections of the gut and can penetrate the gut lining.
- Symptoms: Intermittent intestinal pain and cramping – area may be sore to the touch, diarrhea or constipation, loss of appetite, fever, weight loss, anemia-areas of the colon can bleed
- Because the immune system is involved, joint pain, eye problems, skin issues and liver disease can occur



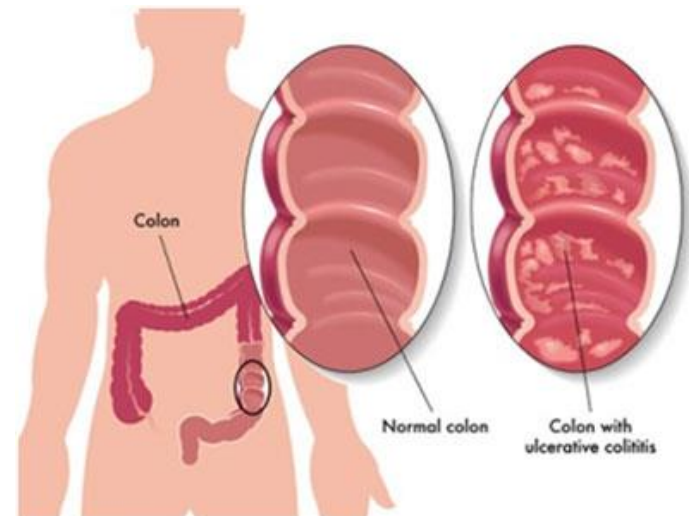
Help for Crohns

- SCFA – Butyrate was effective in lowering immune markers for Crohns and may induce remission
- Glutamine and the amino acid arginine can lower inflammation
- Crohn's patients may be sensitive to FOS and GOS so IMO may be better
- Resistant starch has been shown to reduce bad bacteria
- Omega 3 – lowers inflammation
- Slippery elm bark, aloe vera juice, chamomile , peppermint
- Prebiotic and fermented foods
– go slow



Colitis

- Also known as ulcerative colitis, affect the large intestine starting at the rectom
- Typically, it is inflammation in the innermost lining of bowel only
- Symptoms: Abdominal pain or cramping, diarrhea, rectal bleeding and whitish mucus, fatigue, loss of appetite and anemia
- Immune system involved can also cause joint pain, redness and swelling and liver issues



Cause

- Bad bacteria plays a role
- Two studies show a significant decrease in lactobacilli concentration in biopsies of people with active colitis
- Treatment: Probiotics have been shown to be helpful
- They help control e coli and other bad bacteria strains and increase anti-inflammatory chemicals in the body
- VSL-3 especially helpful
- SCFA deficiency due to a lack of resistant starch fermentation is another potential cause – so taking SCFA can help



Stress

- Stress can aggravate Crohn's flare-ups
- For colitis, stress hormone make the gut lining leaky, which increases inflammation in the lining and increasing symptoms
- Worrying about the conditions increases stress response which then affects symptoms
- Therefore, for IBS, Crohn's and colitis stress management strategies are also necessary to help improve the conditions

