

Microbiome and Mental Health

Allison Krug, MPH

Co-Presenter:

Stephanie Brown, PCC, SPHR, SHRM-SCP- ICF Virginia President

June 29, 2023

1.5 CCEU

Disclaimer:

This presentation is for information purposes only and does not serve as medical advice.

Before starting any new diet or exercise program, it is important to speak with your personal clinician.

ICF Aligned

The Wellness Series on the Gut Microbiome and its relationship to Mood, Immune system and Autoimmune conditions is aligned with the ICF Core Competences

Evokes Awareness

Facilitates Client Growth

ICF Virginia Charter Chapter

Science Presenter

ALLISON KRUG MPH

Allison is the CEO of Artemis Biomedical Communications and Artemis Professional Coaching. As an epidemiologist and science communicator, Allison strives to translate research on health and wellness into actionable steps for her clients. Ms. Krug is a mother of two sons, a US Navy spouse, avid runner and hiker, horseback rider and community volunteer.



Coaching Presenter

Stephanie Brown, PCC, SPHR, SHRM-SCP- President



Stephanie Brown is a ICF Professional Certified Coach (PCC), facilitator, speaker, seasoned Human Resources (HR) professional and Principal of FWD Coaching Concepts LLC. Stephanie received her ACSTH coach training from the United States Office of Personnel Management (OPM) Federal Coach Training Program in 2015. She is a transformative coaching professional who promotes a coach-based leadership style.



Agenda

Meet the presenters

Background

Pre-test

Microbiome Composition

Gut-Brain Axis

Inflammation

Prebiotics

Probiotics

Key takeaways

Coaching demonstration

Post-test

What does your life look like?



Anyone?

1



Organized chaos.

2



Eating on the run!

3

What does your client's life look like?



Anyone?

1



Organized chaos.

2



Eating on the run!

3

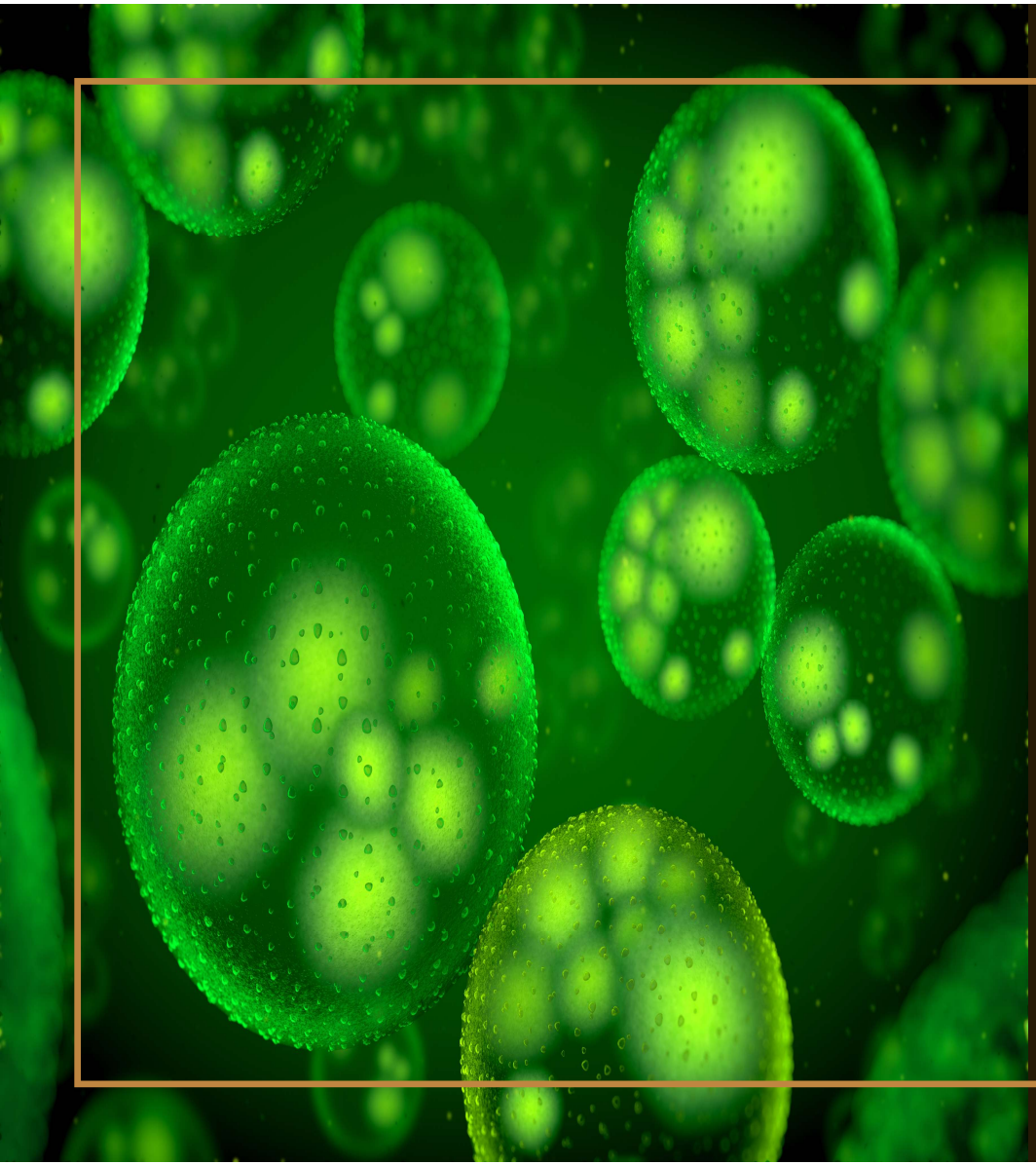






Pre-test

No. 1	Which foods are prebiotics?
No. 2	Which foods are probiotics?
No. 3	Which foods are psychobiotics?

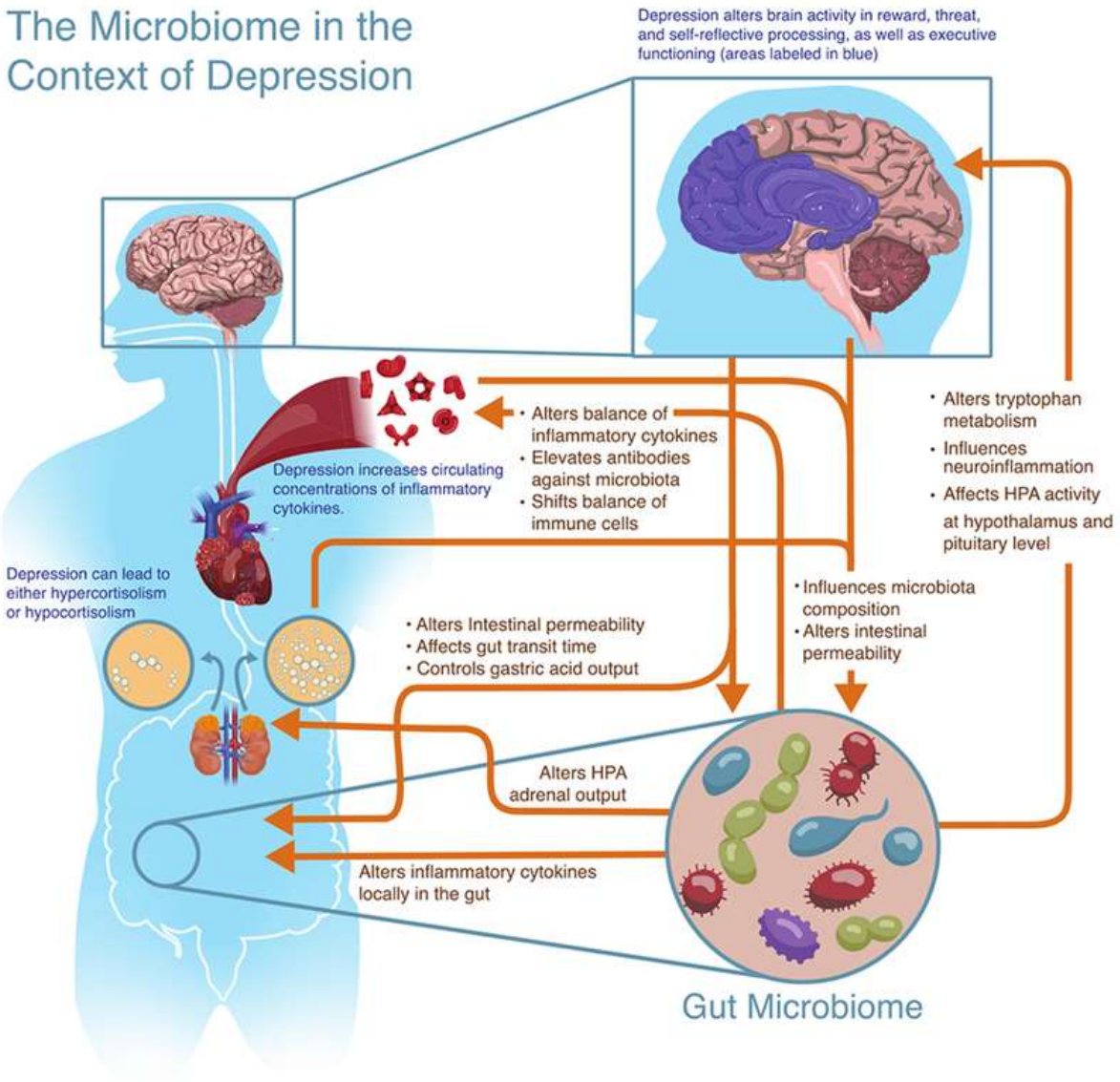


Microbiome Composition

Lining of the gut contains 70-80 percent of our immune system – 4000 sf!

Immune system lining the gut has important job: identify friend vs foe

Gut microbiome is comprised of trillions of microbes – bacteria, viruses, fungi



Bidirectional feedback loops

Flux MC, Lowry CA. Finding intestinal fortitude: Integrating the microbiome into a holistic view of depression mechanisms, treatment, and resilience. *Neurobiol Dis*. 2020 Feb;135:104578. doi: 10.1016/j.nbd.2019.104578. Epub 2019 Aug 24. PMID: 31454550; PMCID: PMC6995775.



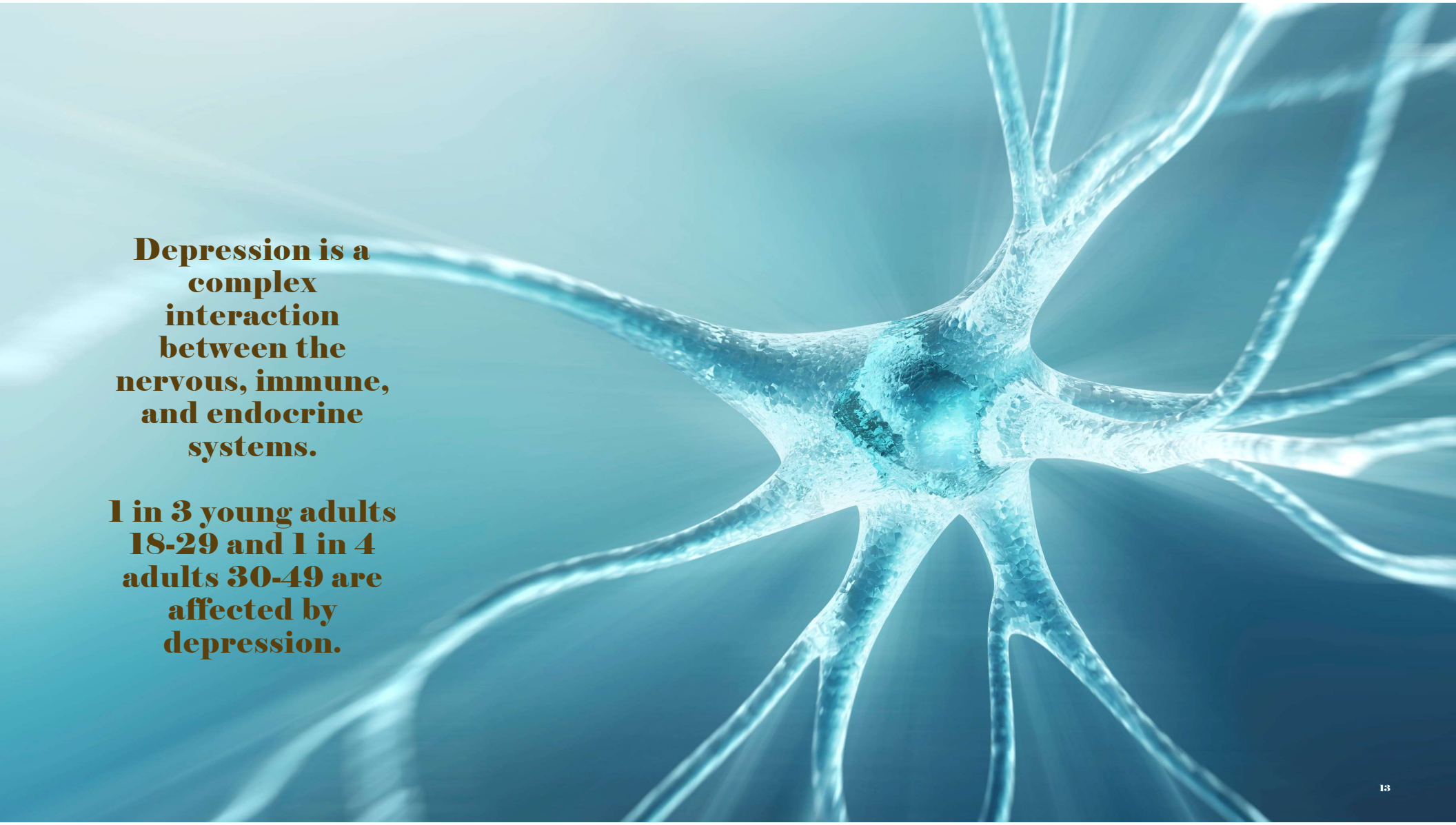
A habitat in our gut comprised of a collection of microbes, their DNA and their metabolites.

Collection of trillions of viruses, bacteria and fungi which have evolved with us symbiotically.

Help us digest fibers, extract nutrients, fight off disease, manufacture neurotransmitters.

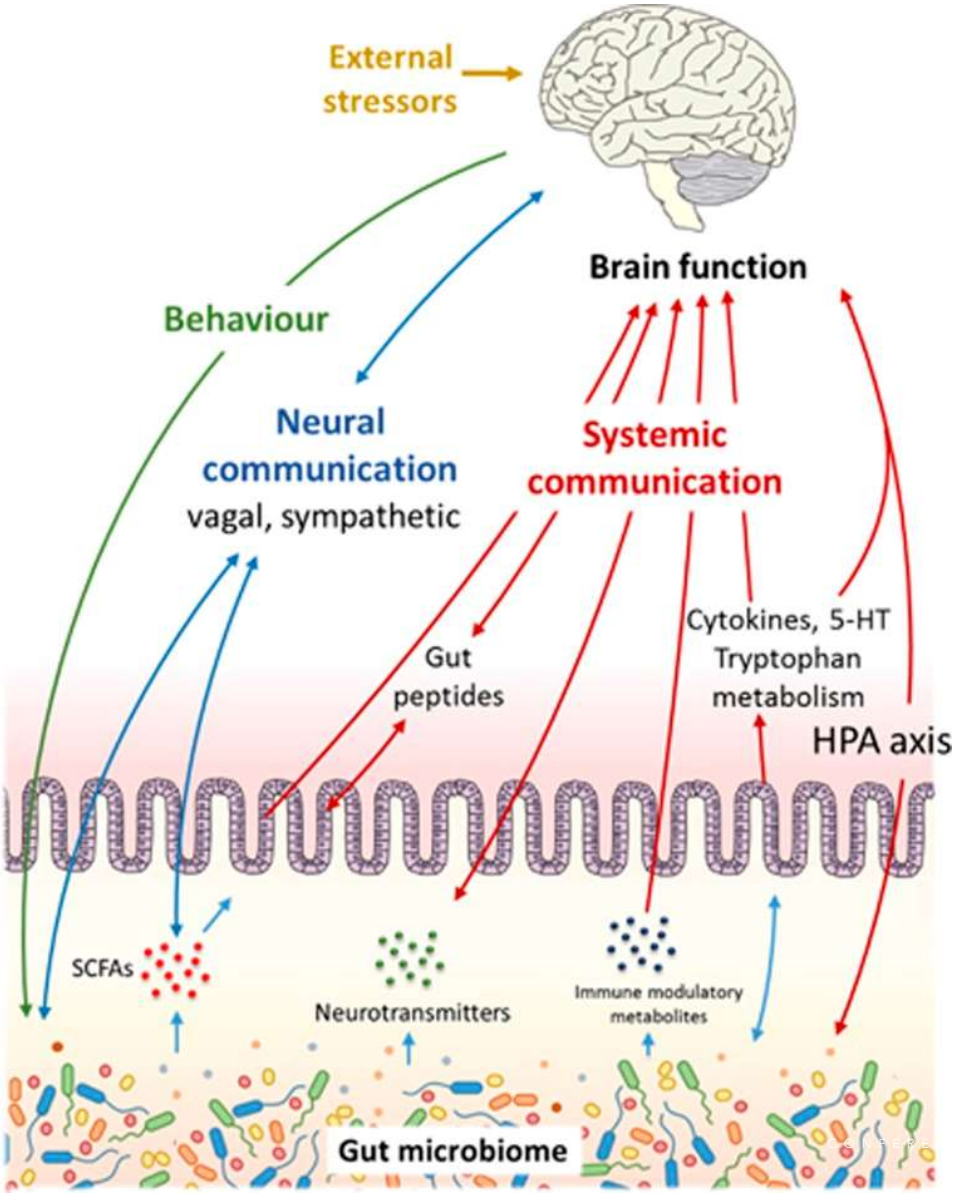
Checkpoint 1

No.1	Where is the microbiome?
No.2	What lives in the microbiome?
No.3	What is its job?



Depression is a complex interaction between the nervous, immune, and endocrine systems.

1 in 3 young adults 18-29 and 1 in 4 adults 30-49 are affected by depression.



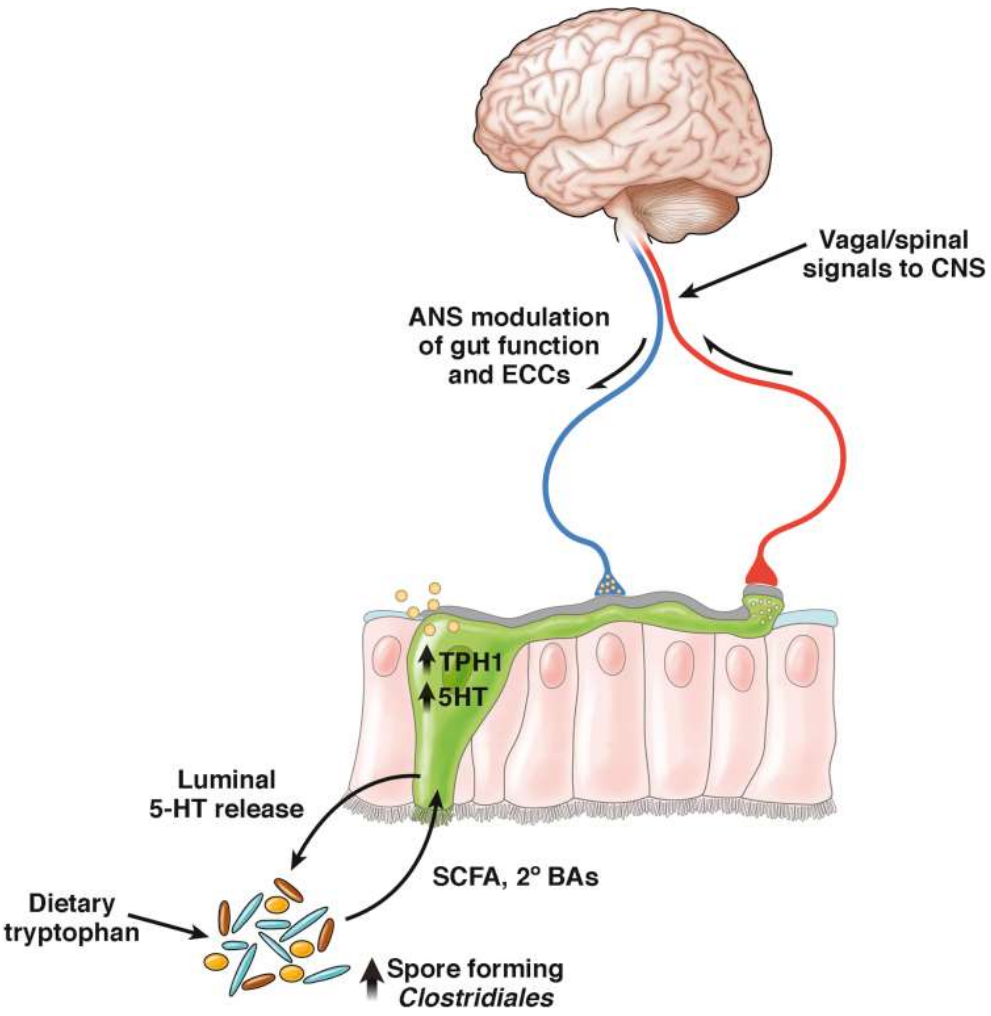
Bidirectional feedback loops

Signaling from the gut to the brain:

- Via vagus nerve
- Microbial metabolites (ie the microbes in the gut produce these products) – short-chain fatty acids (SCFAs), secondary bile acids (2BAs) and tryptophan metabolites.

Gut dysbiosis – when gut motility is disturbed in response to stress, poor diet, inflammation.

Rogers GB, Keating DJ, Young RL, Wong ML, Licinio J, Wesselingh S. From gut dysbiosis to altered brain function and mental illness: mechanisms and pathways. *Mol Psychiatry*. 2016 Jun;21(6):738-48. doi: 10.1038/mp.2016.50. Epub 2016 Apr 19. PMID: 27090305; PMCID: PMC4879184.



Signaling pathways

Signaling: Enteroendocrine cells (EEC) thought to be largely responsible for signaling

20 different EECs sandwiched between epithelial cells in gut (green).

Receptors regulating satiety and hunger have been found in these cells.

Signals released to central nervous system. Tryptophan is an essential amino acid (we have to eat it via protein). It is a precursor to 5-HT, which regulates gut motility.

More than 90% of our 5-HT is made by ECC cells.

Martin CR, Osadchiy V, Kalani A, Mayer EA. The Brain-Gut-Microbiome Axis. *Cell Mol Gastroenterol Hepatol*. 2018 Apr 12;6(2):133-148. doi: 10.1016/j.jcmgh.2018.04.003. PMID: 30023410; PMCID: PMC6047317.



Between 1/4 and 1/3 of adults are affected by depression.

Complex interaction between nervous, immune, and endocrine systems.

Gut-brain axis is a bidirectional pathway between the gut and the nervous system.

Checkpoint 2

No.1	How common is depression?
No.2	What body systems are involved in depression?
No.3	What is the gut-brain axis?

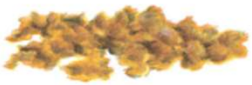


Stephanie and Alli discuss what a typical diet while traveling – not eating our usual healthy foods – does to gut motility. Irregular for days then eat prebiotics and probiotics…what happens?

That's 5-HT signaling that it's time to move on out!

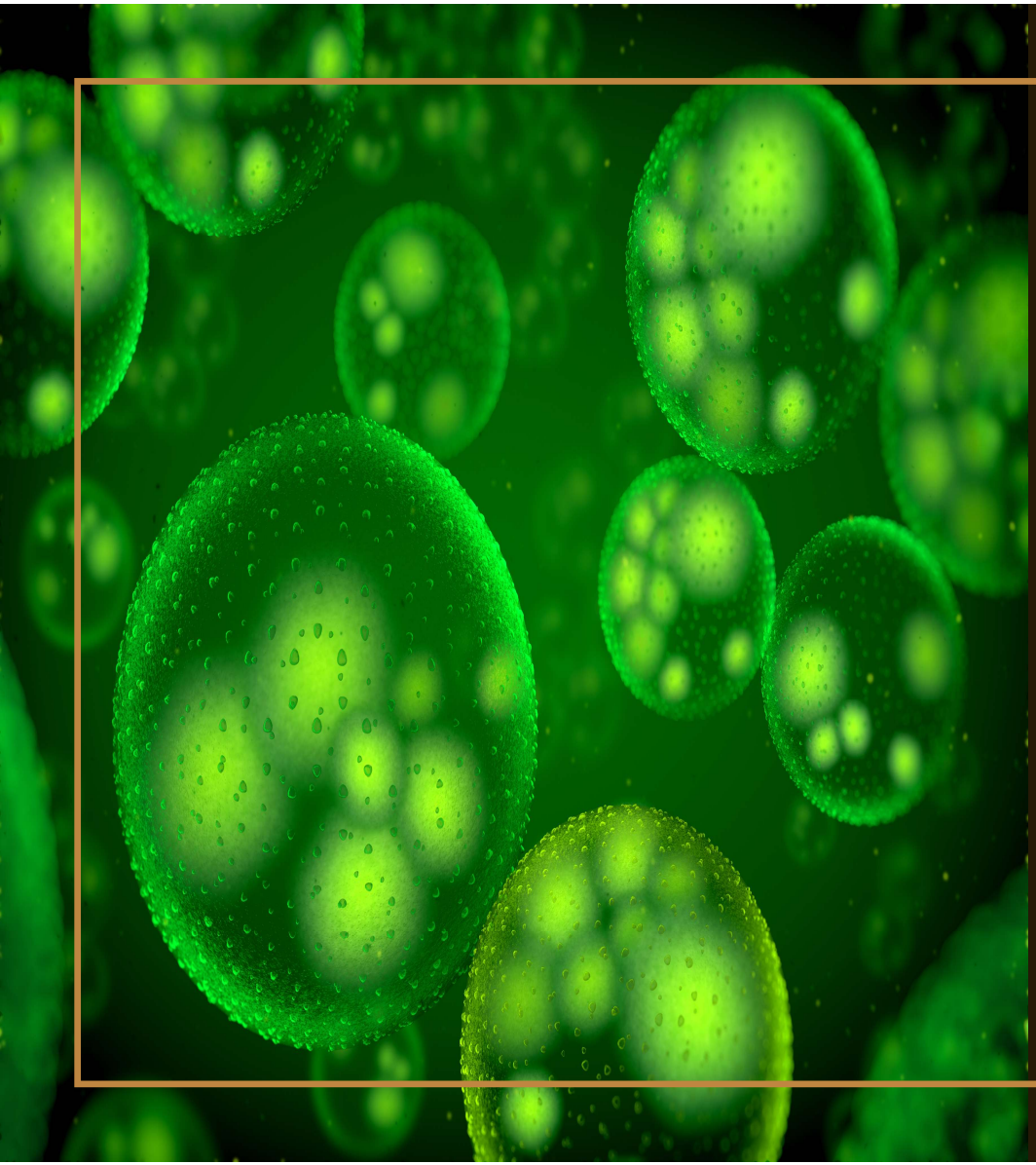
[Bristol Stool Form Scale](#) →

The Bristol Stool Form Scale

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces ENTIRELY LIQUID

The Bristol Stool Form Scale is © The Rome Foundation, Inc. and is used with permission. The graphic components of the Bristol Stool Form Scale depicted here were created by Norgine in conjunction with Dr. Ken Heaton.

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Date of preparation: December 2021



Gut-Brain Interactions

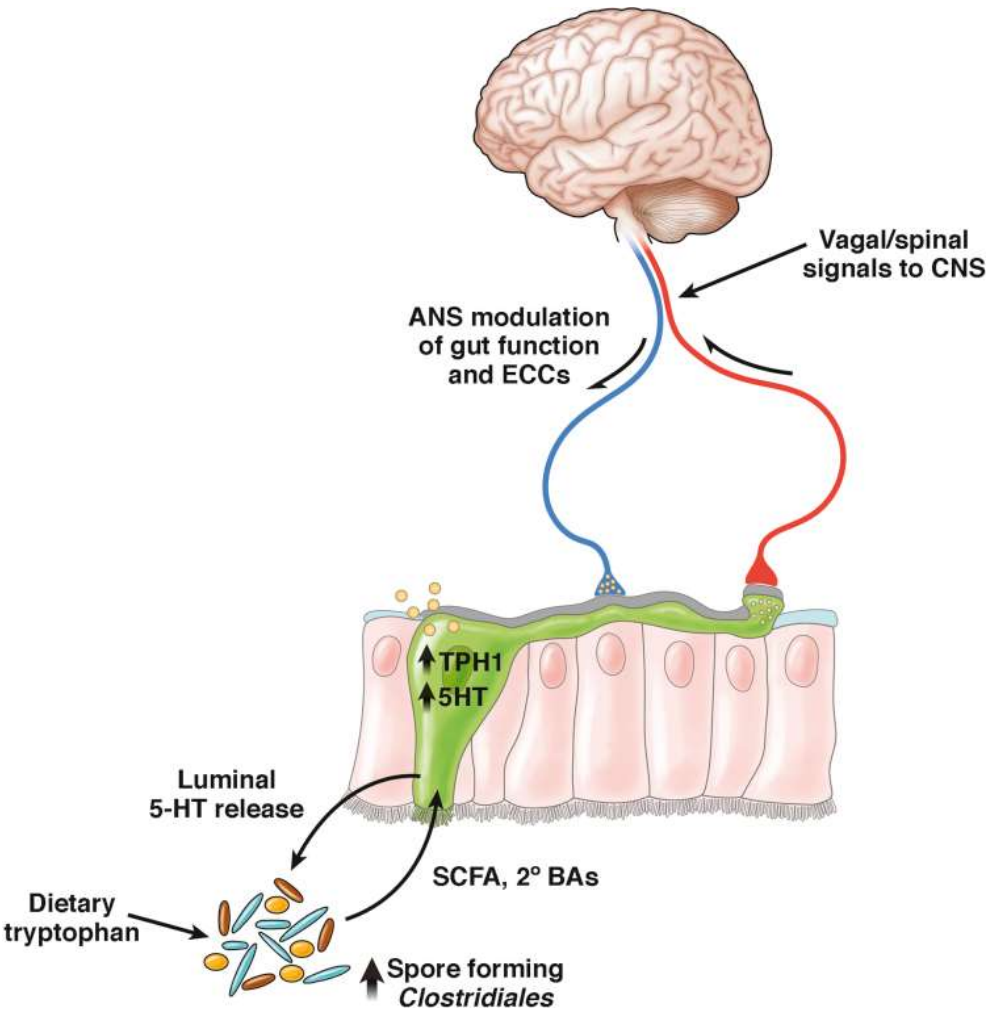
Diet supplies important amino acids such as tryptophan

Activation of vagus nerve which interacts with immune system

Innate immune system affects pro- and anti-inflammatory cytokines which affect brain function and cell aging

Bottoms-Up Signaling: from Gut to Brain

Mucosal Barriers



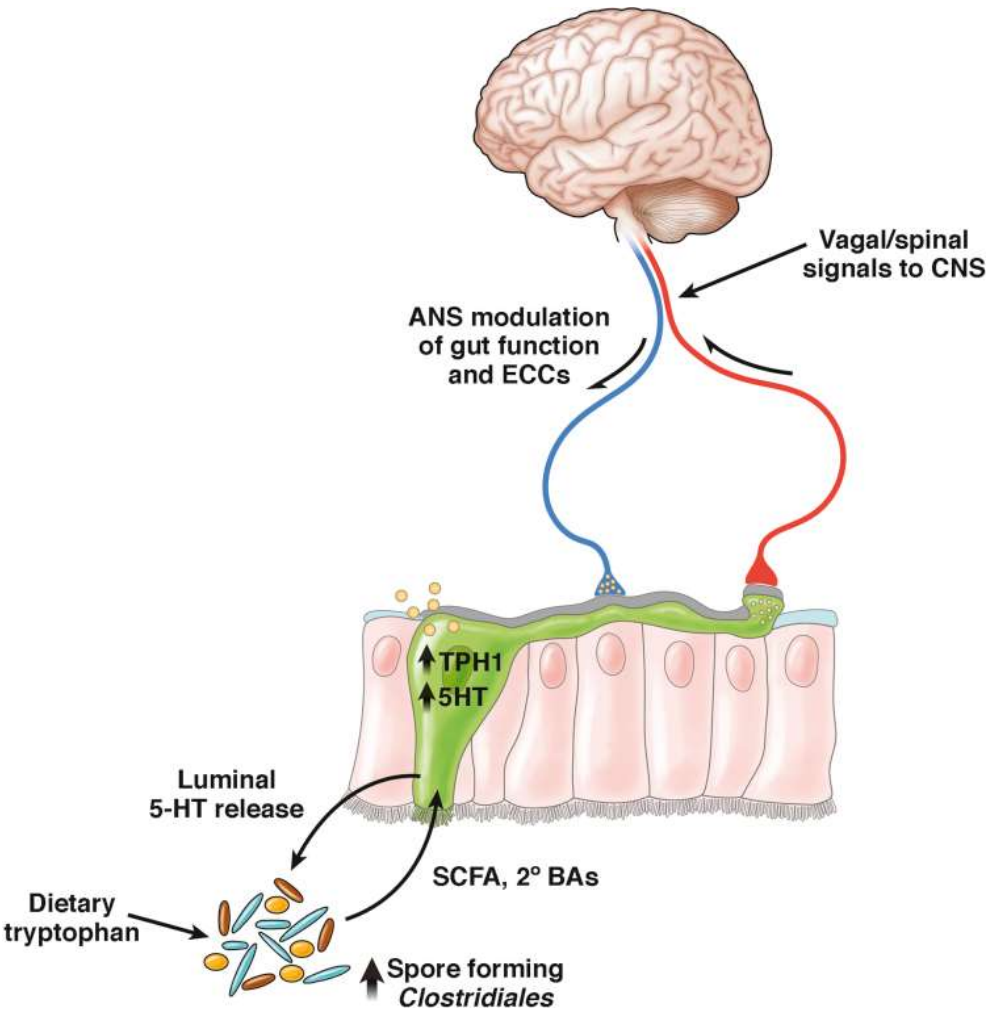
Gut mucus has two layers of protection:

1. Outer layer – thicker, looser
2. Inner layer – firmly attached to cells

The outer layer contains the microbes which digest prebiotics. If we do not eat enough prebiotics, these microbes eat the glycoproteins in the biofilm.

This opens the door to pathogens getting to the inner layer, leading to gut inflammation and leaky gut, autoimmunity.

Martin CR, Osadchiy V, Kalani A, Mayer EA. The Brain-Gut-Microbiome Axis. *Cell Mol Gastroenterol Hepatol*. 2018 Apr 12;6(2):133-148. doi: 10.1016/j.jcmgh.2018.04.003. PMID: 30023410; PMCID: PMC6047317.



Bottoms-Up Signaling: from Gut to Brain

Blood-Brain Barrier

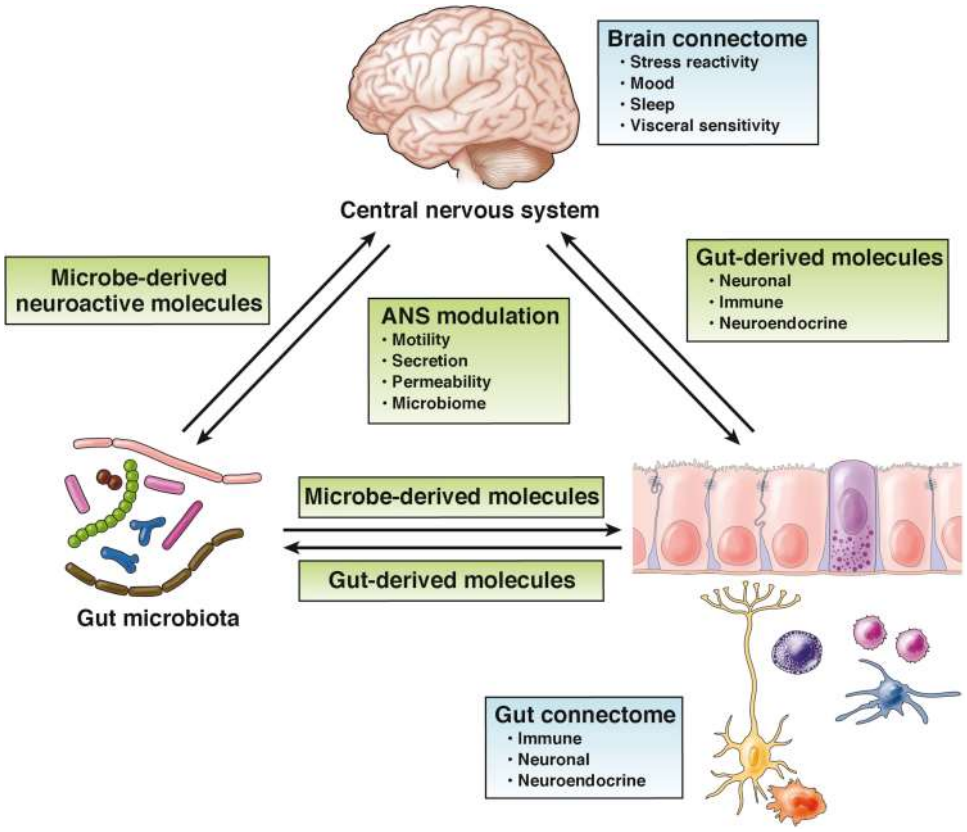
The second stage of bottoms-up signaling is the blood-brain barrier (BBB).

Microbes can up-regulate certain proteins which seal up the junctions between cells, decreasing BBB permeability (occluding and claudin-5).

40 years of research implicates stress in gut microbiome composition.

Martin CR, Osadchiy V, Kalani A, Mayer EA. The Brain-Gut-Microbiome Axis. *Cell Mol Gastroenterol Hepatol*. 2018 Apr 12;6(2):133-148. doi: 10.1016/j.jcmgh.2018.04.003. PMID: 30023410; PMCID: PMC6047317.

Brain-Gut-Microbiome Axis in Depression, Anxiety, ASD, Eating Disorders



Obesity and eating disorders
Gut also dysbiosis comorbid in:

- Depression and anxiety
- Parkinson's
- Autism spectrum disorders

Lack of diversity in microbiome may figure prominently in gut symptoms as well as in the primary condition itself.

Limitations include mostly animal models and lack of human data to prove causality.

Martin CR, Osadchiy V, Kalani A, Mayer EA. The Brain-Gut-Microbiome Axis. *Cell Mol Gastroenterol Hepatol*. 2018 Apr 12;6(2):133-148. doi: 10.1016/j.jcmgh.2018.04.003. PMID: 30023410; PMCID: PMC6047317.



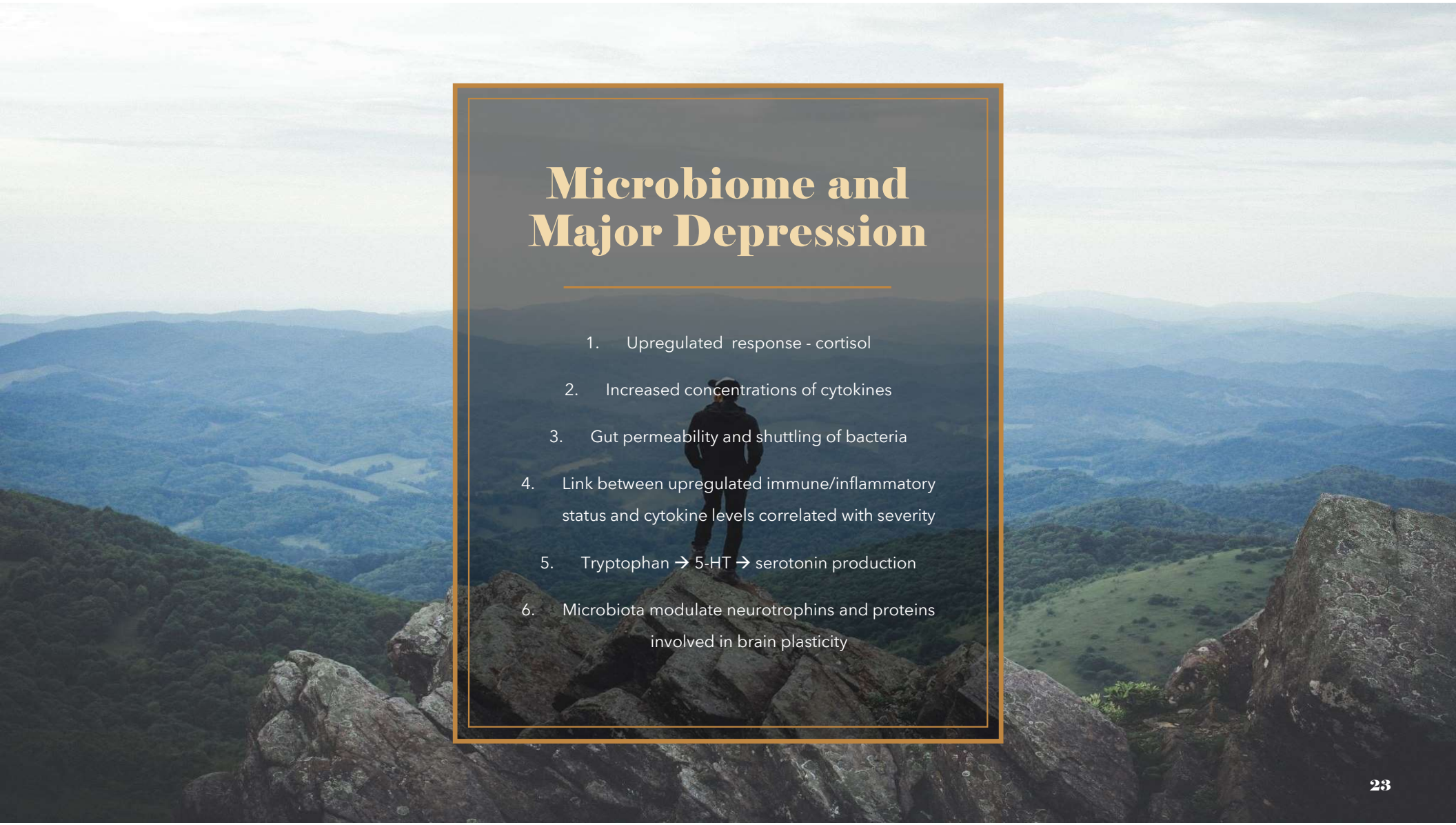
Gut dysbiosis is a change in the diversity of the gut microbiota.

Leaky gut is when the natural protective mucosa is weakened, allowing pathogens to leak out.

Autism spectrum, Parkinson's, Alzheimers, depression, anxiety

Checkpoint 3

No.1	What is gut dysbiosis?
No.2	What causes leaky gut?
No.3	Gut dysbiosis also often appears with what conditions?



Microbiome and Major Depression

1. Upregulated response - cortisol
2. Increased concentrations of cytokines
3. Gut permeability and shuttling of bacteria
4. Link between upregulated immune/inflammatory status and cytokine levels correlated with severity
5. Tryptophan → 5-HT → serotonin production
6. Microbiota modulate neurotrophins and proteins involved in brain plasticity



Microbiome and Brain Development

Maternal microbiome is first influence. (Epigenetics)

High fat or high sugar diets create a pro-inflammatory environment

Infection, poor nutrition, stress associated with behavioral disorders (anxiety, autism, ADHD, depression, schizophrenia).


Forbes HEALTH

Health › Body

Advertiser Disclosure

Psychobiotics: Using Probiotics For Mental Health

By Emily Laurence
Contributor

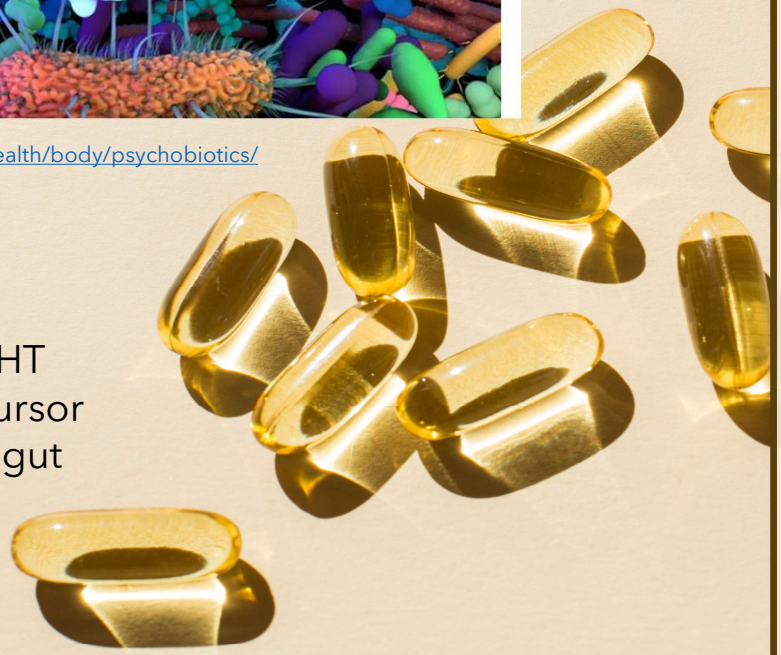
Medically Reviewed Miguel Freitas, Ph.D. Nutrition / Probiotics / Gut Health

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https://www.forbes.com/health/body/psychobiotics/
March 9, 2023

Fun Fact:
>90% of the 5-HT serotonin precursor is made by the gut



Psychobiotics

Probiotics thought to influence gut-brain axis via:

1. Vagus nerve
2. Cytokine production

Prebiotics affect gastrointestinal tract, immune system, bones, lipid and sugar metabolism, mental health.



Running or cycling, 20-30 min best.

Prebiotics – green apples, bananas, chia, flax

5-HT or serotonin – 90% made by the gut!

Checkpoint 4

No.1	What activity can induce cannabinoid (CBD) production?
No.2	Name a psychobiotic.
No.3	What neuroactive compound is made mostly by the gut?

Bringing It All Together

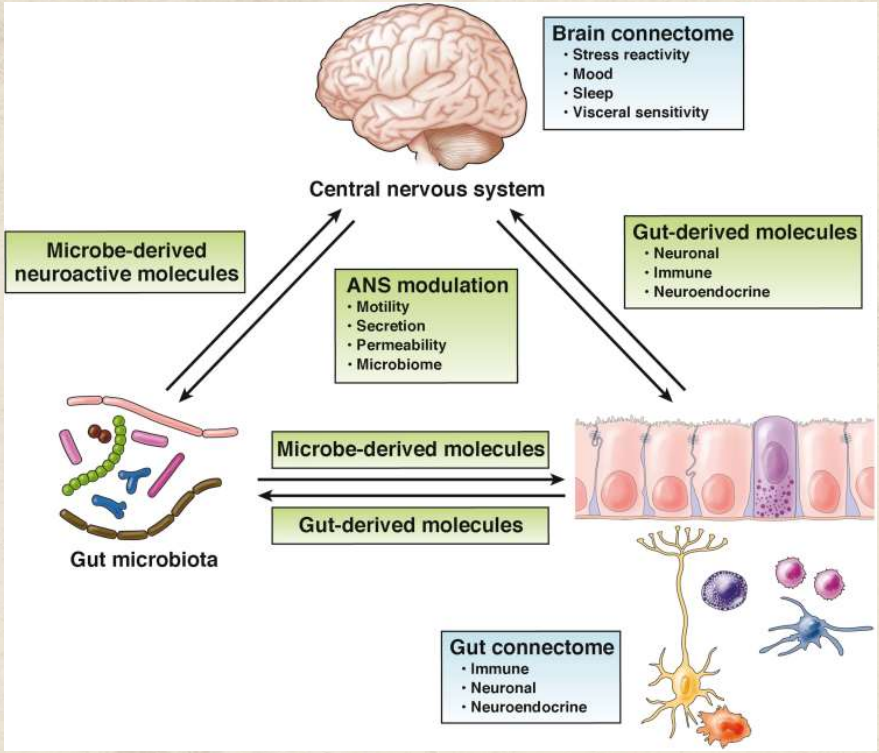


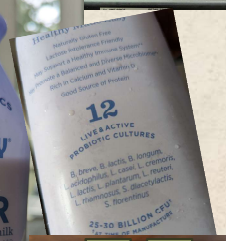
Image credit: Martin CR, Osadchiy V, Kalani A, Mayer EA.
The Brain-Gut-Microbiome Axis. *Cell Mol Gastroenterol Hepatol*. 2018 Apr 12;6(2):133-148.
doi: 10.1016/j.jcmgh.2018.04.003. PMID: 30023410; PMCID: PMC6047317.

	Our intestines contain trillions of bacteria, viruses, fungi and single-celled archaea. These are the probiotics. The bacteria help us digest food. Eating healthy prebiotics feeds the probiotics – the microbes in our intestines.
	The microbes break down the foods into metabolites such as SCFAs, 2BAs which communicate with our central nervous system and immune system. Taking antibiotics or eating too few prebiotics and probiotics disturbs the diversity of our gut microbiome.
	Having a healthy and diverse gut microbiome will protect the lining of our gut, reduce inflammation, increase the secretion of important metabolites which are precursors to many neurotansmitters.















Post-Test

1, 2, 4, 5, 6	Prebiotics - fermentable
3, 7, 8, 9, 11	Probiotics – live microbes!
9, 10	Both - synbiotics

Coaching Prompts



How would you describe your wellness right now?

What is your concept of personal health?

How do you start your day?

How do you end your day?

How did you feel when you drank that glass of water?

How did that bag of Cheetos make you feel afterwards?

How did that apple make you feel afterwards?

How did you feel after eating healthy while traveling last week?





Please add your prompt suggestions to the chat!



Coaching Demo

Stephanie and Alli demo a 10 minute coaching conversation around wellness.

Listen for prompts which open client awareness. Add any which you think would be useful in the chat.

Listen for blocks which prevent the client from paying attention to the body's messages.

What else do you observe?

Quick Prebiotic + Probiotic Superfoods

Chia Pudding

Honey (or maple syrup)

Ginger

Almond milk

Chia seeds

Greek yogurt

Refrigerate overnight

Recipe: https://wholefoodsoulfoodkitchen.com/chia-pudding-with-yogurt/



Chia seeds are loaded with omega 3 fatty acids, protein, antioxidants and fiber!



Flax seed is loaded with omega 3 fatty acids, lignans, and fiber!

Fruit Smoothie

Frozen fruit

1.5 cups yogurt

3 tbsp Ground flaxseed

Stephanie's Finds





Overcoming Barriers to Healthy Eating

1. Commit to learning to try to like ____ food.
2. Buy small amounts of high-quality foods and disguise them in things you already like.
3. Grating or chopping veggies into very small pieces and putting them in a marinara sauce, soup w dab of miso, or sandwich is an excellent way of disguising.
4. Prewashed spinach is undetectable in kefir/ berry smoothies.
5. Finely chopped mushrooms or zucchini mixed in with ground turkey or beef patty (~20:80) makes it juicer and undetectable (teen approved!).

Suggestions from Amy Ogle, MS, RDN

"Go it alone if you have to, but here are some ways to disguise healthy foods."



Thank you!

Stephanie Stephanie Brown, PCC, SPHR, SHRM-SCP-
President, ICF Virginia

Amy Ogle, MS, RDN
Author *Before Your Pregnancy*
www.linkedin.com/in/amy-ogle-ms-rd-beforeyourpregnancy:

How will you incorporate awareness of the gut-brain connection in your practice?

Key takeaways

Increased awareness leads to action.	Small actions can make a big difference.
Gut health sets up a chain reaction affecting mental health.	Curious coaches can catalyze this chain reaction!

Questions?



Natto

