



The Gut-Brain Connection:

How to bring 'gut-health' into a clinical therapy session

Dr. Kate Sage



Your presenter:

Kate Sage, NMD

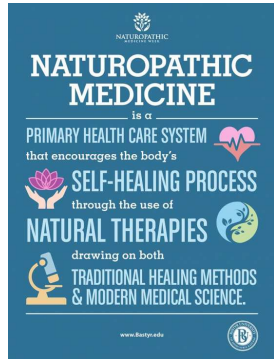
- * Graduated from National University of Natural Medicine in Portland, Oregon
- * Practicing Naturopathic Medicine for 11 years
- * Trained in Family Medicine, Speciality in Pediatrics
- * Joined the Intuition Wellness Center team in September 2019



Objectives

- * Understand what is meant by the gut-brain connection and the research behind it
- * Learn how and when to introduce this concept in a clinical therapy setting
- * Recognize when a medical referral is warranted
- * Have fun! Let's discuss. Please ask questions or add comments through the chat box.

Naturopathic Medicine

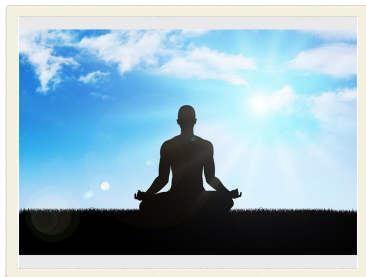


Naturopathic Medicine & Gut Health

- * Gut health is the foundation - "if in doubt, treat the gut".
- * Diet is fundamental - food is medicine
- * Other aspects to digestion - optimize the organs, enzymes and the microbiome
- * Love of [discussing] elimination



Psychology and Gut Health



COVID-19

During late June, 40% of U.S. adults reported struggling with mental health or substance use



For stress and coping strategies: bit.ly/dailylifecoping

CDC.GOV

bit.ly/MMWR81320

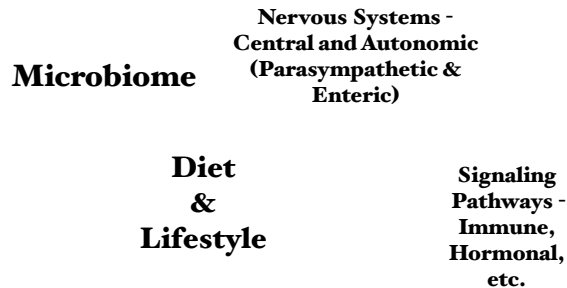
MMWR

New onset, related to the pandemic (Czeisler et al, 2020)

Before we get too far...
How many of you:



The Gut - Second brain?
Lots of pieces to this puzzle.

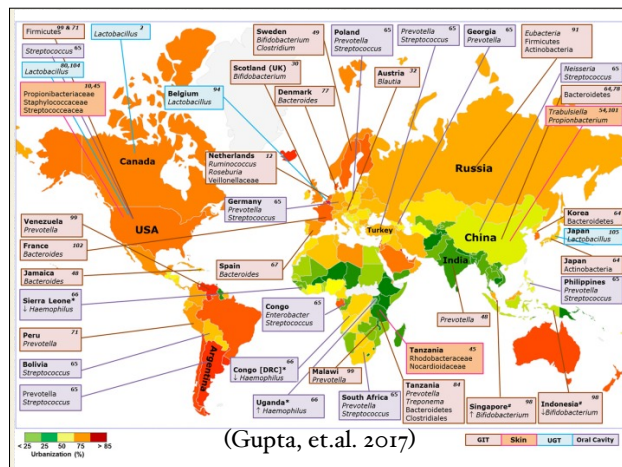


The Microbiome

- * 46 million bacterial genes in each human microbiome [compare to 20-25k human genes in the body]
- * Can weigh up to 6 pounds in total
- * Changes as we age
- * Micro-organisms (flora) in the gut release the same neurochemicals our body produces - **GABA, serotonin, oxytocin, dopamine** (Erdman, et al, 2017)

Microbiome and Diversity

- * Differences between infancy, adolescence, adulthood and aging
- * Socio-economic class
- * Weight
- * Country of origin vs the country in which you live
- * Migration from a non-western nation to the United States is found to be associated with a loss in gut microbiome diversity and function in a manner that may predispose individuals to metabolic disease.
- * Diet - foraging, farming, going to the grocery store



The microbiome can be influenced by:

- * Parents
- * Infections
- * Antibiotics
- * Over-cleanliness/cleaning products
- * Limited diet or eating processed foods
- * Stress
- * Alcohol - depletes good bacteria



The Human Microbiome Project

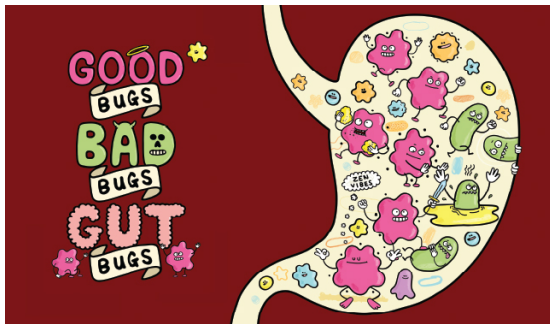


Diseases/symptoms associated with microbiome imbalance

- * ADHD
- * Asthma
- * Autism
- * Allergies and food sensitivities
- * Chronic fatigue
- * **Mood disorders, including depression and anxiety**
- * Diabetes and cravings for sugar and carbs
- * Overweight and obesity
- * Memory problems, poor concentration
- * Skin problems - eczema
- * Insomnia
- * Joint inflammation, Arthritis
- * Autoimmune Conditions
- * Hypertension
- * Menstrual Issues
- * And much more...

Limitations and challenges in microbiome studies:

- * Most studies show correlation rather than causation
- * Many of the studies showing positive correlation are animal studies
- * Bidirectional relationships between gut and brain - which comes first? Both are important.
- * Wide variety in commensal microbiome from human to human
- * Many studies lack "statistical power"
- * Question around the quality, viability, and efficacy of many probiotics used
- * \$\$\$



Question time!

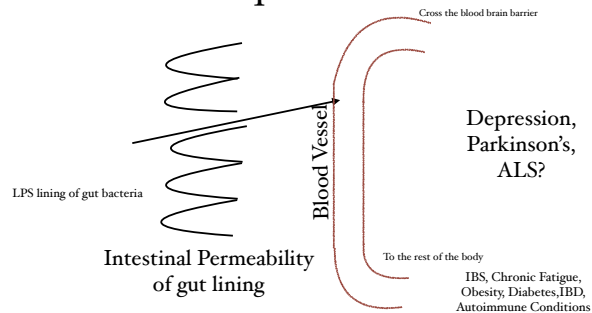
Let's Dig into Depression

- * 4 Different ways in which the microbiome influences mood (*Liang et al., 2018*) - **Bacteria-Brain Signaling**
 1. Immune System - Inflammation
 2. Brain Connection - Neurotransmitters
 3. HPA Axis - Hormones (ie cortisol)
 4. Gut-Brain Dysfunction - Vagus nerve

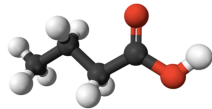
Immune System/Inflammation Connection to Depression

- * **Inflammatory Cytokines** - released by cells of our immune system, increase permeability of the gut lining and the blood-brain barrier
- * **Bacterial Lipopolysaccharides** - the outer shell of a bacteria, when released through a permeable gut causes inflammation downstream

Lipopolysaccharides and Depression



BUTYRATE



- * Produced by certain gut bacteria when fermenting fiber from food
- * Modulates permeability of both gut lining and blood brain barrier -> plugs the leaky gut and BBB
- * FIBER! FIBER! FIBER!

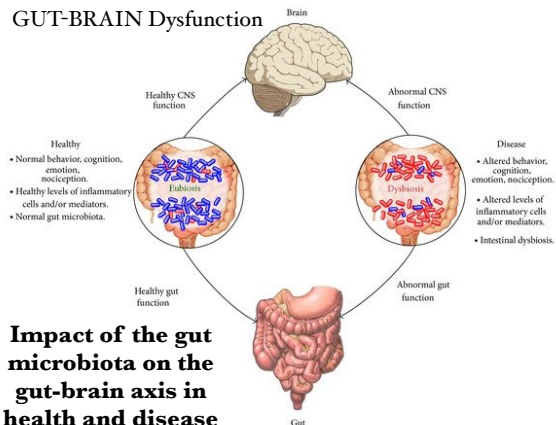
The Brain Connection: Neurotransmitters and the microbiome

- * Gut microflora produce and regulate neurotransmitters (*Sbaron et al. 2014*), (*Erdman, et al. 2017*)
- * Tryptophan, serotonin, kynurenine
- * - **95 of serotonin is found in the gut**
- * *Bifidobacteria infantis*: increases serotonin, decreases kynurenine (in rats) (*Kennedy et al. 2017*)

The Hormone Connection - stress and our microbiome

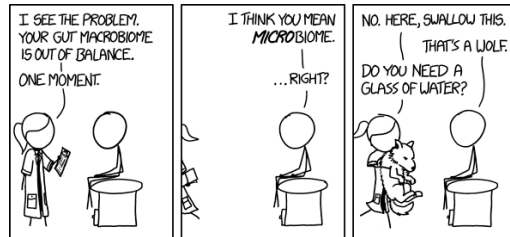
- * Hypothalamic-Pituitary- Adrenal (HPA) Axis - feedback loop
- * Depressed individuals - negative feedback dysfunction, leading to a chronic increase in some hormones, including cortisol
- * Microbiota influence the development and maintenance of this system - gut luminal catecholamines cross-talk
- * *L. Helveticus* and *B. Longum* have been shown to reduce cortisol levels in humans (*Messauodi et al. 2015*)
- * Consuming **prebiotic** supplement galacto-oligosaccharide (GOS) resulted in lower waking cortisol response and less sensitivity to fearful stimuli (*Schmidt et al. 2014*)

GUT-BRAIN Dysfunction



Depression and Treatment with “Psychobiotics”

- * Probiotics and prebiotics used to exert psychological effects
- * Meta-Analysis of 5 studies (*Huang et al., 2017*) brought together found:
 - * Probiotics effectively reduce depression scale ratings in persons under the age of 65
 - * Strains, duration, dosage, and depression rating scales in each study were different
- * **2020** Meta-Analysis of 7 studies (*Noonan et al, 2020*) found:
 - * Combination of probiotics and prebiotics for treatment of depression is better than placebo



https://imgs.xkcd.com/comics/gut_fauna.png

QUESTIONS?

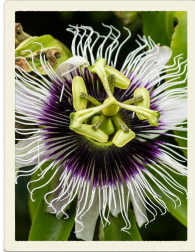
Anxiety - our microbiota and GABA

- * Studies have shown that gut microbes are able to produce the neurotransmitter gamma-aminobutyric acid (GABA) - our own version of Xanax (*Foster et al. 2013*).
- * *Bacteriodes* spp. in the gut
- * Same 4 methods as depression, just different signals
- * Double-blind placebo controlled study (*Tillisch et al, 2013*): 36 women ate yogurt..



Probiotic vs. non-probiotic interventions on the microbiome: A look at anxiety

- * Meta-analysis of 21 studies, 1503 subjects looking at affects of probiotics and other microbiome influences* on anxiety symptoms (*Yang et. al 2019*)
- * Both methods of influencing microflora had a positive influence on anxiety symptoms
- * Interventions regulating intestinal flora were more effective then just taking a probiotic
- * Especially effective for those with concurring chronic disease



Microbiome influence on cognition - learning and memory

- * Adults were given the Trail Making Test (tests motor speed, attention and cognitive flexibility) - able to find a correlation between microbial composition and performance (*Manderino et al. 2017*) - 43 participants, ages 50-85



ADHD and gut health

- * More evidence is showing that serotonin plays a role in the development of ADHD (*Oades et al, 2010*)
- * Persons with ADHD tend to have a more processed, less nutrient-dense or even restricted diet (*Ptacek et al, 2014*)
- * A 2015 study found that children given probiotics at birth were less likely to get diagnosed with ADHD later (*Pärty et al, 2015*)

ADHD and the microbiome

- * Promising results on elimination diet changes helping with symptoms of ADHD by decreasing inflammation, leaky gut...
- * Study found altered gut microbiome in adolescence and adults with ADHD (*Aaerts et al., 2017*)
- * Correlation with emergency C-section (not scheduled) and development of ADHD discovered in 2019 (*Bull-Larson, Mohjari, 2019*)

Trauma and the microbiome

- * Dramatic microbiome changes in patients 72 hours post traumatic injury - decreased diversity and abundance (*Howard et al, 2017*)
- * Role of inflammation, HPA Axis/cortisol, intestinal permeability, vagus nerve, neurotransmitters when under chronic/repeated trauma and/or stress
- * South African study on 18 persons with post-traumatic stress disorder (PTSD) vs 12 persons who were trauma-exposed (TE). Persons suffering PTSD had decreased abundance of 3 phyla compared to TE persons (*Hemmings et al, 2017*)



Maybe.

Clinical evidence shows persons with less bifidobacterium and lactobacillus species more prone towards depression.

A better plan than microbiome testing...

- * Stool testing that checks for ova and parasites, yeast overgrowth, c. diff, h. pylori, occult blood, and provides a digestive enzyme and inflammation analysis
- * Breath test for small intestine bacterial overgrowth (SIBO)
- * Blood test for Celiac
- * Urine test for organic acids - provides information about vitamin and mineral levels, oxidative stress, neurotransmitter levels, bacteria and yeast overgrowth and more.

When to think of the microbiome in a therapeutic setting

- * Have a chronic health condition - especially one that affects digestion (IBS, Crohn's, Celiac, Ulcerative Colitis)
- * Depression, anxiety symptoms followed an infection
- * Client connects mental health symptom with a digestive issue
- * Bowel movements are not regular - should happen daily - OK
- * Eat a restricted or standard American diet - low in fiber, green vegetables, fermented foods, high in meat, sugar and refined carbs
- * Others? Please add to comments.

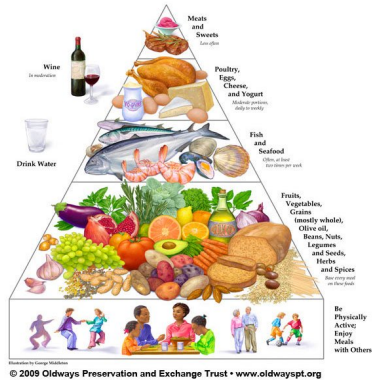
5 Ways to Positively Change the Microbiome

- * Diet
- * Prebiotics
- * Probiotics
- * Mind-body-Gut
- * FMT

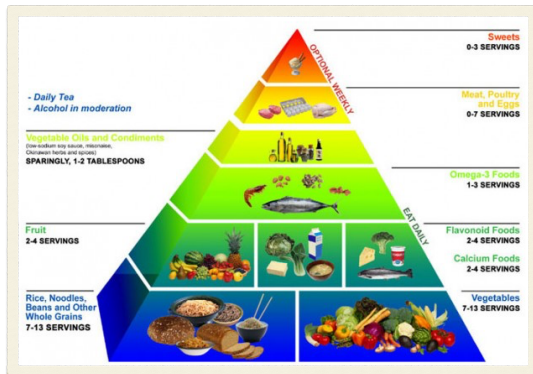


Mediterranean Diet Pyramid

A contemporary approach to delicious, healthy eating



Okinawan Diet





What is your favorite fermented food?

Easy to Add Into Your Diet ~Probiotic Foods~

- * Sauerkraut
- * Kimchi
- * Kefir
- * Yogurt
- * Pickles - buy from the refrigerated section
- * Kombucha



Prebiotics:
non-digestible
carbs to feed your
microbiome

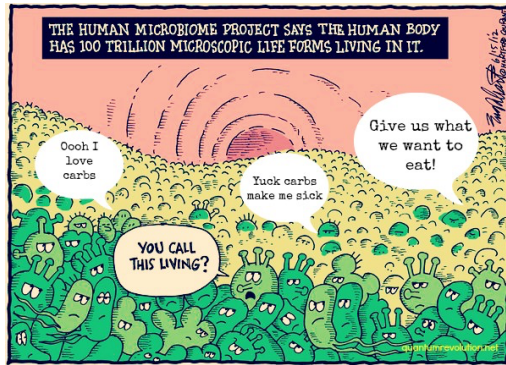
Acacia gum
Lactulose
Lafinose
Oligosaccharides
Psyllium
Resistant starch
Wheat dextrin



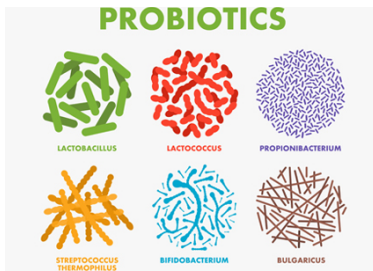


Pistachios

The best prebiotic nut (or at least better than almonds)
(Ukhanova M et al, 2014)



Questions or comments?



- * Take with food at mealtime
- * Strains included are more important than numbers (though they should be in billions, not millions)
- * Refrigerated case
- * No Prebiotic - inulin
- * Gummies - not strong enough

Should you recommend a probiotic supplement?

- * It is up to you to decide if you feel comfortable making these sorts of recommendations
- * Good side - very safe. Side effects sometimes include extra gassiness or bloating which will stop if you discontinue the probiotic.
- * Get the kind in the refrigerator at a natural foods store (not on the shelf at Walgreens)
- * Lactobacillus rhamnosus, lactobacillus acidophilus, bifidobacterium- best studied for treating depression and anxiety
- * Bifidobacterium combination for children, esp b. infants and b. rhamnosus

Probiotic Strains for Depression

- * Bifidobacterium (B.) bifidum, B. breve, B. infantis, B. longum + B. helveticus, Lactobacillus (L) acidophilus, L. brevis, L. casei, L. plantarum, L. rhamnosus, L. salvarius, Saccharomyces (S.) thermophilus
- * Activia yogurt - Bifidobacterium animalis lactis DN-173 010/CNCM I-2494 + 3 other strains —> better for ulcerative colitis but was the strain used in the anxiety study discussed earlier...
- * Probiotics on the marketplace now formulated specifically for mood support - Garden of Life Mood +, Mood Boosting Probiotic by Lifted Naturals, Jarrow-dophilus Mood by Jarrow, New Chapter Mood Support

Mind-Body-Gut Combo Therapies

- * Meditation
- * Exercise
- * Getting outside
- * Pets - especially farm animals
- * Garden - or just play in the dirt
- * Mindful eating
- * Stress Modulation
- * Vagus Nerve Exercises



Play in the dirt!

A recent study in Finland showed that in only 28 days, the gut and skin microbiome of preschool children playing in a planted "forest floor" was dramatically different from those who were playing in a more urban preschool setting. (Roslund et al, 2020)



Fecal Microbiota Transplants (FMT)

<https://youtu.be/Dim7YXYIRm0>

FMT and Depression

- * Fecal Microbiotic Transplantation
- * Stool transferred from depressed or anxious persons to a “germ-free” rat can induced depression or anxiety in the rat (*Holzer, 2017*)
- * 2020 meta-analysis of 21 studies - some with human donors - showed strong evidence for the treatment and transmission of psychiatric illnesses through FMT

Vagus Nerve Exercises

- * Singing, humming, chanting
- * Meditation
- * Gargling
- * Deep breathing - focusing on the out breath
- * Yoga
- * Laughing
- * Cold Exposure (end shower in cold)



Referral

- * Mental health condition with concomitant digestive issue/disease that has not been addressed [root cause vs. band-aid]
- * Need more support, resources around changing eating habits and food choices
- * Condition appeared post-infection

Sample treatment plan for Depression, Anxiety...

- * Diet - high in vegetables, to include fermented foods. Limit sugar, red meat, processed foods, alcohol. *See Mediterranean diet.*
- * Probiotic - Garden of Life Mood +, Mood Boosting Probiotic by Lifted Naturals, Jarrow-dophilus Mood by Jarrow, New Chapter Mood Support
- * Move your body - outside is best
- * Get vitamin D levels tested
- * Mindfulness and deep breathing practices

Books I Recommend for You and Your Clients

Anderson, S (2017). *The Psychobiotic Revolution: mood, food and the new science of the gut-brain connection.* Washington D.C.: National Geographic

Mayer, E (2016). *The Mind-Gut Connection: how the hidden conversation within our bodies impacts our mood, our choices, and our overall health.* New York: Harper Wave

Perlmutter, D., & Loberg, F. (2015). *Brain maker: the power of gut microbes to heal and protect your brain.* New York: Little, Brown & Company.

- * SPOILER - Diet drinks, animal products, cleaning supplies negatively affect the microbiome

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Services and Programs at Intuition Wellness Center

Clinical Services:

- * Psychotherapy:
 - * Play Therapy
 - * Traditional Counseling
 - * Family Therapy
 - * Parent Guidance
- * Psychological Evaluations
- * Pediatric Occupational Therapy
- * Naturopathic Family Medicine

Wellness:

- * Wellness Groups: (Past Examples: Nurtured Mothering, Family Yoga, Teen Girls Empowerment Group)
- * Parent Education: Parents' Heart-to-Heart:

Training & Consultation

- * Externship & Clinical Supervision
- * Continuing Education (APA approved sponsor)
- * Professional Presentations
- * Professional Consultation

Serving children and young adults (ages birth - 25) and their families

Questions?



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