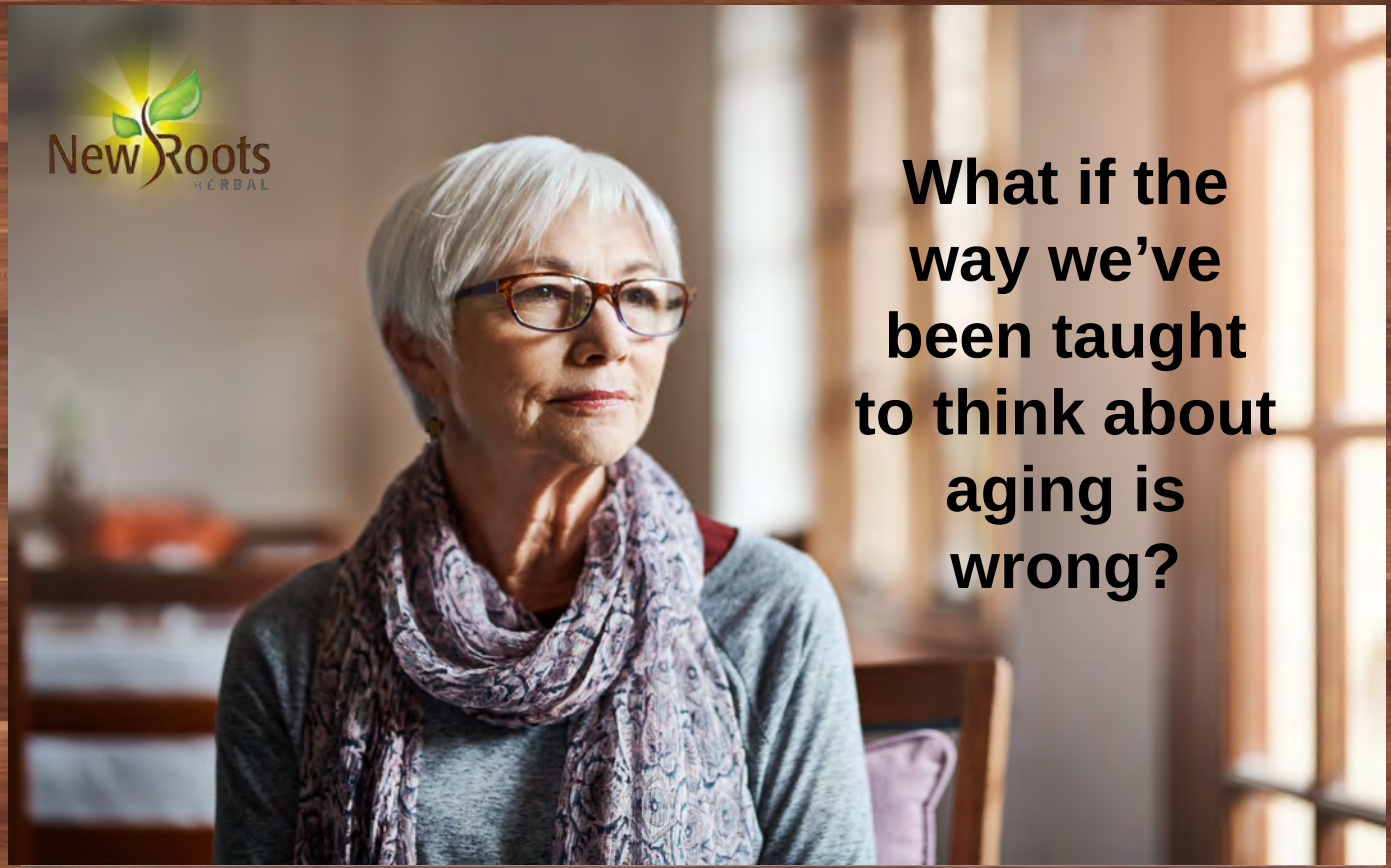
The microbiota & aging – A paradigm shift in healthy long life

Dr. Kim Bretz ND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What if the way we've been taught to think about aging is wrong?

What if…?

- **We are missing half the picture?**
- **Aging can be modulated through our gut bacteria?**
- **We could help modulate our patients' life habits to help with a healthier aging process?**

Why should we care?

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What if
…we are missing half the picture?

40,000,000,000,000

The estimated number of bacterial cells in the average human

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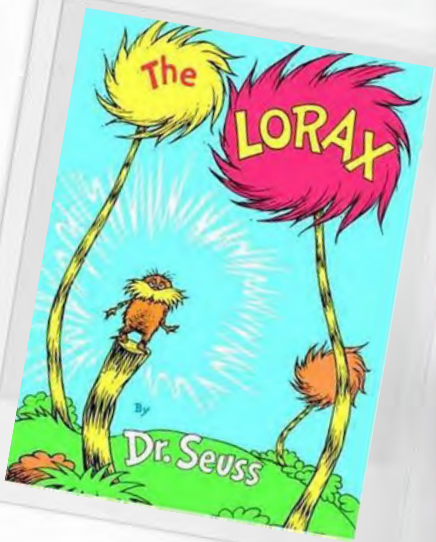
We have looked ad nauseum at the biochemical pathways of our human cells – we've missed half of us

The Microbiota & the Lorax



Strong views, Loosely held

What if…

…aging can be modulated by your gut bacteria?

Common Understanding of aging & the microbiota

“The recent consensus is that, in aggregate, the diversity of the gut microbiota declines with age, although whether this is associated with healthy aging is controversial and the delineation of what is normal in different cohorts are still not clear.

Thus, continued study of the gut microbiota in large and distinct cohorts is needed to identify and separate potential microbial biomarkers for age and frailty.”

Healthy aging & the Microbiota

mSphere. 2017 Sep 27;2(5). pii: e00327-17. doi: 10.1128/mSphere.00327-17. eCollection 2017 Sep-Oct.

The Gut Microbiota of Healthy Aged Chinese Is Similar to That of the Healthy Young.

Bian G[1], Gloor GB[1,2,3], Gong A[1], Jia C[1], Zhang W[4], Hu J[5], Zhang H[6], Zhang Y[7], Zhou Z[8], Zhang J[9], Burton JP[1,3,10], Reid G[1,3,10], Xiao Y[1], Zeng Q[11], Yang K[1,3,12,13,14], Li J[1].

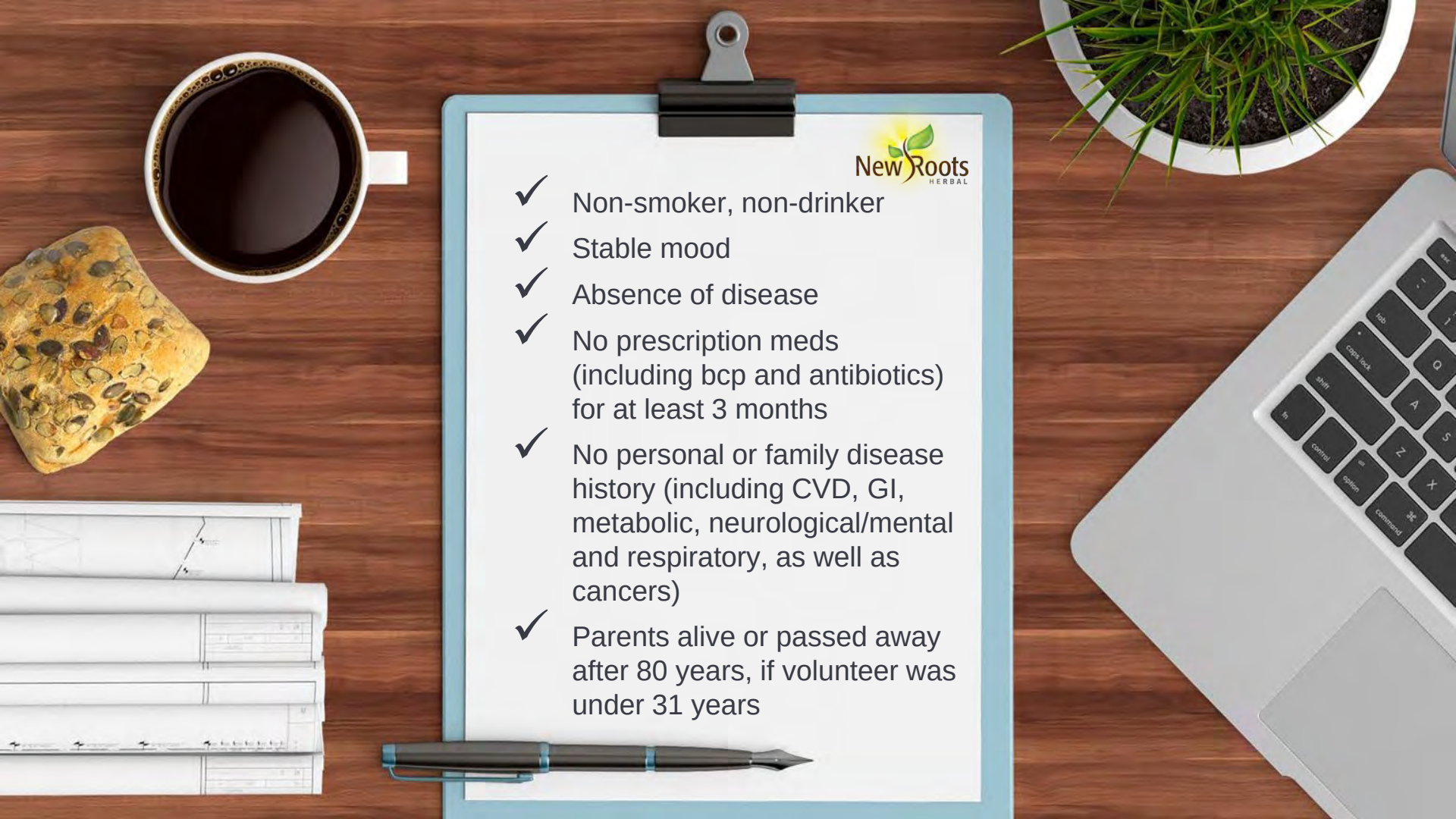
Author information

Abstract

The microbiota of the aged is variously described as being more or less diverse than that of younger cohorts, but the comparison groups used and the definitions of the aged population differ between experiments. The differences are often described by null hypothesis statistical tests, which are notoriously irreproducible when dealing with large multivariate samples. We collected and examined the gut microbiota of a cross-sectional cohort of more than 1,000 very healthy Chinese individuals who spanned ages from 3 to over 100 years. The analysis of 16S rRNA gene sequencing results used a compositional data analysis paradigm coupled with measures of effect size, where ordination, differential abundance, and correlation can be explored and analyzed in a unified and reproducible framework. Our analysis showed several surprising results compared to other cohorts. First, the overall microbiota composition of the healthy aged group was similar to that of people decades younger. Second, the major differences between groups in the gut microbiota profiles were found before age 20. Third, the gut microbiota differed little between individuals from the ages of 30 to >100. Fourth, the gut microbiota of males appeared to be more variable than that of females. Taken together, the present findings suggest that the microbiota of the healthy aged in this cross-sectional study differ little from that of the healthy young in the same population, although the minor variations that do exist depend upon the comparison cohort. **IMPORTANCE** We report the large-scale use of compositional data analysis to establish a baseline microbiota composition in an extremely healthy cohort of the Chines
to the expected difference i
almost all respects to that o
consequence of an active h
design. One surprising resu
was replicated, suggesting t

What if…

…the microbiota is investigated in healthy populations rather than in the ill or frail?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✓ Non-smoker, non-drinker
✓ Stable mood
✓ Absence of disease
✓ No prescription meds (including bcp and antibiotics) for at least 3 months
✓ No personal or family disease history (including CVD, GI, metabolic, neurological/mental and respiratory, as well as cancers)
✓ Parents alive or passed away after 80 years, if volunteer was under 31 years

What did they find?

- Overall microbiota of healthy aged was similar to that of people decades younger
- Major differences were found before age 20
- Little difference in gut microbiota from ages 30 to >100 (in this healthy pop.)
- The microbiota of males appeared to be more variable than females

“The main conclusion is that if you are ridiculously healthy and 90 years old, your gut microbiota is not that different from a healthy 30-year-old in the same population”

-Greg Gloor, Phd

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Inflammaging

Chronic low grade inflammation that characterizes aging and predicts susceptibility to age-related pathologies

Healthy aging & the Microbiota

Trends Endocrinol Metab. 2017 Mar;28(3):199-212. doi: 10.1016/j.tem.2016.09.005. Epub 2016 Oct 24.

Inflammaging and 'Garb-aging'.

Franceschi C[1], Garagnani P[2], Vitale G[3], Capri M[4], Salvioli S[2].

Author information

Abstract

'Inflammaging' refers to the chronic, low-grade inflammation that characterizes aging. Inflammaging is macrophage centered, involves several tissues and organs, including the gut microbiota, and is characterized by a complex balance between pro- and anti-inflammatory responses. Based on literature
molecules resulting
While their productio
progressively declin
propagate the aging

"…increased plasma levels of proinflammatory cytokines, such as IL-6 and IL-8, have been found, and 9% of the total variability of the gut microbiota was related to the pattern of proinflammatory cytokines, suggesting that the **intestinal ecosystem in older subjects contributes to inflammaging**

What did they find?

- The changes occurring in the GM of older people can have far-reaching biological consequences owing to the important physiological anti-inflammatory role of SCFA

- These actions promote the resolution of intestinal inflammation, thus avoiding the leakage of bacteria and bacterial-derived inflammatory compounds into the blood

Modulating aging…

…through the gut microbiota


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Gut Microbiota: Change
Diet
Digestive health
Stress & sleep
Method of birth
Exposure to chemicals
Exposure to nature
Exercise
History of infections, surgery and antibiotics
Use of other medications
Water treatment

Focus: Diet

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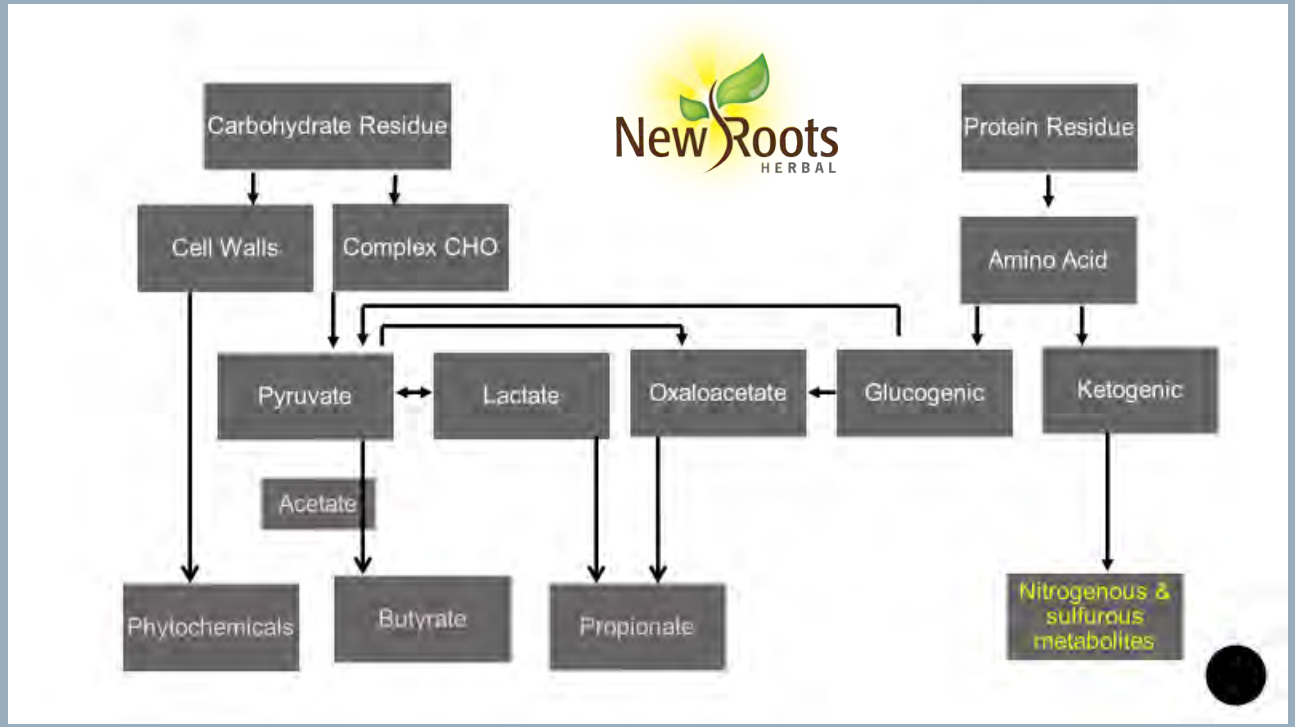
- 90-95% of food is digested and absorbed in the small intestine
- **What about the extra 5-10%**

The Undigested Residues

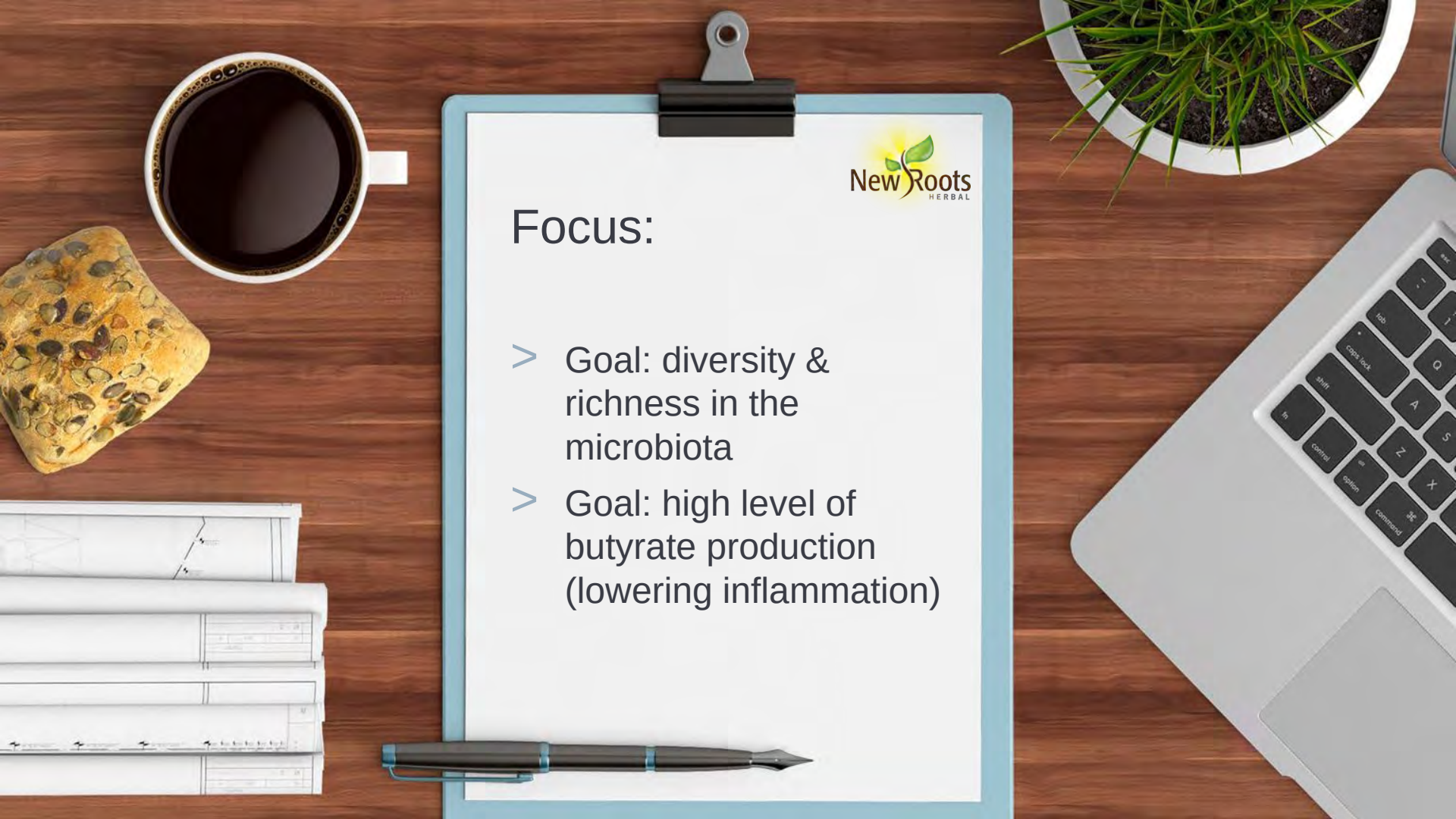
- Largely fermented by the bacteria of the large colon – and turned into gases and metabolites

- These gases and metabolites directly affect the GI system…but also affect the rest of our body


Carbohydrate Residue
Protein Residue
Cell Walls
Complex CHO
Amino Acid
Pyruvate
Lactate
Oxaloacetate
Glucogenic
Ketogenic
Acetate
Phytochemicals
Butyrate
Propionate
Nitrogenous & sulfurous metabolites

SCFA – Butyrate Functions:

Cell Metabolism	• Energy supply
Microbiota Homeostasis	• Phenolics and antioxidants
Genetic/Epigenetic Regulation	• Histone deacetylase inhibition
Antiproliferative	• Reduced cell cycling • Apoptosis
Immunomodulatory & anti-inflammatory	• NF-kB suppression
Mucosal Health and Defense	• Mucin synthesis • Tight junctions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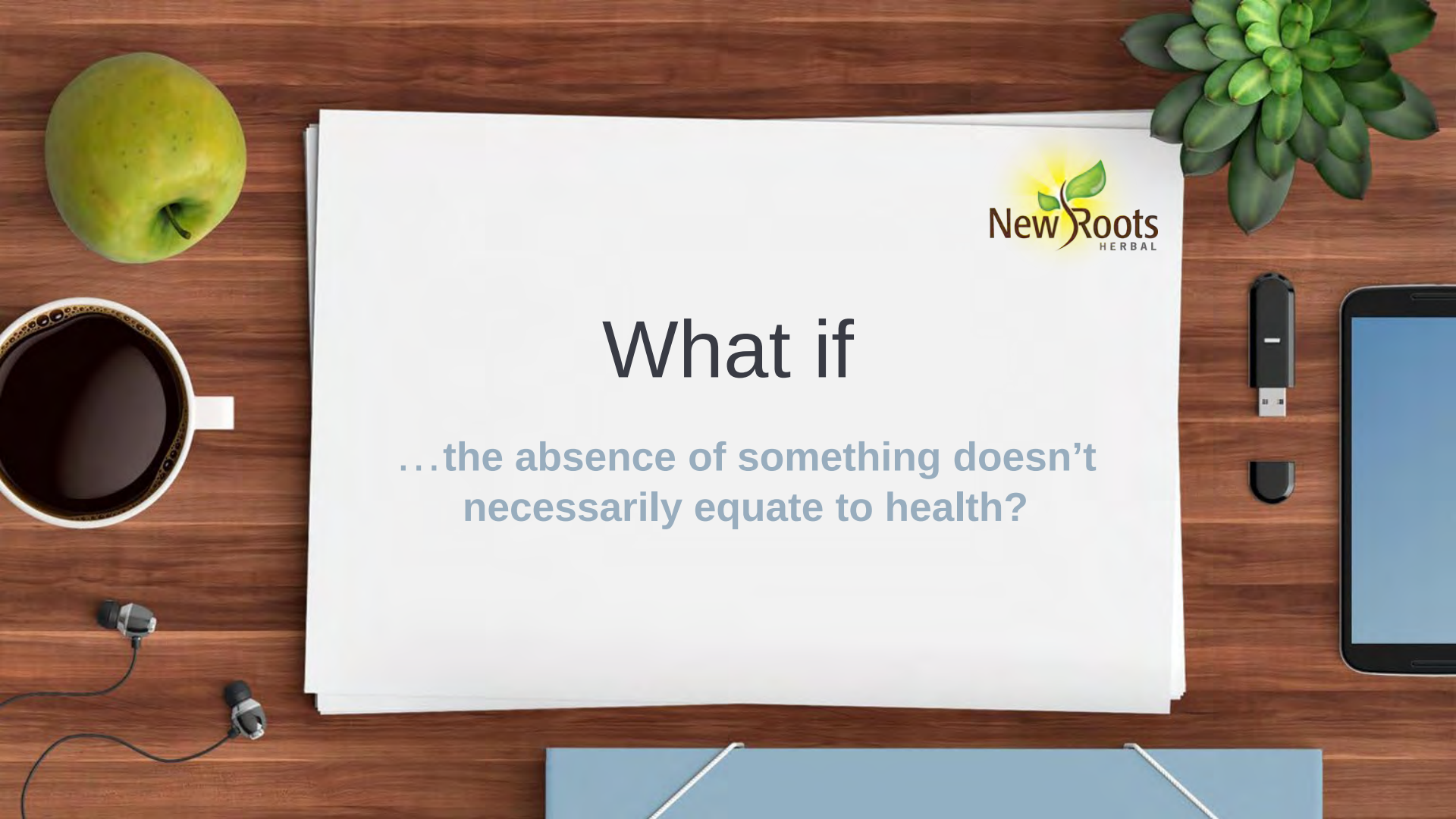
Focus:
Goal: diversity & richness in the microbiota
Goal: high level of butyrate production (lowering inflammation)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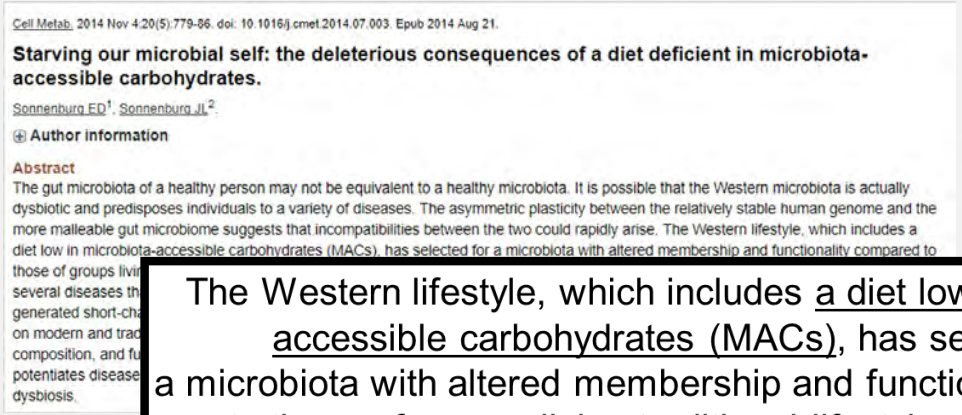
What if
…the absence of something doesn’t necessarily equate to health?

MAC – Microbiota Accessible Carbs



Cell Metab. 2014 Nov 4;20(5):779-86. doi: 10.1016/j.cmet.2014.07.003. Epub 2014 Aug 21.

Starving our microbial self: the deleterious consequences of a diet deficient in microbiota-accessible carbohydrates.

Sonnenburg ED[1], Sonnenburg JL[2]

⊕ **Author information**

Abstract

The gut microbiota of a healthy person may not be equivalent to a healthy microbiota. It is possible that the Western microbiota is actually dysbiotic and predisposes individuals to a variety of diseases. The asymmetric plasticity between the relatively stable human genome and the more malleable gut microbiome suggests that incompatibilities between the two could rapidly arise. The Western lifestyle, which includes a diet low in microbiota-accessible carbohydrates (MACs), has selected for a microbiota with altered membership and functionality compared to those of groups livi
several diseases th
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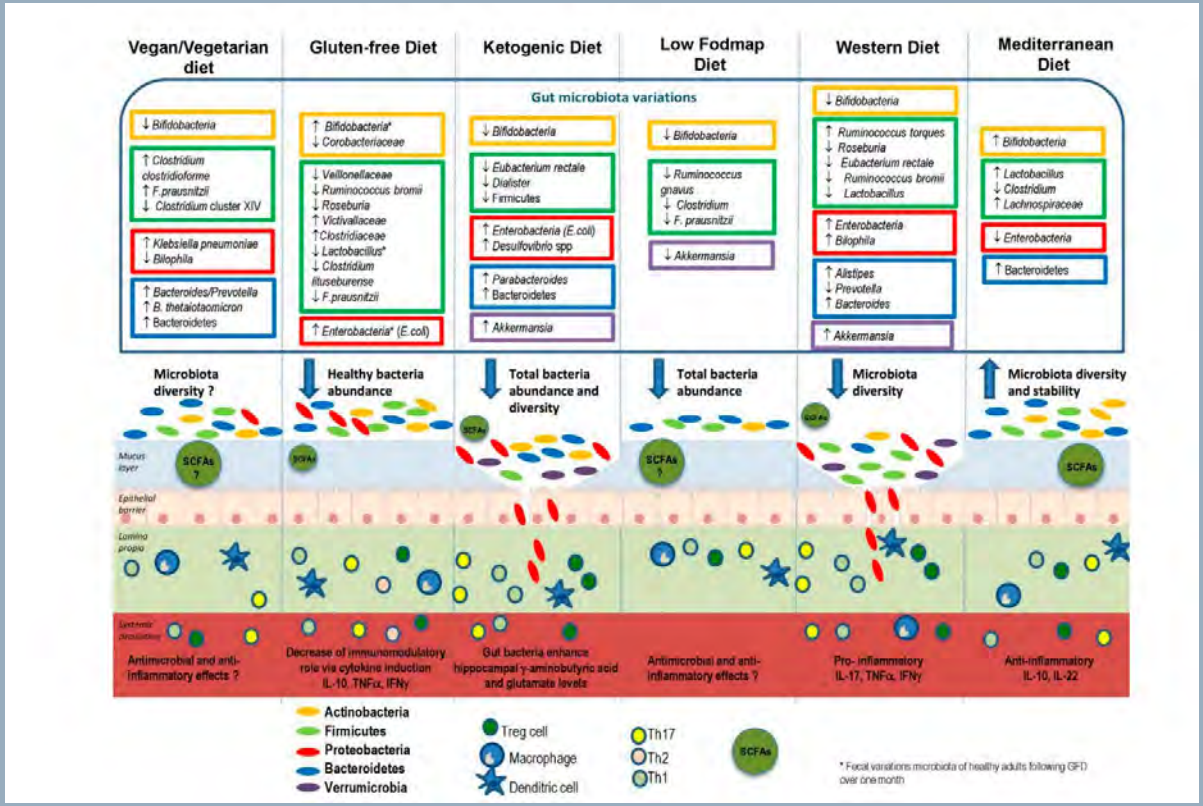
dysbiosis.

The Western lifestyle, which includes a diet low in microbiota-accessible carbohydrates (MACs), has selected for a microbiota with altered membership and functionality compared to those of groups living traditional lifestyles. Interactions between resident microbes and host leading to immune dysregulation may explain several diseases that share inflammation as a common basis.

Foods/Diets that don’t Provide Much MAC:

- Highly processed packaged foods
- High protein and/or high fat diets compared to undigested carbohydrate residues
- Low residue diets
- Low FODMAP diet
- Juicing

While we may have times we need to limit a diet, that should not, for most, be the long-term strategy



Food Components and Dietary Habits: Keys for a Healthy Gut Microbiota Composition. *Nutrients* **2019**, *11*, 2393.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Let’s look at this
at a deeper level

What are your goals for your patients regarding food, digestive health and aging?

You need to communicate this very clearly – and up-front!

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Healthy Aging Through the Microbiota
Deal with gut issues
Rule out GI disease including functional gastrointestinal disorders
Build a healthy microbiota
Wide variety of foods
Daily probiotic and prebiotics – supplements and food
Lower inflammation
Work on stress/sleep issues

- **The Road Map**
  - What is your general plan?
  - Ensure they understand there is individuality but...have a plan
- **Have Resources to Help**
  - Menu planners & recipes
  - Exercise/sleep/stress programs
- **Expectations**
  - What should be happening and when

Deal with…

…the gut first. Key consideration?

Do fiber & plant foods aggravate???

Dealing with Dysbiosis (the short version)

Symptoms:	Solutions:
• Bloating, gas	• Enzymes
• Constipation	• Laxative (short term) Kill off Probiotic
• Inflammation	• Turmeric, L-glutamine & quercetin
• Sleep	• Passionflower, theanine
• Stress	• Passionflower, theanine, chamomile

Enzyme Primer

Digestive enzymes are classified based on their target substrates:

- Proteases and peptidases split proteins into small peptides and amino acids.
- Lipases split fat into three fatty acids and a glycerol molecule
- Amylases split CHO such as starch and sugars into simple sugars such as glucose

Enzyme Primer

But what if there's no problem with their pancreas?

- **Alpha-galactosidase** – beans, veg, whole grains (esp. cruciferous)
- **Lactase** – milk lactose
- **Hemi-cellulase & cellulase** – plant cell wall/fiber
- **Pectinase** – breaks down pectin (polysaccharide) found in cell walls (fruits/veg)
- **Dipeptidyl-peptidase IV** - gluten

Enzyme Primer

Use:

- Increasing fiber levels
- Increased plant foods in general
- Food intolerances
- Symptoms of IBS, dyspepsia
- Vegetarian patients

Constipation Primer

The Plan:

- Get the bowels moving
- Kill off the dysbiosis (Wild Oregano Oil)
  - 5 drops with water tid; avoiding taking within 2 hours of probiotics or minerals
- Add back good bacteria (ProBoulardii Plus)
  - 11 strains including S. boulardii, and inulin
  - 1 capsule daily

Inflammation Primer

L-Glutamine:

- In healthy individuals, almost all tissues in the body synthesize glutamine.
- But, in metabolically stressed individuals there is an increased demand for glutamine, making supplementation essential.
- This includes people with acute or chronic bowel disease, burns, trauma, sepsis, or immune disorders, and can include people with temporary increased metabolic needs resulting from extreme physical activities

Inflammation Primer

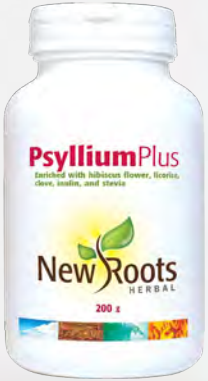
L-Glutamine:

- Promotes gut mucosal integrity by acting as an energy source and preventing bacterial translocation
- Provides a major fuel source for cells of the immune system
- Improves nitrogen balance in times of stress
- Increase blood flow to the gut, thereby helping the healing process

Fiber Primer

The Facts:

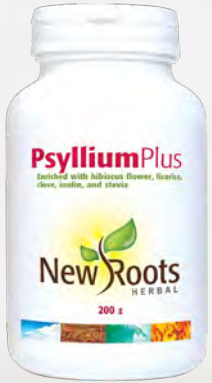
- Fiber has not been studied nearly as much as thought
- The common go-to recommendation of ‘just add more fiber’ commonly backfires
- Most fiber studies are done on healthy individuals and not people with gut issues



Fiber Primer

The Facts:

- The most research?
  - Psyllium fiber
- But the need to go low and slow is important
- Dosing:
  - Start at 1 tsp or less (esp with sensitive patients)
  - Increase to 2-3 tsp daily
  - Watch blood pressure to ensure no increase with licorice root



Healthy aging & the Microbiota

Int J Mol Sci. 2019 Jan 20;20(2). pii: E433. doi: 10.3390/ijms20020433.

The Effect of Psyllium Husk on Intestinal Microbiota in Constipated Patients and Healthy Controls.

Jalanka J[1,2], Major G[3], Murray K[4], Singh G[5], Nowak A[6], Kurtz C[7], Silos-Santiago I[8], Johnston JM[9], de Vos WM[10], Spiller R[11].

Author information

Abstract

Psyllium is a widely used treatment for constipation. It traps water in the intestine increasing stool water, easing defaecation and altering the colonic environment. We aimed to assess the impact of psyllium on faecal microbiota, whose key role in gut physiology is being increasingly recognised. We performed two randomised, placebo-controlled, double-blinded trials comparing 7 days of psyllium with a placebo (maltodextrin) in 8 healthy volunteers and 16 constipated patients respectively. We measured the patients' gastrointestnal (GI) transit, faecal water content, short-chain fatty acid (SCFA) and the stool microbiota composition. While psyllium supplement had a small but significant effect on the microbial composition of healthy adults (increasing *Veillonella* and decreasing *Subdoligranulum*), in constipated subjects there were greater effects on the microbial composition (increased *Lachnospira*, *Faecalibacterium*, *Phascolarctobacterium*, *Veillonella* and *Sutterella* and decrease

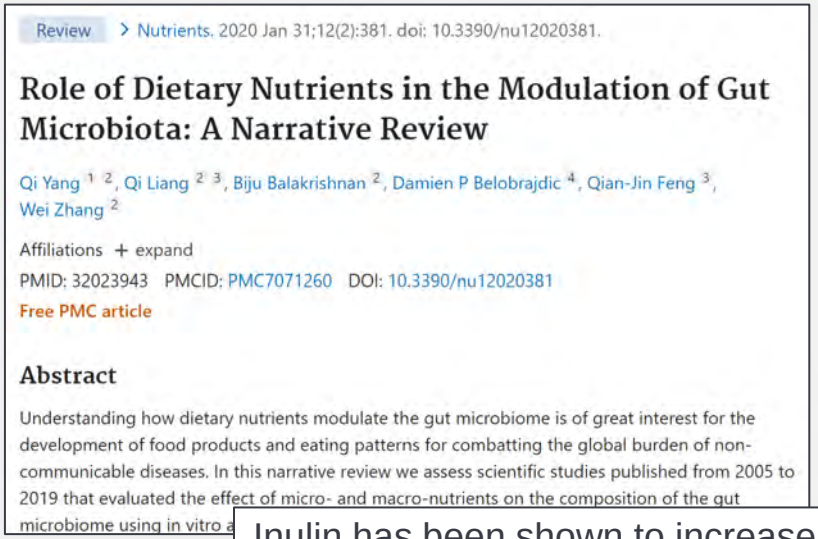
several taxa to be asso

known to produce butyr

supplementation increa

Significant increases in three genera known to produce butyrate, *Lachnospira*, *Faecalibacterium, and Roseburia*

Healthy aging & the Microbiota



Review > Nutrients. 2020 Jan 31;12(2):381. doi: 10.3390/nu12020381.

Role of Dietary Nutrients in the Modulation of Gut Microbiota: A Narrative Review

Qi Yang [1 2], Qi Liang [2 3], Biju Balakrishnan [2], Damien P Belobrajdic [4], Qian-Jin Feng [3], Wei Zhang [2]

Affiliations + expand

PMID: 32023943 PMCID: PMC7071260 DOI: 10.3390/nu12020381

Free PMC article

Abstract

Understanding how dietary nutrients modulate the gut microbiome is of great interest for the development of food products and eating patterns for combatting the global burden of non-communicable diseases. In this narrative review we assess scientific studies published from 2005 to 2019 that evaluated the effect of micro- and macro-nutrients on the composition of the gut microbiome using in vitro a

Inulin has been shown to increase abundance of Bifidobacteria & Fecalibacterium in healthy populations

Probiotic & prebiotic food!

Probiotic Foods

- Fermented vegetables
- Sauerkraut, kimchi
- Miso
- Plain yogurt, kefir
- Aged cheese
- Sourdough bread
- Raw honey

Prebiotic Foods

- Oat groats, steel cut oats, barley
- Bananas
- Psyllium fiber, ground flax
- Garlic, onion
- Mushrooms, asparagus & most produce
- Legumes, lentils

Stress & Sleep Primer

The Facts:

- Although hard for patients to think about, poor sleep & high stress can cause dysbiosis
- This needs to be part of the basis of what we look at, all the time

Comorbid psychiatric disorders (including anxiety & depression) cause treatment failure in gut conditions

Stress & Sleep Primer

- **B vitamins** – healthy nervous system
- **Ashwaganda** – resistance to stress & helps mental balance
- **Rhodiola** – contributes to optimal mental & cognitive function
- **Passionflower** – helps induce calm, rest & sleep

Dose: 2 capsules during the day, with food

- Crosses the BBB to help increase alpha brain-wave frequency
- Helps lower sensation of anxiety & mental clarity & concentration

Dose: 1 capsule daily

Stress & Sleep Primer

- **Passionflower** - supports production of *gamma*-aminobutyric acid (GABA) to suppress excessive brain activity and induce relaxation.
- **Catnip** - drives cats crazy, it helps humans relax.
- **Melatonin** - supports circadian rhythms that regulate sleep cycles. Increasing research in gut health
- **Skullcap** - supports the nervous system Dose: 1-4 capsules before bed (approx. 45 minutes)

Microbiota & Aging Considerations: Our New Understandings

- A gut microbiota in a healthy 30 year old is very similar to a healthy 90 year old
- A gut microbiota in an unhealthy aging person has a loss of diversity & richness
- Aging is modulated through the gut microbiota (as well as our own cells) – a healthy robust & diverse microbiota predisposes to a healthier aging process
- Therefore treating the gut is part of healthy aging

Microbiota & Diet Considerations: What to do on Monday

- Educate your patients through social media & one-on-one visits on the relationship between gut microbiota & aging
- Work with a tracking program to get a 3-day average of the amount of fiber & probiotic/prebiotic foods in a patients diet
- If patients aggravate with plant/fiber-rich foods or show signs of functional GI disorders you need to treat that first – use enzymes to help your patients tolerate fiber-rich foods
- If you don't see enough probiotic/prebiotic & fiber rich foods, start adding in through supplementation!

Thanks!

Visit the New Roots Herbal booth and register with your e-mail to receive free access to

- Recording and slides of this presentation
- Healthy Aging meal plan
- **Two** additional free webinars:
  - Overcoming Candida overgrowth
  - A Practical Guide to Parasite Cleansing and Detoxification

By registering you will automatically be entered into to win ANY 3 New Roots Herbal products of your choice!

Contact: **info@newrootsherbal.eu**

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