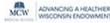


Should I Really Wash my Hands all the Time? Why Bacteria Can be Our Friends!

Nathan A Ledeboer
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Medical Director, Microbiology and Molecular Diagnostics
Froedtert Health and Wisconsin Diagnostic Laboratories

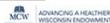
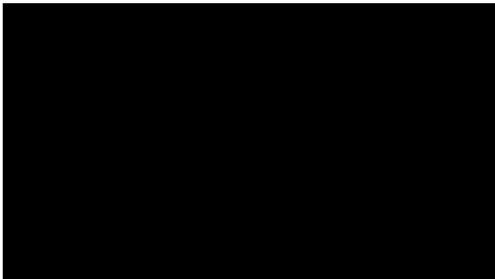


Microorganisms are Critical to Health

1. What is the Microbiome and Why it's Important
2. How the Microbiome is Important in Development
3. Can My Microbiome Help Me Fight The Bulge?
4. How Does Precision Medicine and Understanding My Microbiome Change How I receive Healthcare? And What Can I Do Now?

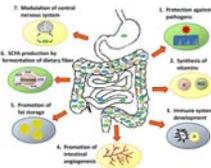


It All Comes Down to Poo.....



What is The Microbiome?

- The human microbiome is a population of more than 100 trillion microbes that colonize our body – mainly the gut, mouth and skin
- The Microbiome can play many roles:
 - Protects you from disease
 - Helps you eat!!
 - Affects your mood
 - Helps you fight off diseases

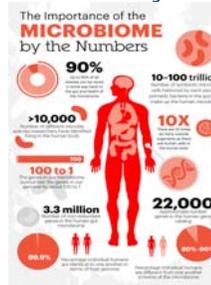


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Why is My Microbiome Important to My Health?

Known Diseases Associated with the Microbiome

- Inflammatory Bowel Disease (IBD)
 - Patients with IBD have less microbial diversity versus healthy patients
 - Your environment combined with your microbiome determine your risk
- Eczema/Asthma/Allergies
 - The lack of early-life exposure to microbes in developed countries alters the microbiota composition of the infant gut, which disrupts immune development causing allergic disease
- Many Others



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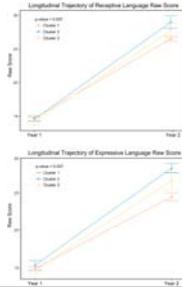
How the Microbiome is Important in Development



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Microbiome Can Affect Emotions and Cognitive Development

- Study from UNC recently showed an abundance of *Bacteroides* was associated with:
 - Better motor skills
 - Perceptual abilities
 - Faster language development
- Study from UCLA recently showed correlation between two bacterial species and emotion.
 - Patients with more *Prevotella*
 - Higher emotional intelligence
 - Better Attention
 - Patients with more *Bacteroides*
 - Less anxiety
 - Less irritability



Microbiology and Allergies

- Several studies suggest that a lack of microbial colonization of the respiratory or GI tract, associated with:
 - Increased risk of allergies
 - Increased risk of viral respiratory infection



Is Precision Medicine Suggesting we Put Away the Purell Hand Sanitizer?

- Rate of asthma has dramatically increased over the last 60 years in westernized countries
- “Hygiene hypothesis”
 - Increase in asthma associated with reduction in microbial exposure or colonization
 - This begins as early as the first year of life

Is Having a Dog Precision Medicine?

- Exposure to household pets, especially to dogs, in early life is associated with lower rates of allergies
- Studies have found more diverse bacterial communities in dust from residences with dogs compared to residences with no pets
 - But, while dogs are helpful for newborns, they can be harmful to your microbiome later in life!
 - Also the presence of cockroaches, cats, and mice may also be beneficial in preventing allergic diseases in young children



Can My Microbiome Help Me Fight The Bulge?



Can Understanding My Microbiome be My Easy Button for Weight Control?



The Chicken or the Egg? Which Comes First?

- Mounting evidence suggests that the gut microbiome responds to diet, antibiotics, and other stimuli
- Establish causality in obesity has been difficult
 - Strong link between gut microbiota and obesity

Manolagas et al. (2017). Cell Host and Microbe, 22(15):586-599

ADVANCING A HEALTHIER WISCONSIN ENDOWMENT

How Does Precision Medicine and Understanding My Microbiome Change How I receive Healthcare? And What Can I Do Now?

CONVERSATIONS WITH SCIENTISTS

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Do I Need to Have my Microbiome Analyzed?

- Maybe
 - We're still learning how to use the microbiome to improve health
 - Changes in microbiome that affect your health happen over longer periods of time – A Glacial development for microbes
 - Who tests your microbiome can significantly impact the results

CONVERSATIONS WITH SCIENTISTS

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Transitioning from "Sick Care" to "Healthcare"

- Changes as we progress:
 - Using Informatics to identify at-risk results/behaviors that may be overlooked
 - Routine evaluation of you Gut Microbiome, Oral Microbiome, Respiratory Microbiome may be as common as getting your annual physical
 - Understanding how your microbiome may put you at risk for infections will direct admissions and may prevent being in isolation



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Transitioning from "Sick Care" to "Healthcare"

- Treatment of diseases like allergies or obesity may be as simple as taking an "Microbe Pill"
 - But, please don't wait, exercise and diet are still very important in overall health!
- Don't be afraid to get dirty!



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