NewLife Medicine

Finding the root cause of the problem

Ilona Samara, M.D.

- Family Medicine Board Certified
- Graduated from OU School of Medicine in 2004
- Completed Family Residency at OU Health Sciences in 2008
- Worked as a PCP for Saints Medical Group until 2017
- Started a private practice in Yukon, Oklahoma in 2017
- Happily practicing medicine… and helping people heal

Our Microbiome

What is it?

What does it do?

OBJECTIVES

1. Define GI microbial ecosystem and its development
2. Discuss functions of GI microbiome
3. Discuss ways to promote a “healthy GI microbiome”
4. Define probiotics and how to use them

GI Microbiome Affects Our Health

Gastrointesitnal	Non GI:
• Gallstones, IBD, IBS, *C.difficile* infection, colorectal cancer (fusobacterium), hepatic encephalopathy, fatty liver, gastric cancer	• Mood disorders, Dementia, Multiple Sclerosis, Eczema, Asthma, Allergies, Autoimmune disorders, Fibromyalgia, Obesity, Hyperlipidemia, Diabetes, Metabolic Syndrome, Autism, Chronic Fatigue, Oxalic kidney Stones…

OUR MICROBIOME

- Every bodily surface hosts a myriad of microorganisms:
  - Skin = 10^12
    (one trillion) resident bacteria
  - Mouth = 10^10
    (ten billion) resident bacteria
  - Gut = 10^14 (100 trillion); total weight approximately
    2-5 lbs. and most are anaerobes

We are a petri dish

- Humans vs. Bacteria
    - •Human somatic & germ cells - approximate average = 10^13(10 trillion)
    - •Total microbiota> 10^15 (100 trillion) -outnumbering human cells by 10:1
    - •Human genes ~20,000
    - •Common microbial genes: 3.3 million –outnumbering human genes >150:1

GI Ecosystem Definitions

Microbiome, microbiota, microflora: all interchangeable terms referring to the total microbial organisms in the gut

Metagenome: all the genetic material that is non human

Commensal bacteria: non pathogenic usual resident of the gut (as supplied by the environment and diet)

Pathobiont: commensal organism that has a potential to become pathogenic (ex. *C. difficile*)

- Guilliams, Thomas G. PhD, *Functional Strategies for the Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals, 2016: 86*

Definitions Continued

Probiotic: intentionally consumed microorganism for the benefit of a host (those found in foods are not considered probiotics)

Prebiotics: a substrate or “food” for the commensal bacteria

Synbiotics: a product with both prebiotic and probiotic

Bacteriophage: a virus that infects bacteria

Biofilm: an extracellular matrix that contains a community of microbes attached to the gut mucosa

- Guilliams, Thomas G. PhD, *Functional Strategies for the Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals, 2016: 86*

Definitions Continued

- DYSBIOSIS:
  - It is not the classical gut infection, per se, but the host's pathogenic response to non pathogenic microbes resulting in an inflammatory reaction affecting the host

HOW IT ALL BEGINS

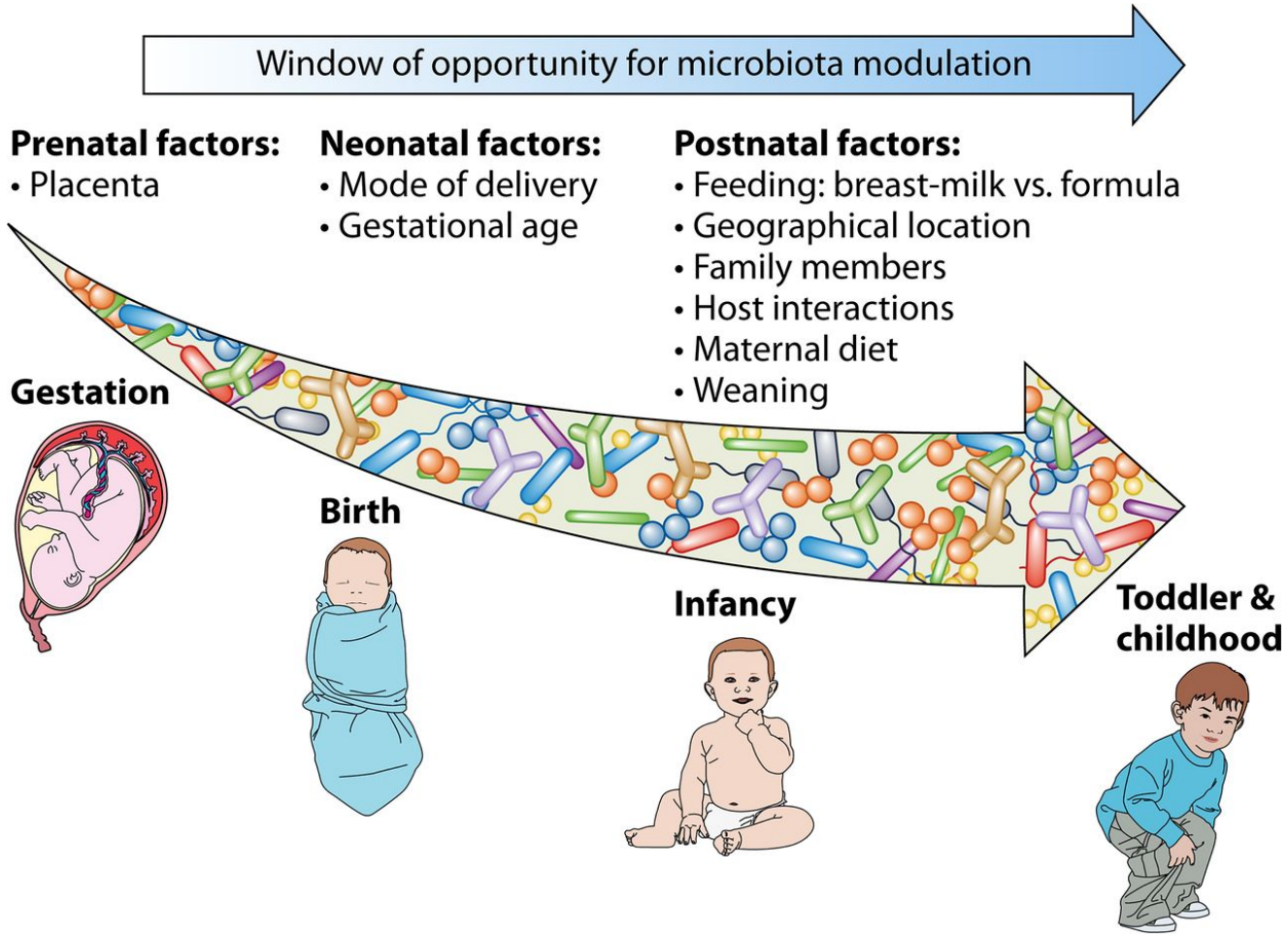
Colonization begins in the womb and develops until age 3

Important Factors

Prenatal

Neonatal

Postnatal



Colonization Pattern At A Glance

Reinhardt C., et al. JPGN 2009; 48:249-256

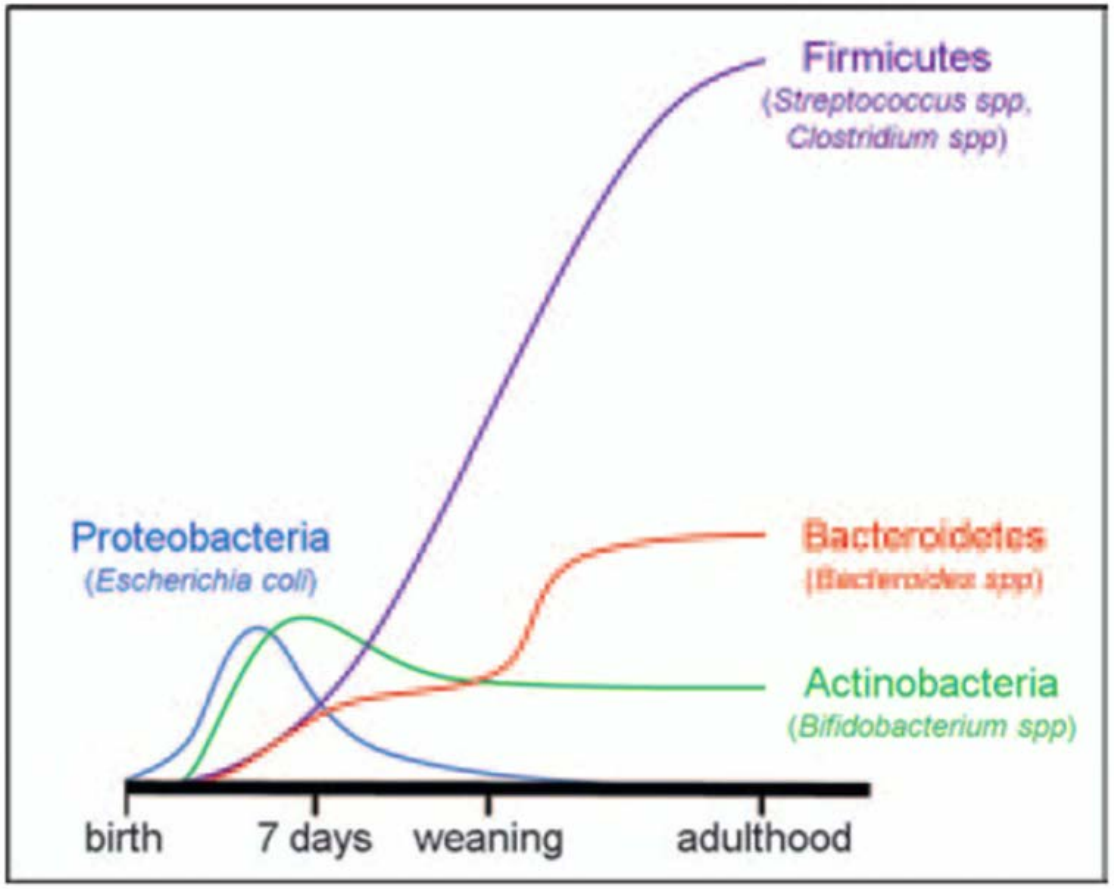


FIG. 2. Colonization pattern of the developing human gut. The initial microbiota after birth is dominated by facultative anaerobes. After weaning, the microbiota develops into a stable community dominated by bacteria belonging to the Firmicutes, Bacteroidetes, and Actinobacteria divisions (65,68).

Developing Microbiome

- Different outside factors affect the development and establishment of microbiota in human tract.
- This has great impact on host's immunity in the first year of life, developing metabolic, inflammatory diseases and allergies.

Allergology International 66 (2017) 515–522

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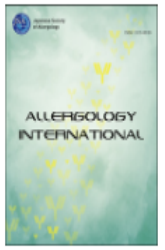

Invited review article

Development of the gut microbiota in infancy and its impact on health in later life

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GI, gastrointestinal; IBD, inflammatory bowel disease; SCFA, short chain fatty acids;

ABSTRACT

Gut microbial ecology and function are dynamic in infancy, but are stabilized in childhood. The 'new friends' have a great impact on the development of the digestive tract and host immune system. In the first year of life, especially, the gut microbiota dramatically changes through interactions with the developing immune system in the gut. The process of establishing the gut microbiota is affected by various environmental factors, with the potential to be a main determinant of life-long health. In this review, we summarize recent findings regarding gut microbiota establishment, including the importance of various factors related to the development of the immune system and allergic diseases later in life.

Colonization Begins in the Womb

Allergology International 66 (2017) 515-522

placentas,[34] and meconium.[35–37] Gosalbes *et al.*[37] showed that meconium microbiotas could be classified into two types: the first is less diverse and dominated by bacteria in the family Enterobacteriaceae, and the other is more diverse and dominated by bacteria

functions of the gut microbiota also change greatly before and after the introduction of weaning foods. The functional repertoire of an infant's microbiota changes during the first year of life, as the early microbiota before weaning is enriched in bacteria with genes that

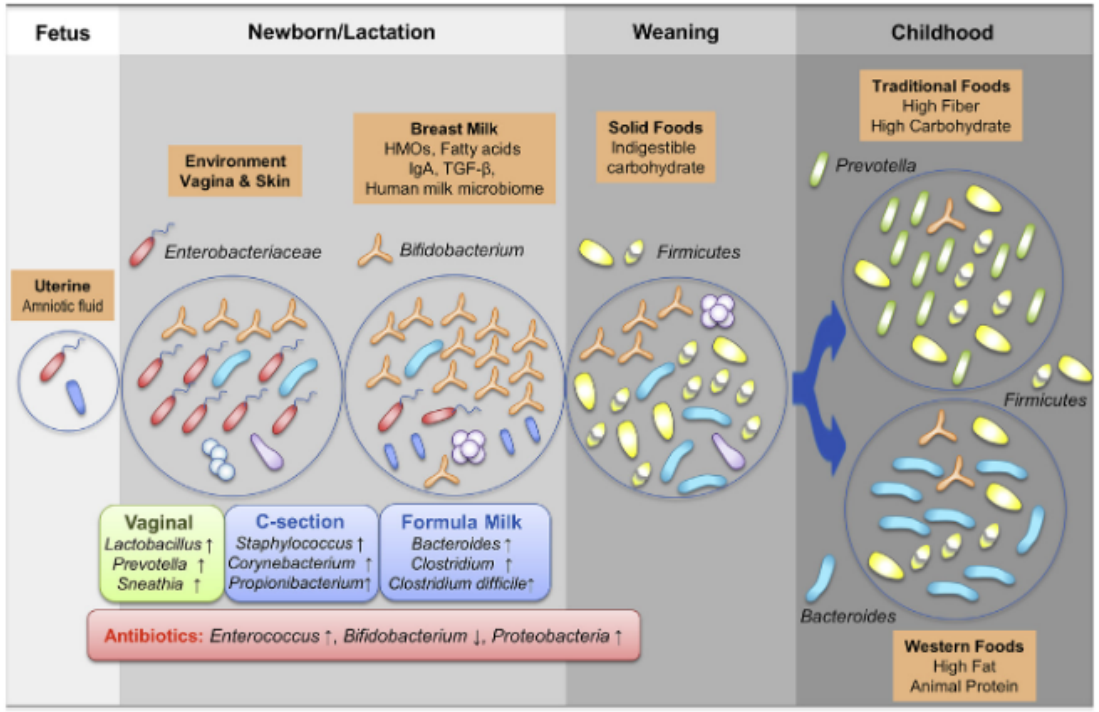


Fig. 1. Fetal-to-childhood gut microbiota colonization and important factors affecting this process. Establishment of the gut microbiota may begin *in utero* and be affected by dynamic shifts in early life. Diversity of the gut microbiota increases with age until it becomes a stable adult microbiota. This process of establishing the gut microbiota is affected by various factors such as delivery mode, methods of milk feeding, the introduction of solid foods, and foods consumed daily in childhood.

Colonization of the Fetus

GI tract traditionally was considered sterile until colonized by microorganisms residing in the environment at birth.

Presence of microorganisms in amniotic fluid, fetal membranes, umbilical cords, placentas, and meconium documented in different studies.

Allergology International 66 (2017) 515-522

Colonization of the Fetus

Gosalbes et al. showed meconium microbiota could be classified into two types:

- Less diverse and dominated by bacteria in the family Enterobacteriaceae
- More diverse and dominated by bacteria in the phylum Firmicutes, especially lactic acid bacteria.

These are different from the microbiota of vagina, feces, or skin of pregnant women

Resemble the microbiota of amniotic fluid

A fetus's GI tract appeared to be colonized by bacteria through amniotic fluid that was swallowed

Allergology International 66 (2017) 515-522

Gosalbes MJ, Llop S, Valles Y, Moya A, Ballester F, Francino MP. Meconium

Colonization of the Fetus

Experimental work with mice has shown transfer of bacteria from a mother's gut to that of her fetus.

- Pregnant mice orally inoculated with a genetically labeled Enterococcus faecium strain isolated from breast milk of a healthy woman.
- The strain was detected in the amniotic fluid of the inoculated animals.

Oral bacteria can reach the uterus via blood stream, specifically if periodontal disease present.

Aagaard et al. and others, demonstrated genetic and taxonomic composition of the placental microbiota resembles microbiota in the oral cavity.

Allergology International 66 (2017) 515-522

Aagaard K, Ma J, Antony KM, Ganu R, Petrosino J, Versalovic J. The placenta harbors a unique microbiome. Sci Trans Med2014;6:237ra65.

Factors Affecting Colonization After Birth

At Birth

- Preterm vs Full Term
- Mode of delivery
- Maternal Weight
- Hospital Environment
- Contact with mother, staff
- Antibiotic use
- Feeding choice

Up to 2 years of age

- Breastfeeding vs Formula
- Use of prebiotics/probiotics
- Antibiotics
- Timing of weaning
- Foods chosen
- Siblings

Gut Microbes. 2012 May 1; 3(3): 203-220.

Gut Microbes

ISSN: 1949-0976 (Print) 1949-0984 (Online) Journal homepage: https://www.tandfonline.com/loi/kgmi20

Composition of the early intestinal microbiota

Fiona Fouhy, R. Paul Ross, Gerald F. Fitzgerald, Catherine Stanton & Paul D. Cotter

To cite this article: Fiona Fouhy, R. Paul Ross, Gerald F. Fitzgerald, Catherine Stanton & Paul D. Cotter (2012) Composition of the early intestinal microbiota, Gut Microbes, 3:3, 203-220, DOI: 10.4161/gmic.20169

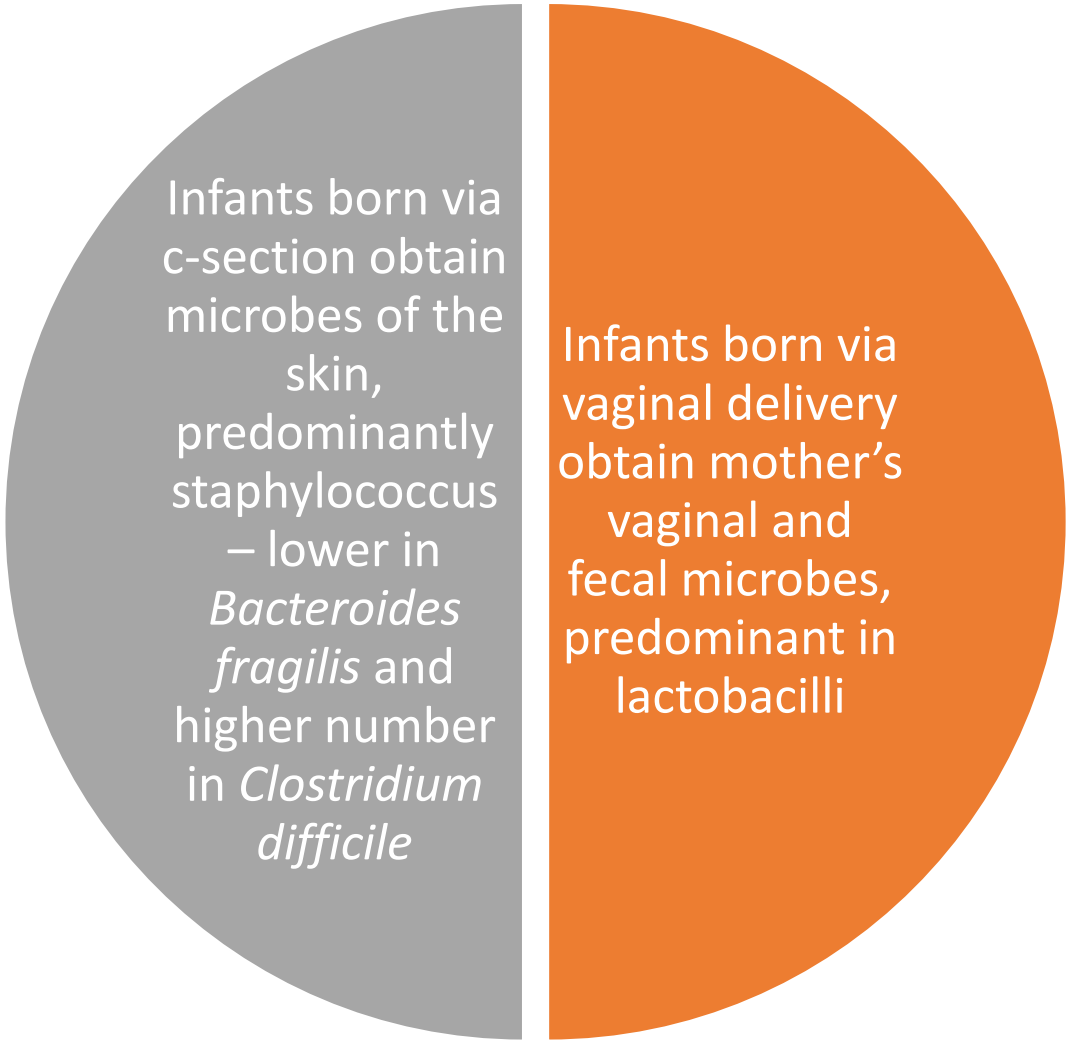
To link to this article: https://doi.org/10.4161/gmic.20169

ferent technologies compare with those generated using older approaches.

Shaping the Early Intestinal Microbiota: Effect of Mode of Delivery

Infants undergo rapid colonization during delivery and in the first few hours following birth. Initially the infant is colonized by aerobes, followed by facultative anaerobes and, as the oxygen level is diminished, strict anaerobes predominate.[54-56] Some of the earliest colonizers include *E. coli* and enterococci, and, once the oxygen has been consumed, they are followed by strict anaerobes including bifidobacteria, Bacteroides and Clostridium spp.[1,57] However, while these general patterns of colonization occur, colonization of the infant's gut is altered by birth mode. Infants born vaginally are colonized with vaginal and fecal microbes from their mother, and this has been shown to result in a strong maternal signature, which contrasts with the microbiota of caesarean born infants.[1] It is generally accepted that infants born by caesarean section have no access to the mother's microbiota, although there have been suggestions that the swallowing of amniotic fluid allows some colonization of the infant's gut in utero.[58] Caesarean delivered infants are instead colonized by microbes from the environment, such as those from healthcare staff, wards and other infants. A recent study of 9 women and their 10 infants (i.e., including one set of twins) was completed using high-throughput sequencing (Roche/454) of the variable 2 (V2) region of the bacterial 16S rRNA gene.[59] The authors sequenced 34 samples from the mother and 46 from their infants, resulting in 157,915 partial 16S sequences. The study found that there was a strong vertical transmission of vaginal microbes from the mother to the infant when birth was by vaginal delivery, resulting in a dominant number of lactobacilli within hours of birth. In contrast, in the gut of caesarean delivered infants there was a strong presence of maternal skin microbes, with staphylococci being dominant in these infants.[59] This study advances our understanding of the relationship between the mother's microbiota and that of her infant and highlights the benefits of employing high-throughput sequencing for such purposes.

Vaginal vs C-section: it does matter…

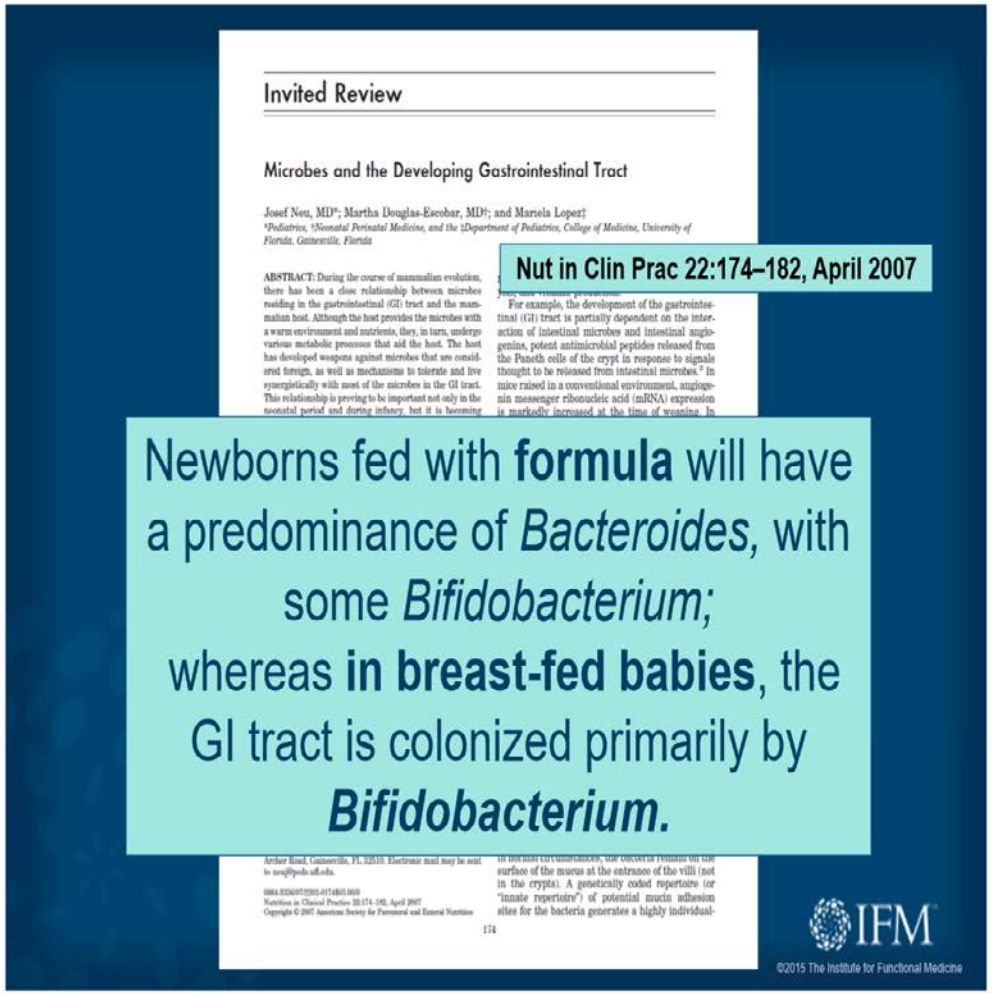


Differences in microbiome due to feeding mode

Breast feeding

vs

Formula feeding



IFM GI Conference October 2015, Dallas, TX

So I digress...

- Here's an important question:

  Where does the GI tract begin?

And the Answer is….

If you said “the mouth” you are correct!

Oral inflammation/infection fuels the inflammatory response exacerbating other systemic diseases

Oral health is often overlooked by physicians – ‘cause we don’t deal with that…

Inflammation in oral cavity, aka periodontal disease and/or failing root canals = impact on entire body via systemic circulation, peripheral nerve pathways, lower GI tract

Ozment D.D.S., D., The Forgotten Orifice: Investigating The Systemic Impact Of Oral Inflammation. *Clinical Intensives in Metabolic and Nutritional Medicine.* Spring 2017

Periodontal disease (gum disease) may affect general health

Dementia/Alzheimers[21-27]

- The infection and inflammation of periodontal disease may be associated with cognitive decline and dementia.

Respiratory Infections[2-5]

- Inhaling bacteria from the mouth and throat can lead to pneumonia.
- Dental plaque buildup creates a dangerous source of bacteria that can be inhaled into the lungs.

Severe Osteopenia[11]

- Reduction in bone mass (osteopenia) is associated with gum disease and related tooth loss.
- Severity has been connected to tooth loss in post-menopausal women.

Pregnancy Complications[17-18]

- 50-70% of women will develop gingivitis some time during their pregnancy - a condition called pregnancy gingivitis.[17]
- The increase of estrogen and progesterone levels during this time causes the gums to react differently to the bacteria in plaque. This reaction causes swelling, bleeding, redness or tenderness in the gum tissue.[18]

Stroke[1]

- Those with adult periodontitis may have increased risk of stroke.

Oral Cancer[19-21]

- Chronic periodontitis may lead to the loss of bone and increased risk for oral cancer.

Heart Disease[6-10]

- Those with adult periodontitis may have increased risk of a fatal heart attack.[1,6,7]
- Periodontitis also increases chances of being diagnosed with cardiovascular disease.[1]
- Bacteria from the mouth may cause clotting problems in the cardiovascular system.[8]

Uncontrolled Diabetes[12-16]

- Chronic periodontal disease can disrupt diabetic control.[12-15]
- Diabetes can alter the pocket environment, contributing to bacterial growth.[14]
- Smokers with diabetes increase their risk of tooth loss by 20 times.[13]
- People with type II diabetes are three times as likely to develop periodontal disease than are nondiabetics.[13]

References:
1-28 on file at www.zila.com/STMreferences.pdf

So What?

- Medical literature supports that chronic inflammation in the mouth has been involved in diseases such as:
  - Alzheimer's Dementia – increased levels TNF-a, IL-6, Il-1B, CRP
  - Diabetes
  - Heart, Valvular, and Vascular Disease
  - Obesity
  - RA
  - Pregnancy Complications – miscarriages, preterm births,
  - Respiratory Disorders – pneumonia, COPD
  - Cancer – colorectal, tongue, pancreatic, recurring breast ca

Ozment D.D.S., D., The Forgotten Orifice: Investigating The Systemic Impact Of Oral Inflammation. *Clinical Intensives in Metabolic and Nutritional Medicine.* Spring 2017

ALWAYS LOOK in the patient's mouth and note what kind of oral health is evident

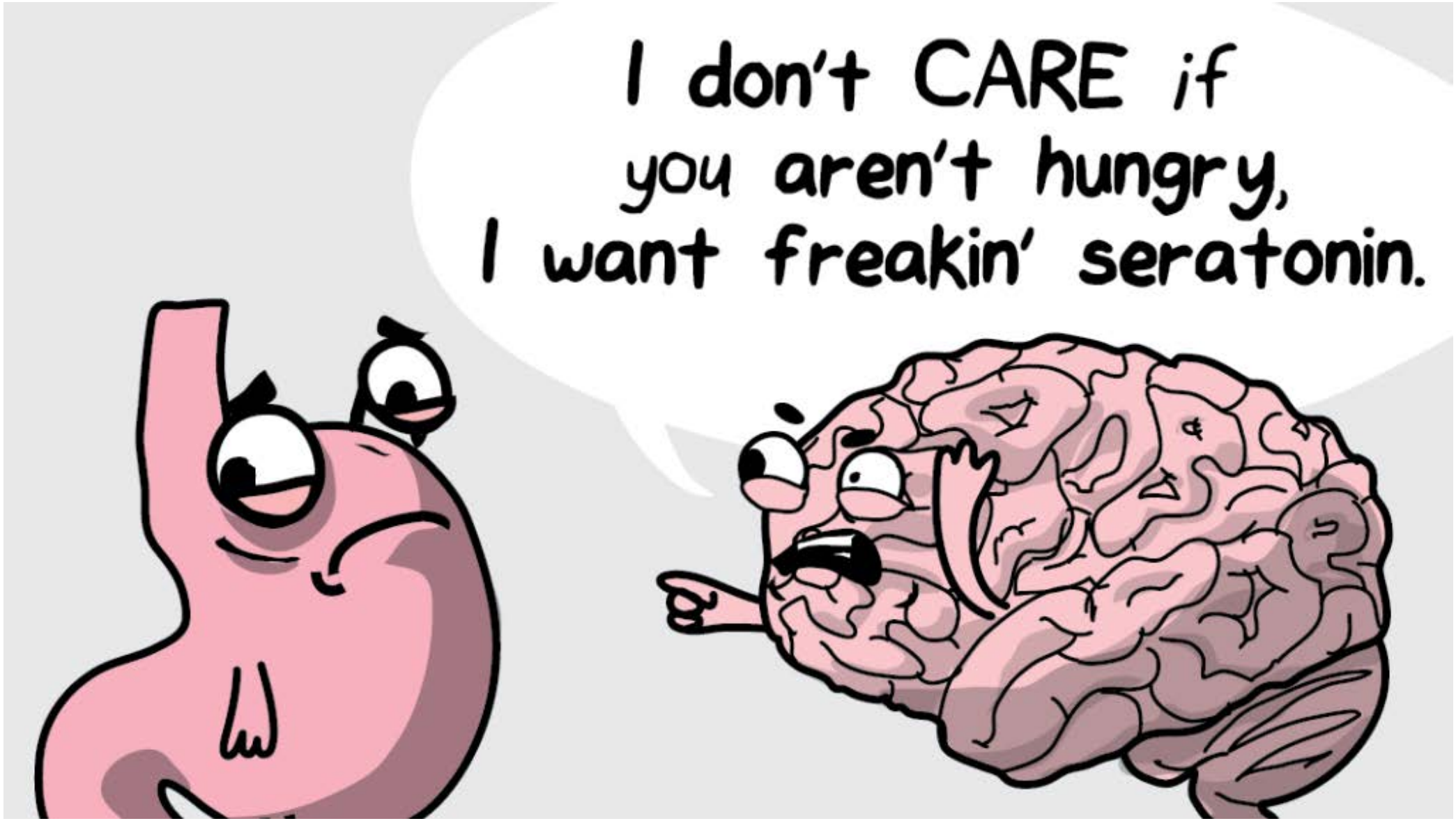
Advise patients to see a dentist who recognizes that periodontal health is important

WE ALL WIN

Functions of GI System

Functions of GUT Microbiome

Metabolic Processes	Fermentation Vitamin, neurotransmitter, AA synthesis Energy production
Trophic Stimulation	Epithelial cell differentiation Immunomodulation
Protection	Compete for nutrients, space, adherence Produce bacteriocidins



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Metabolic Processes

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016: Figure 16

Fermentation

Break down non digestible starches and mucus derived from epithelial cells

Synthesis of

vitamin K &D, biotin, folate, niacin, riboflavin, pantothenic acid, thiamin, short chain fatty acids, amino acids, serotonin, melatonin, dopamine, epi, NE

Metabolize dietary carcinogens

Detoxification and biotransformation of hormones, toxins, medications, bile acids, phytonutrients

Microbiome has a metabolic capacity that can serve the host

- The genetic material of the bacteria are 100 x than human with metabolic capacity of a human liver.

MENU

nature REVIEWS IMMUNOLOGY

Review Article | Published: 01 May 2009

The gut microbiota shapes intestinal immune responses during health and disease

June L. Round & Sarkis K. Mazmanian

Nature Reviews Immunology **9**, 313–323 (2009) | Download Citation

An Erratum to this article was published on 17 July 2009

Abstract

Immunological dysregulation is the cause of many non-infectious human diseases such as autoimmunity, allergy and cancer. The gastrointestinal tract is the primary site of interaction between the host immune system and microorganisms, both symbiotic and pathogenic. In this Review we discuss findings indicating that developmental aspects of the adaptive immune system are influenced by bacterial colonization

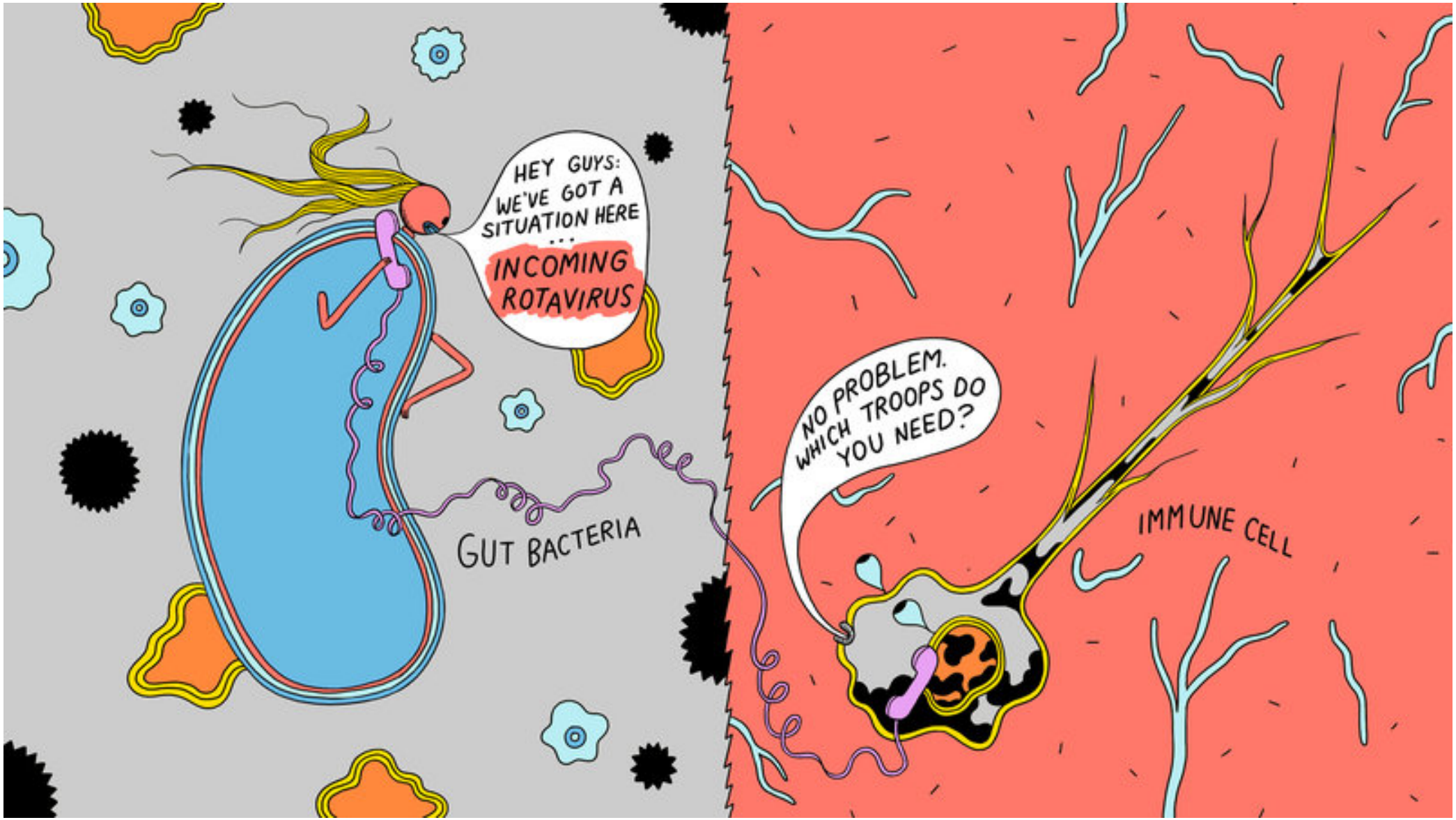
Trophic Stimulation

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016: Figure 16

Epithelial cell differentiation and proliferation by SCFA's to protect against neoplasia: butyrate the main SCFA

Apical cell tightening of tight junctions

Immune system development and maintenance: oral tolerance development



Google Images

Protection from Pathogens

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals.

Competition for

- Niche
- Nutrients
- Receptors

Displacement of Pathogens and not allowing them to thrive

Productions of bactericidins, lactic acids that can kill pathogens

Regulation by Microbiome

Inhibit Pathogenic Bacteria	Improve Epithelial Function	↑ Immunoregulation
↓ Luminal pH	↑ SCFA (butyrate)	↑ IL-10, TGFβ
Bacteriocidal proteins	↑ Healing	↓ TNF, IL-12
Colonization resistance	↑ Mucus	↓ T cell proliferation
↓ Epithelial binding	↓ Apoptosis	↑ Apoptosis TH1 cells
↓ Epithelial invasion	↑ Barrier integrity	↑ sIgA
↑ β defensins	↑ HSP 25, 72	↓ NFκB

Institute for Functional Medicine GI Module October 2015

Microbiome influences our immune system

- Composition of microbiome can shape a healthy immune system or cause disease in host

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Microbiome influences our immune system

- There are some bacteria that shape a healthy immune system.
- Lacking these bacteria leads to disease?

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Microbiome influences our immune system

- It has been proposed the total information encoded by the mammalian genome is not enough to carry out all functions required for health and products of microbiome are CRUCIAL for protection from various disease

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Microbiome influences our immune system

It is possible that changes in development or composition of the microbiome disturb the partnership between microbiota and human immune system, leading to altered immune responses that may underlie various human inflammatory disorders

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Ways to promote healthy gut microbiome through DIET

GGoogle Images

Cartoon Stock: shrn 2927

Ways to promote healthy gut microbiome through DIET

- Mediterranean diet better than Western SAD Diet (Standard American Diet)
- Eating wide variety of plants or daily “rainbow” of veggies/fruits, preferably organic
- Eating seasonal and local foods
- Eating fresh, non processed foods
- Eating fiber and complex carbs (no simple carbs)
- Fermented foods like pickled veggies (cabbage, cucumbers, etc.); kimchi; miso, yogurt, kefir
- Avoid foods, meat treated with abx
- Avoid artificial sweeteners (affect microbiome with a shift to cause metabolic d/o)

COMPLEX CARBS and FIBER

Leads to more diverse bacteria

Dietary fiber: men 38 g/day, women 25 g/day

Breakdown of carbs to short chain fatty acids butyrate, propionate, and acetate change pH

Pathogenic bacteria not likely to thrive	Butyrate is the main SCFA used by colonocytes/enterocytes for energy

PROTEINS

Needed by bacteria for a nitrogen source

Can result in undigested or putrefactive SCFAs or excessive fermentation of amino acids → IBD, Colorectal ca?

FATS

Increased omega 6 intake associated with increased bacteria derived LPS (lipopolysaccharides) → increased inflammatory response

Different response with omega 3s → cause decreased inflammation

PREBIOTICS

Resistant starches present in veggies, fruits, legumes

Food for microbiome that is needed to thrive and survive

Effects of Antibiotics

Resist the Resistance kid!

Google Images

It was on a short-cut through the hospital kitchens that Albert was first approached by a member of the Antibiotic Resistance.

40% of all adults and 70% of all children in the U.S take one or more courses of antibiotics each year.

Morgun, A. (2015) *Gut.* Doi:10.1136/gutjnl-2014-308820

Effects of Antibiotics

Produce

- Produce Superbugs and resistant strains

Alter

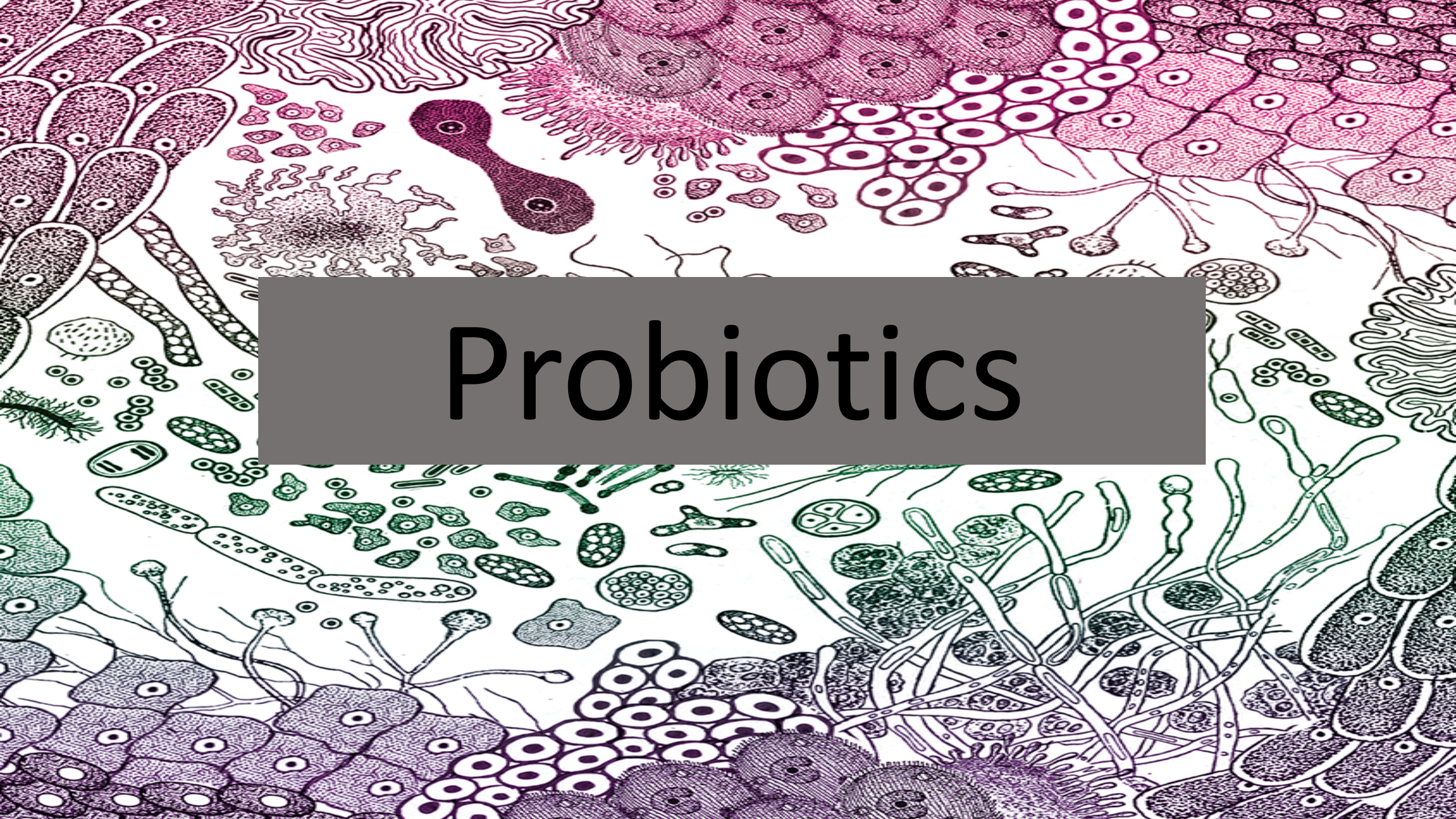
- Alter the gut microbiome diversity
  - Core species are mostly resilient, but
  - It may take up to a year (or in some cases never) to regain the same diversity as prior to antibiotic treatment

Alter

- Alter the microbiome's metabolic activity
  - Perhaps triggers or perpetuators of obesity, inflammatory diseases, autoimmune disease

When tempted to write that Z-pack… remember Batman

Pinterest.com


Probiotics

What Are Probiotics?

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:127-128

Deliberately consumed microbes for health benefit

Sold as food or supplements

Differ from commensal organisms

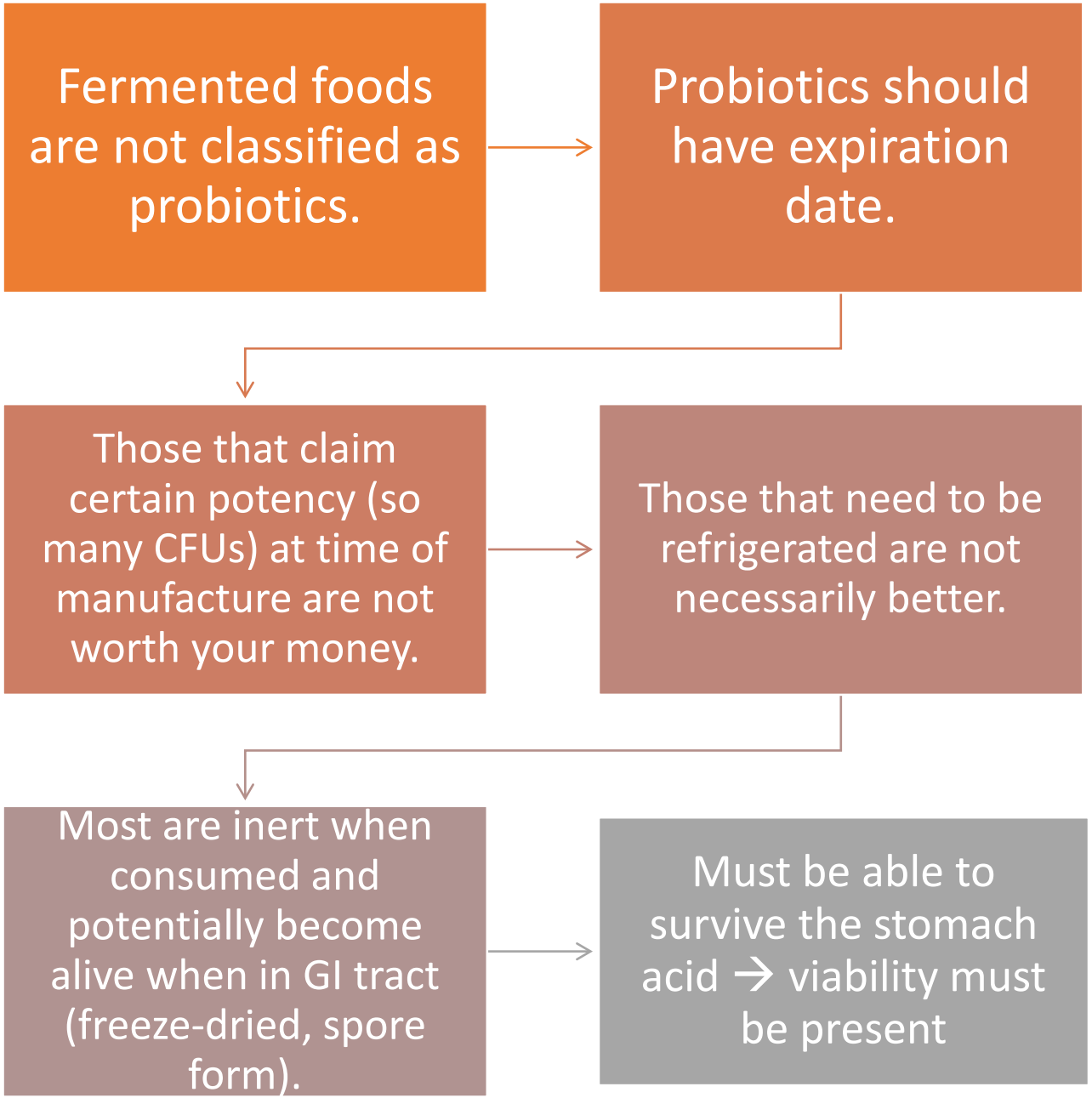
- Transient (most stay 1-2 weeks in gut)
- Do not “re-colonize”
- Affect the GI environment to allow indigenous bacteria to thrive

Most studies done on Lactobacillus and Bifidobacterium (most gut microbes difficult to culture).

Must prove safe and transit viable in human clinical trials

- Children: most available strains safe to use ages zero to eighteen

Which ones to choose?



Which Strain to Choose? How Much?

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:129

Go for the multi strain

- Choose at least 5 strains with 2 Bifidobacteria, 2 Lactobacillus, Streptococci, and Saccharomyces for diversity that we naturally acquire through foods.

There is no good data on rotating strains every few months.

Changes in commensal bacteria after taking probiotics is difficult to see BUT changes in clinical symptoms may be evident.

No good recommendations on specific maintenance doses but usually 20-40 billion CFUs in Adults and 1-5 billion CFUs in Children.

High Dose Probiotics

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:131-133

High doses of 200 billion CFUs to several trillion CFUs in specific disease states such as C.Diff associated diarrhea, IBS, IBD.

Safety and tolerability of high dose probiotics proven in hundreds of clinical trials.

Rare cases of septicemia in immunocompromised, HIV, organ transplants with Lactobacillus.

Special Considerations

- Short Bowel Syndrome
  - D-lactate produced mostly by gut bacteria cannot be metabolized and can lead to D-lactic acidosis.
- Diabetes Type 2
  - D-lactate produced secondary to hyperglycemia
  - Higher D-lactate levels in both serum and urine as compared to non diabetics.

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016: 133

Probiotic use During Antibiotic Treatment

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:134

YES !!!!!!!

Prevent or decrease abx GI side effects → strain dependent

DO Not decrease abx efficacy!

Most probiotic strains are resistant to abx but AMOX, PCN G, Ampicillin are detrimental to probiotics except *S. Boulardii*

Make sure to choose probiotics with *S. Boulardii* when taking abx

General advice is to take probiotics and abx 2 hours away from each other

Infants And Children

Great area of interest and GROWING number of Research

Safe and well tolerated

PRECAUTIONS with certain groups at risk as potential for translocation from gut to blood stream due to intestinal permeability:

- Immune compromised, critically ill
- Low birth weight and very low birthweight
- Premies
- Structural heart anomalies
- Central venous catheter

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:135

Infants and Children

- Selected Use for specific Conditions
  - Acute Gastroenteritis recommendations by the European Society of Pediatric Gastroenterology and Hepatology: *L.rhamnosus GG 10 billion CFUs, S.boulardii 250-750 mg daily , L.reuteri DSM 17938* most studied and recommended to be taken for 5 -7 days. Recommend against use of E.faecium SF68 (possible recipient of vancomycin-resistant genes – this is the kid that joined the resistance group earlier).

- G Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:135-137

Infants and Children

- Selected Use for specific Conditions
  - Antibiotic Associated Diarrhea: reduced incidence with *Lactobacilli spp., Bifidobacterium spp., Streptococcus spp., or Saccharomyces boulardii* alone or in combo (Cochrane Review of 23 RCT and 3,938 children ages 2 weeks to 17 yrs. old).

G Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:135-137

Infants and Children

Selected Use for Specific Conditions

- *Clostridium difficile* Infection – use of probiotics decreases risk.
- *H. Pylori* infection: adding probiotics with triple abx therapy increased eradication rate and reduced side effects.
- Necrotizing Enterocolitis: Cochrane review of 24 RCTs → preterm neonates reduced risk in NEC and all-cause mortality but no difference in nosocomial sepsis. Doses and strains still a big question.
- Infantile Colic: studies done on *L.reuteri* with positive results →consider choosing probiotic with this strain
- Ulcerative Colitis and functional gastrointestinal disorders → limited evidence of efficacy but safe to use.

Guilliams Ph.D, Thomas G.Functional Strategies for The Management of Gastrointestinal Disorders: Principles and Protocols for Healthcare Professionals. Stevens Point: Point Institute, 2016:135-137

One Last Thing

WHAT'S YOUR NUMBER?

You may want to ask your patients!

Your #2 should be a 3 or a 4, at least once daily!!!

Stool Form Correlates to Intestinal Transit Time

THE BRISTOL STOOL FORM SCALE

SLOW TRANSIT

RAPID TRANSIT

Type 1		Separate hard lumps, like nuts
Type 2		Sausage-like but lumpy
Type 3		Like a sausage but with cracks in the surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces

We need to poop, not once every so often, but daily or even a few times daily!!!!

And we need to look at our poop when done

Another one last thing…

In the years to come the evaluation of the GI microbiome in the oral cavity as well as the GI tract will be a necessary part of our initial approach to human disease or wellness.

> “We just won’t know what to do without the poo.”

And this is just the tip of an iceberg!

Thank YOU!