

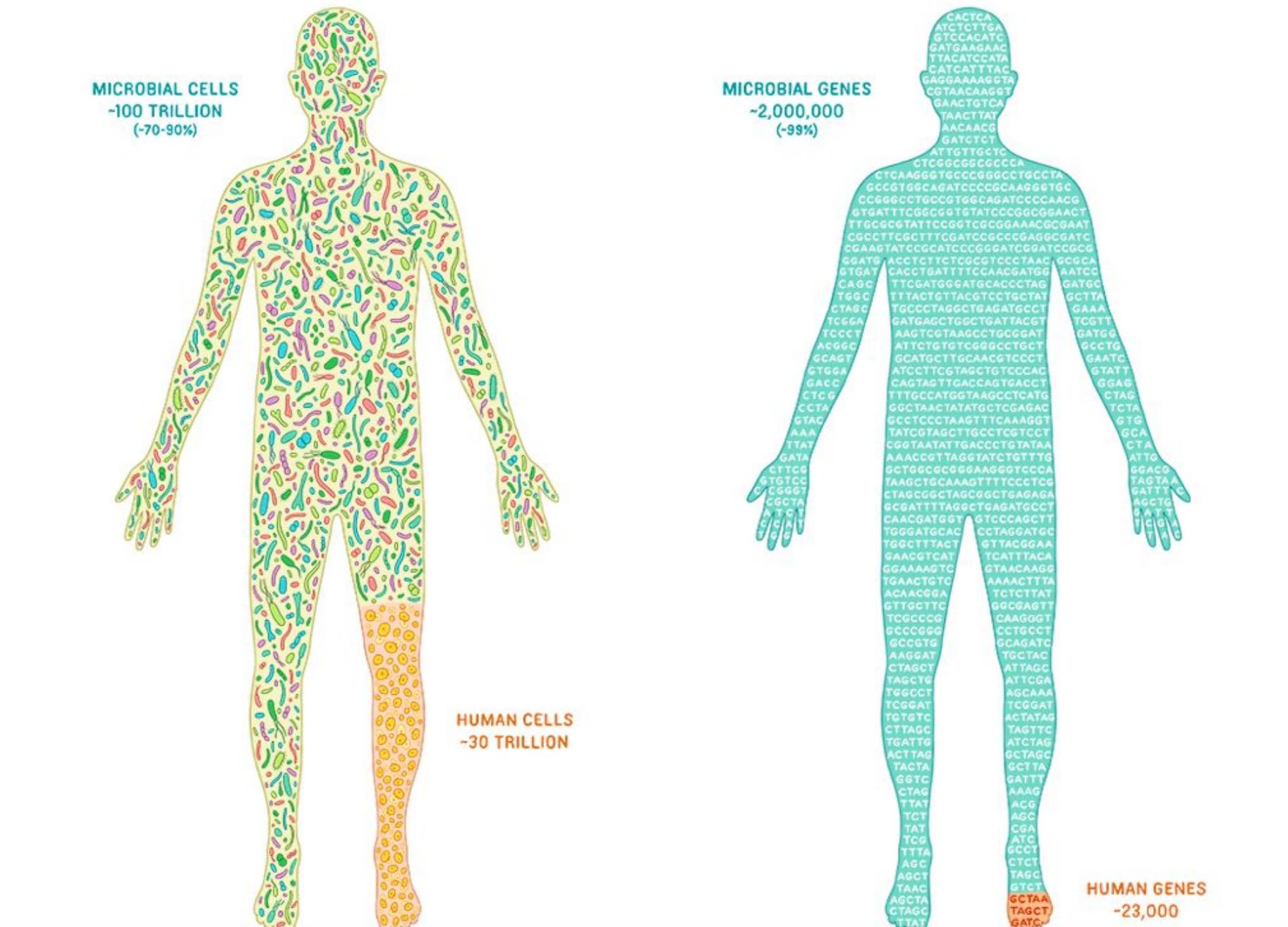
# The Mouth-Brain Axis

HOW ORAL DYSBIOSIS INFLUENCES BRAIN HEALTH

DR. JOCELYN STRAND



Biocidin  
Botanicals™



# THERE ARE MORE OF THEM THAN US!

The largest percentage of the human microbiota (95%) resides in the GI tract, and every human being has a unique microbiota composition which could potentially serve as a unique fingerprint.

Due to their small size, these organisms make up only about 1–3 percent of our body mass, but this misrepresents the microbiome's tremendous power and potential.

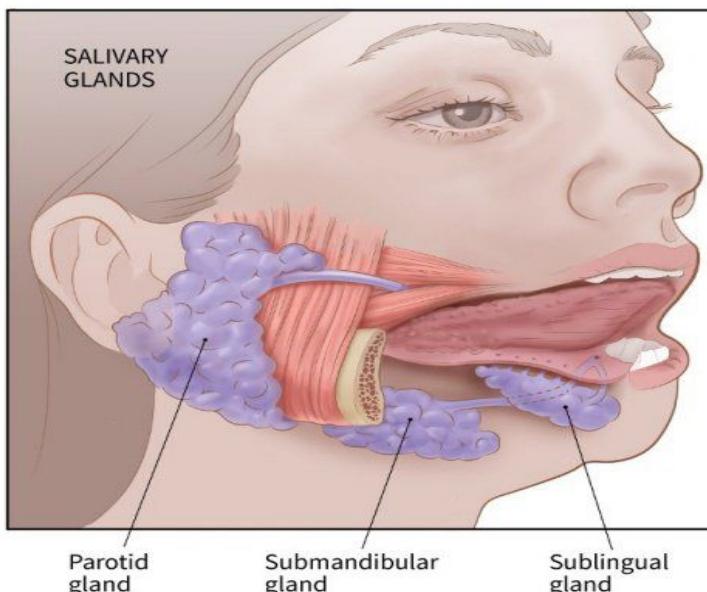


# 50-100 BILLION

Number of bacteria in the oral microbiome

# THE IMPACT OF ORAL HEALTH

- 700+ species of bacteria in the mouth, with a mean of 296
- 1 milliliter of saliva =  $10^8$  microorganisms
- We swallow one liter or more of saliva each day!



<https://www.drkarafitzgerald.com/tag/oral-microbiome/>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6057715/>  
<https://www.nature.com/articles/sj.bdj.2016.865>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5274568/>  
<https://pubmed.ncbi.nlm.nih.gov/9673163/>



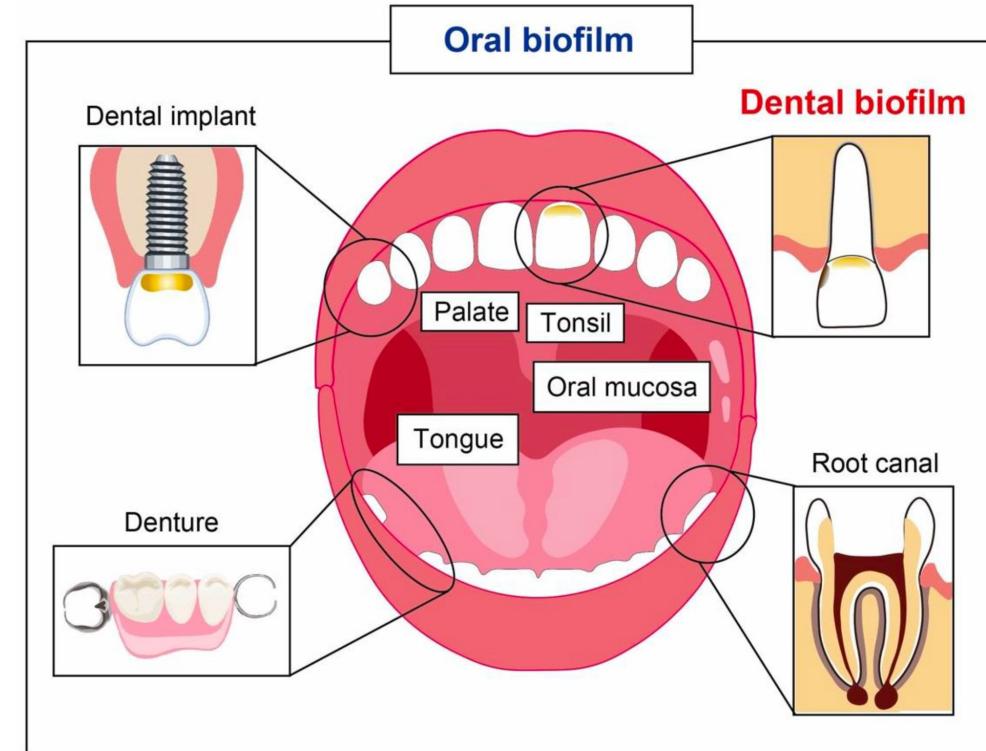
# WHAT IS ORAL DYSBIOSIS?



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# ORAL HEALTH AND DYSBIOSIS

- The distinct, non-shedding structure of teeth (smooth surfaces, pits and fissures, proximal sites, and exposed roots) enables large masses of microbes to accumulate as dental plaque biofilm.
- The plaque biofilm does not naturally shed as it accumulates, which is a key driver to dysbiosis in the absence of proper oral hygiene to disrupt and remove it.
- If not removed, certain bacteria are able to emerge, and an incipient dysbiosis develops.

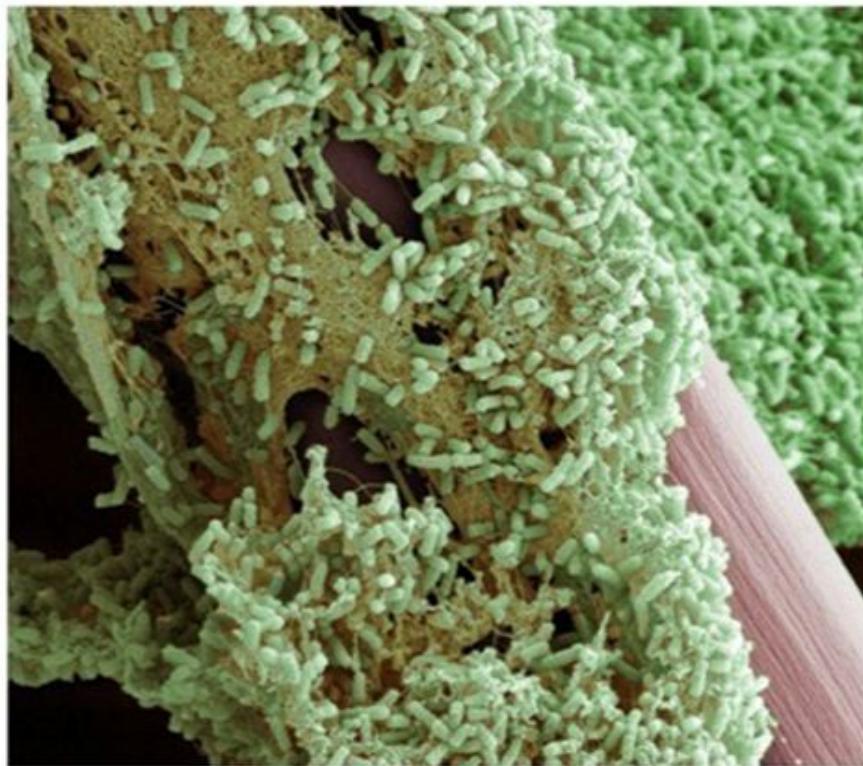


<https://www.mdpi.com/2079-6382/11/6/727/htm>

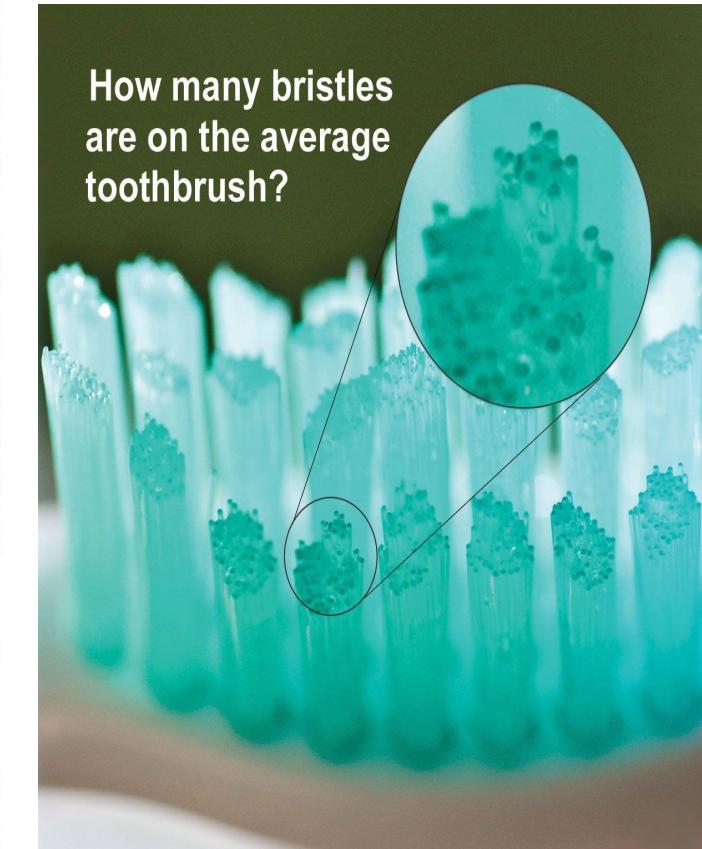
# ORAL BIOFILMS



Biofilm on a toothbrush bristle

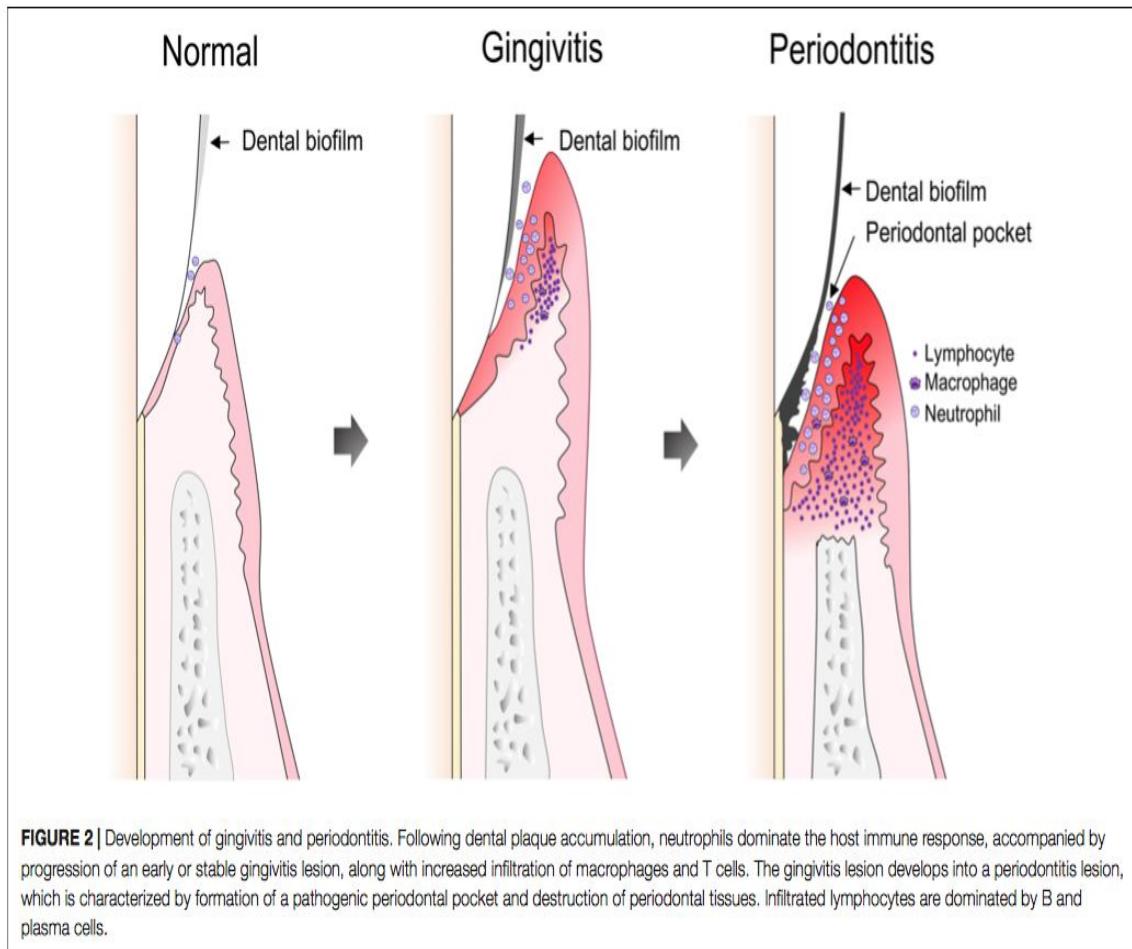


Biofilm on a toothbrush bristle (higher magnification)



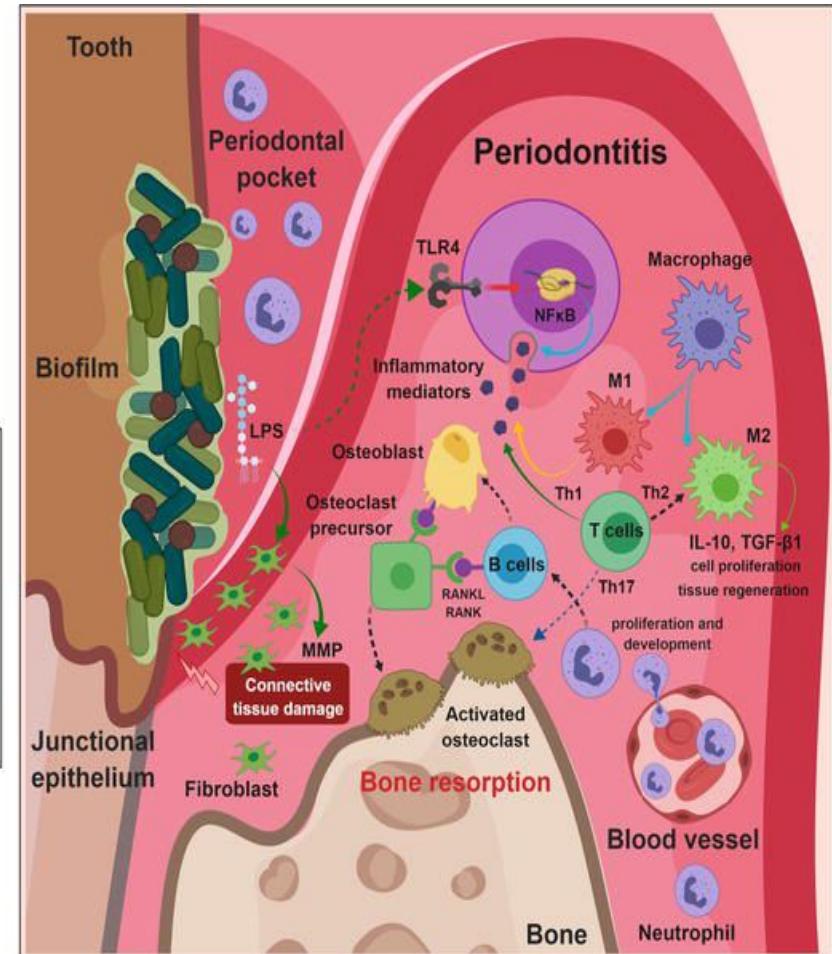
How many bristles  
are on the average  
toothbrush?

# DENTAL PLAQUE AS BIOFILM



**FIGURE 2** | Development of gingivitis and periodontitis. Following dental plaque accumulation, neutrophils dominate the host immune response, accompanied by progression of an early or stable gingivitis lesion, along with increased infiltration of macrophages and T cells. The gingivitis lesion develops into a periodontitis lesion, which is characterized by formation of a pathogenic periodontal pocket and destruction of periodontal tissues. Infiltrated lymphocytes are dominated by B and plasma cells.

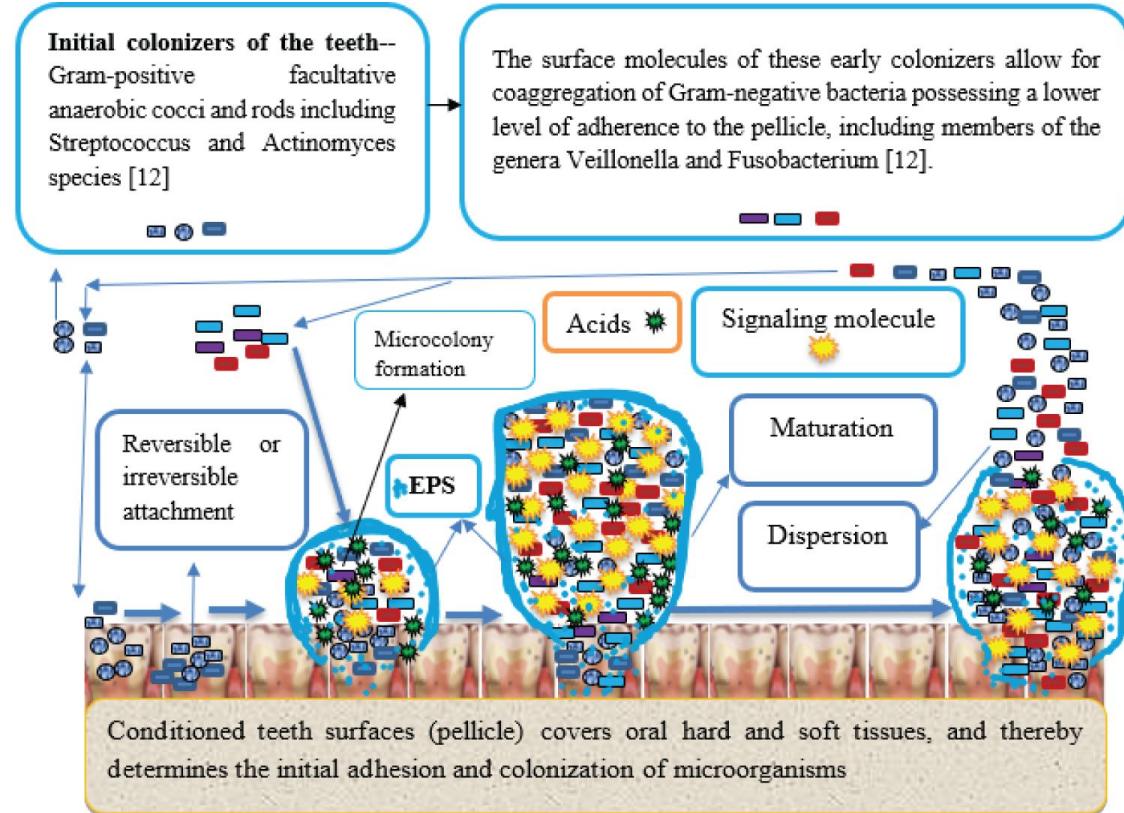
Kriebel K, Hieke C, Muller-Hilke B, Nakata M, Kreikemeyer. Oral Biofilms for Symbiotic to Pathogenic Interactions and Associated disease – Connection of Periodontitis and Rheumatic Arthritis by Peptidylarginine Deiminase. *Frontiers Microbio*. Jan 2018; Vol.9: article 53. with permission.



<https://www.intechopen.com/books/periodontal-disease-diagnostic-and-adjunctive-non-surgical-considerations/pathogenesis-of-periodontal-disease>

# WHAT ARE BIOFILMS?

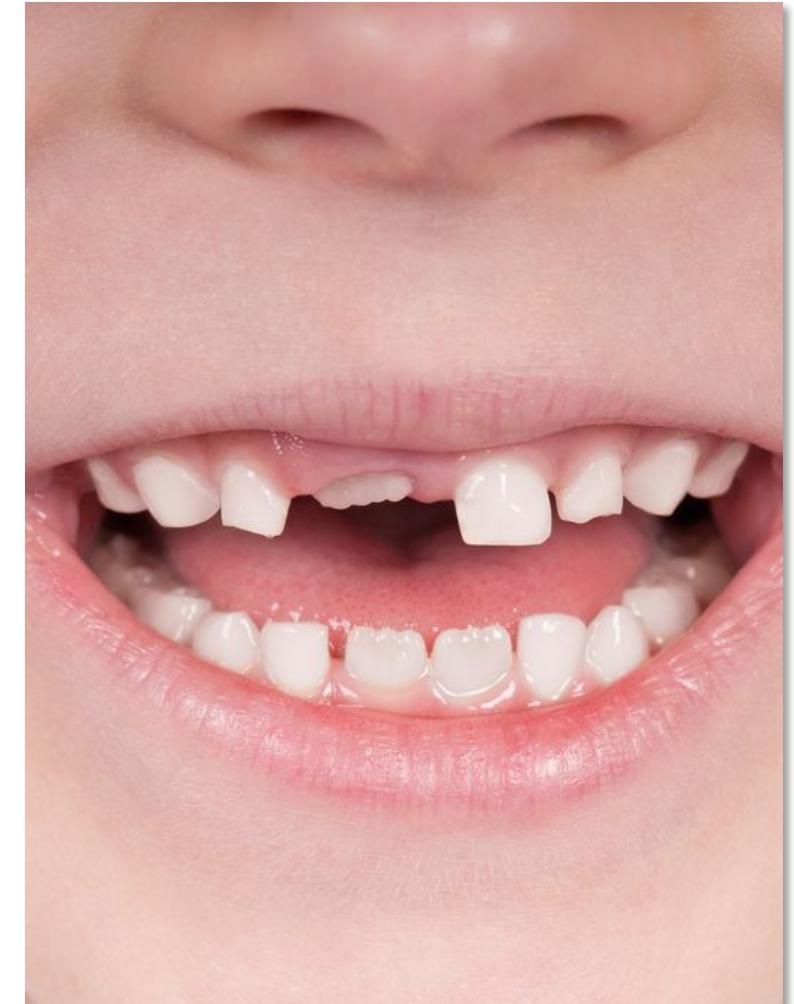
- Biofilms are communities of microbial cells composed of multiple organisms, including bacterial, viral, and fungal species and residing in an extracellular matrix.
- 80%+ of all microbial infections develop biofilms beginning in as little as two weeks from the onset of infection.
- Biofilm bacteria can resist up to 5000 times the antibiotic concentration that would normally be needed to resolve infections.



<https://clinmedjournals.org/articles/ijodh/international-journal-of-oral-and-dental-health-ijodh-7-127.php?jid=ijodh>

# WHAT DOES A WELL-BALANCED MICROBIOME LOOK LIKE?

- Pink, firm gums
- No bleeding when brushing, flossing, or during professional cleanings
- No visible plaque or hard calculus
- No cavities or restorations due to cavities
- Well-lubricated oral tissues
- Clean tongue
- Pleasant breath



# WHAT DOES ORAL DYSBIOSIS LOOK LIKE?

- Red, puffy, smooth gums
- Visible plaque and/or calculus
- Coated tongue
- Bad breath
- Visible caries OR fillings/crowns present
- Early loss of baby teeth due to decay
- Dry mouth





# THE ORAL-SYSTEMIC CONNECTION

“Inflammation is the root of all medical evil and often the root is the roots of the teeth.”

-Ellie Campbell DO



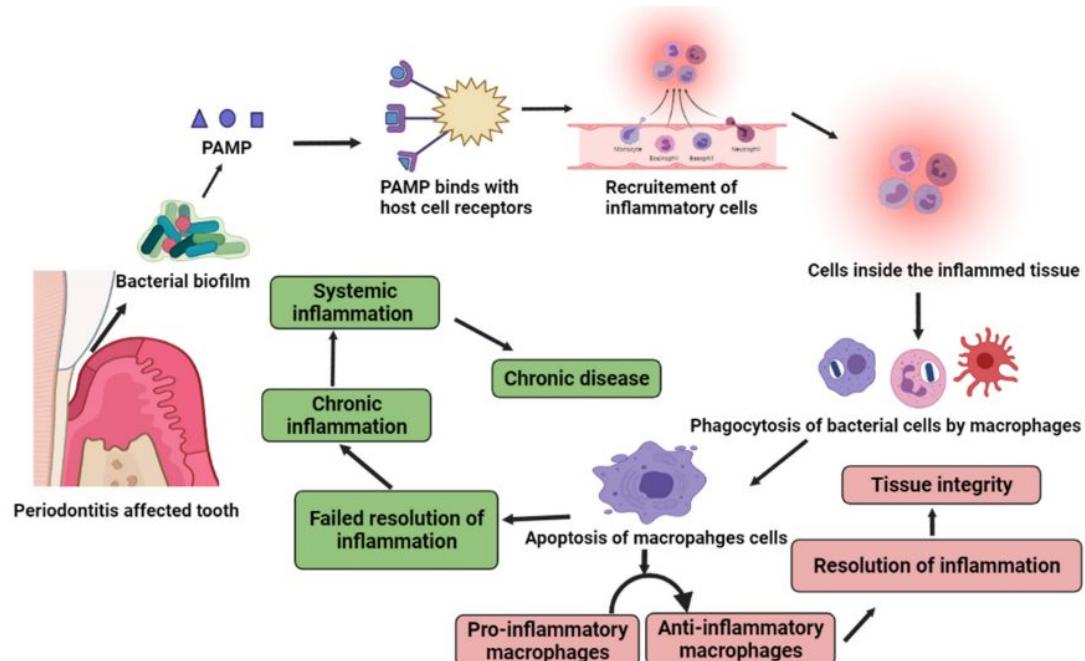
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# THE IMPACT OF ORAL HEALTH

- Periodontal disease (gingivitis and periodontitis) – the most common inflammatory disease globally
- Affects 50% of adults over 30, and 70% of those over 65 years old
- This is an easy area to make a big impact without adding to supplement burden

# INFLAMMATORY CASCADE OF PERIODONTITIS

Clinically, the failure to treat Periodontal Disease (PD) leads to loss of teeth and increases the risk of a multitude of chronic, systemic illnesses. Central to PD is persistent inflammation as a result of oral dysbiosis and infection, and subsequent production of inflammatory mediators and irritating microbial metabolites. Local inflammation causes destruction of connective tissue, and ultimately alveolar bone loss and, finally, characteristic chronic and progressive destruction.



**Figure 1.** Inflammatory cascade of periodontitis. Pathogen mediates a series of events leading to the recruitment of inflammatory cells at the infection site. This triggers the phagocytosis of bacterial cells, followed by the apoptosis of phagocytic cells and resolution of inflammation. Imbalance in this cascade leads to chronic inflammation and associated systemic complications.

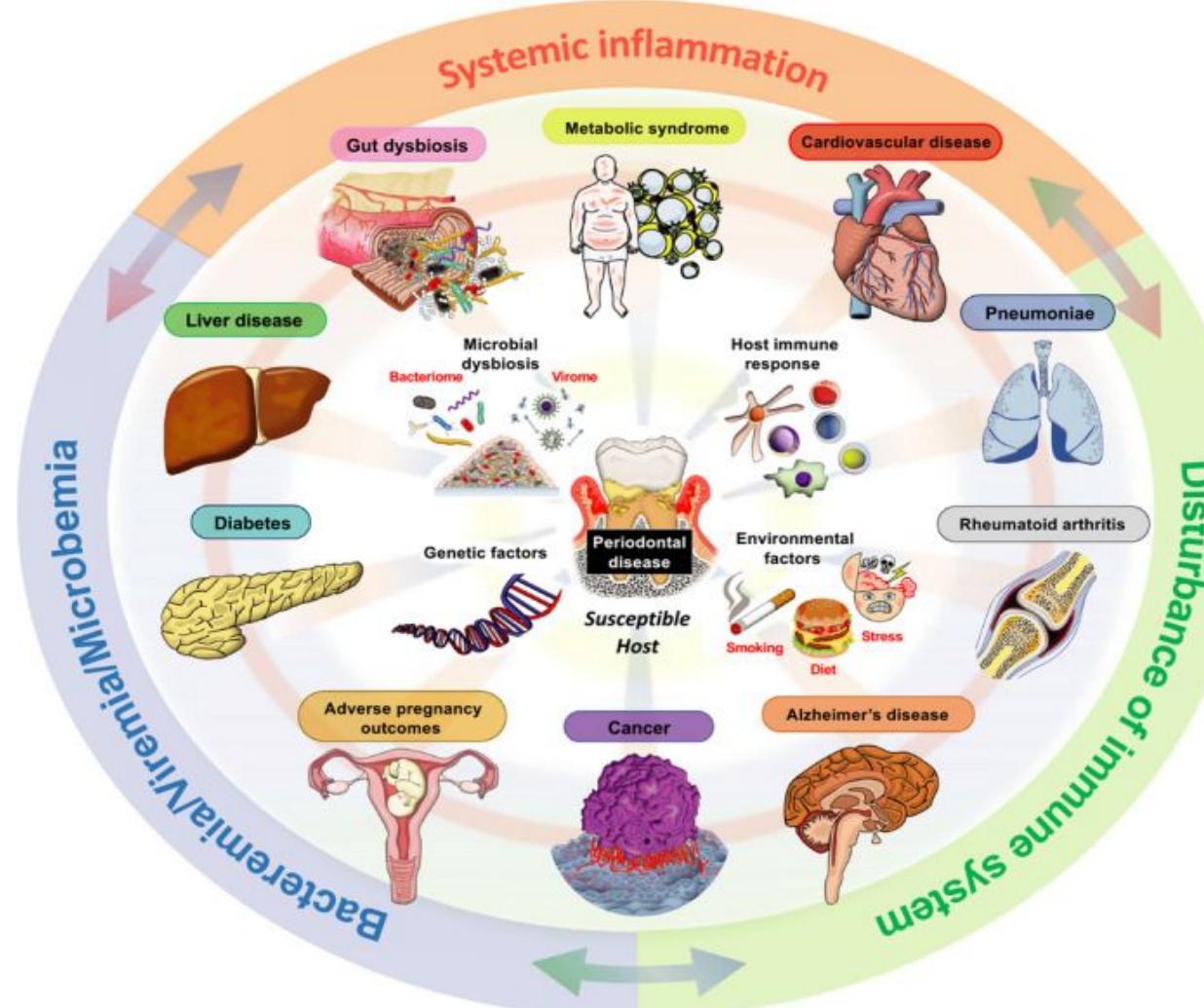
## WHAT DO THEY HAVE IN COMMON?

- Heart disease
- Obstructive sleep apnea
- Alzheimer's
- Diabetes
- COPD
- Adverse pregnancy outcomes
- Gum disease
- Stroke

# INFLAMMATION



# ORAL DYSBIOSIS & SYSTEMIC ISSUES





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## Whole-body health begins in the mouth

When oral dysbiosis occurs, pathogenic bacteria reach levels that may lead to infections, such as tooth decay and gum disease,<sup>4</sup> and ultimately a predisposition to many systemic diseases and conditions. Research has shown that more than 120 diseases originate in the mouth.<sup>5</sup>



Cognitive  
Decline



Oral  
Microbiome



Cardiovascular  
Disease



Metabolic  
Health



Respiratory  
Health



G.I.  
Discomfort



Rheumatoid  
Arthritis

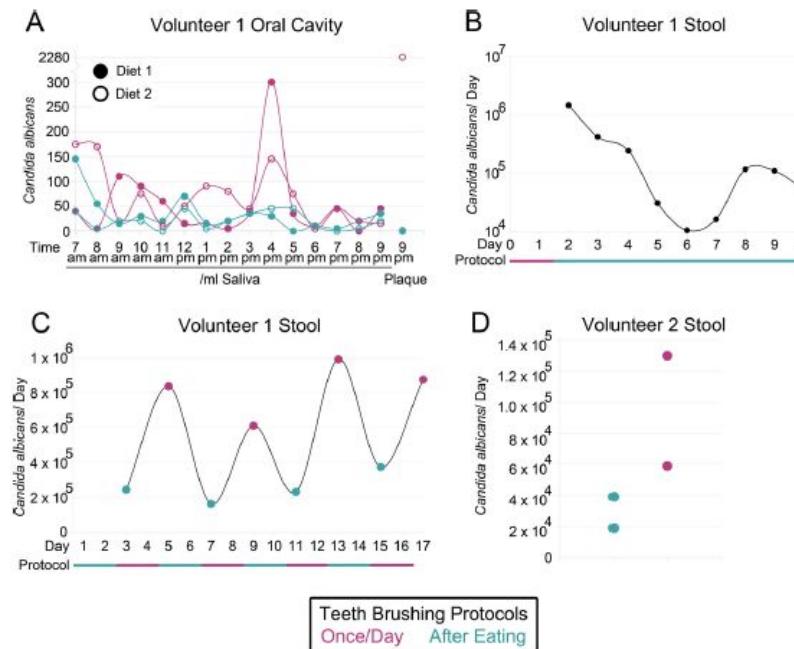


Weight  
Management

# ORAL DYSBIOSIS & GUT HEALTH

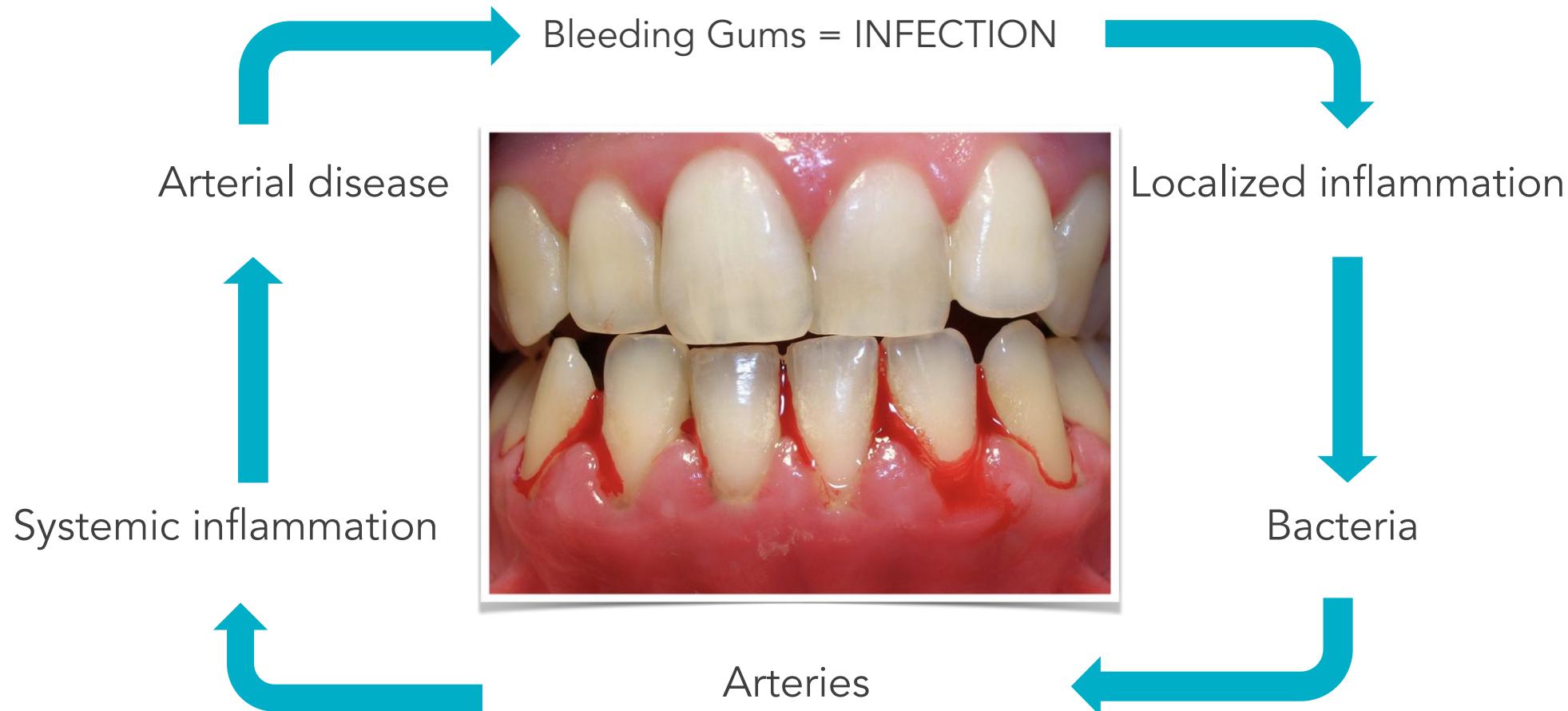
## Oral-Gut Microbiome Connection

Brushing after meals resulted in a dramatic reduction in stool levels of *C. albicans*



**FIG 5** *Candida albicans* levels were decreased in the mouth and stool of healthy human volunteer(s) when teeth were brushed more often. (A) Concentrations of *C. albicans* in saliva throughout days when an adult volunteer either did or did not perform tooth brushing after eating. The volunteer consumed the same diet on both tooth-brushing protocols, the experiment was performed for two different diets, and levels of *C. albicans* were measured in a sample of plaque at the end of each day. (B) The total number of *C. albicans* cells in the stool of a volunteer over time (plotted on a log axis). Following a period of brushing teeth just once per day, the volunteer performed tooth brushing after every meal for 8 consecutive days. The diet was not the same from day to day but contained similar levels of sugars throughout the time period. (C and D) Lastly, the total number of *C. albicans* cells was measured in the stool of (C) a volunteer who alternately followed different tooth-brushing protocols for 2 days over the course of 16 days or of (D) a second volunteer who twice conducted each tooth-brushing protocol on nonconsecutive days. For all experiments, saliva, plaque, or stool was plated on Sabouraud plates containing antibiotics. Possible *C. albicans* colonies were later spotted on chromogenic media to distinguish the *C. albicans* colonies from closely related species and to adjust *C. albicans* numbers.

# ORAL DYSBIOSIS & CARDIOVASCULAR HEALTH



# *Porphyromonas gingivalis*

## Cardiovascular

- Atherosclerotic cardiovascular disease
- Myocardial infarction
- Abdominal aortic aneurysm
- Hypertension

## Oncology

- Squamous cell carcinoma
- Esophageal cancer
- Pancreatic cancer

## Metabolic

- Diabetes
- Non-alcoholic fatty liver disease

## Pulmonary

- Pneumonia
- COPD

## Neurological

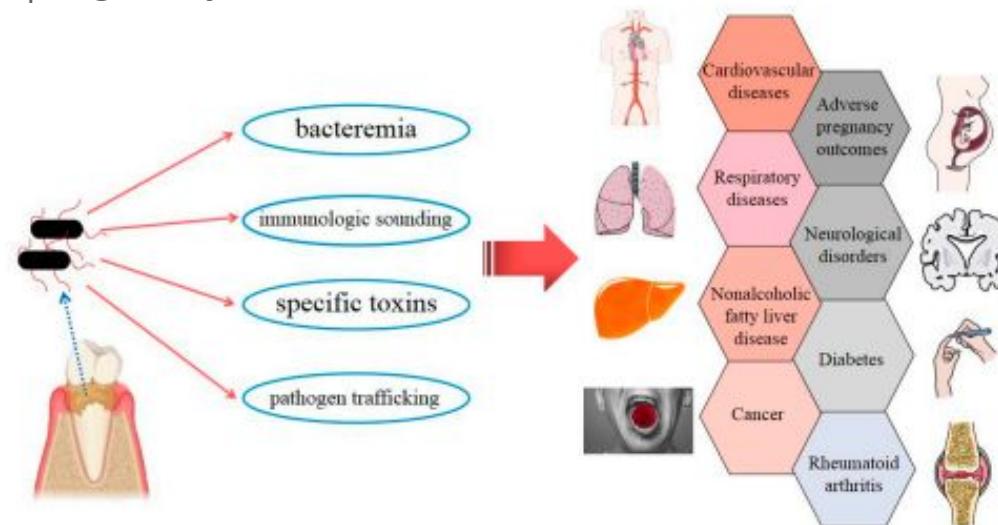
- Alzheimer's
- Depression

## Rheumatological

- Rheumatoid arthritis

## Obstetrics

- Poor pregnancy outcomes



**Figure 4.** Strategies by which *Porphyromonas gingivalis* can invade the whole body, along with simple a schematic representation of *Porphyromonas gingivalis*-associated systemic diseases.

## TO SUMMARIZE

- INFLAMMATION is the root cause of chronic systemic and oral disease.
- You cannot be in good overall health if you have poor oral health.
- Oral and gut microbiomes are inextricably linked.
- Reducing inflammation in the mouth can reduce inflammation in the body.
- Healing the oral dysbiosis is about more than just brushing and flossing.





# **BUILDING & MAINTAINING A HEALTHY MICROBIOME**



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Botanicals™**

# DIET: “WEED, SEED, FEED” —DR. MARK HYMAN

## Foods that can harm gut & oral health

- **Sugar:** Cane sugar, high fructose corn syrup, artificial sweeteners, fruit juices
- **Gluten:** Wheat, barley, rye, spelt, oats, farro, kamut, triticale
- **Starchy vegetables:** White potatoes, corn
- **Dairy:** A1 cows
- **Refined oils:** Soy, grape seed, corn, peanut, cottonseed, safflower, sunflower, partially hydrogenated, vegetable, canola
- **Highly processed/packaged foods**
- **Alcohol**
- **Glyphosate-laden produce**
- **GMOs**

# DIET: “WEED, SEED, FEED” —DR. MARK HYMAN

## Foods that optimize gut & oral health

- **PREbiotics:** Dandelion greens, artichokes, asparagus, alliums, resistant starches (e.g., yucca, cassava, plantains, sweet potatoes/yams, taro, jicama)
- **PRObiotics:** Fermented & cultured foods like kimchi, sauerkraut, natto, tempeh, pickles, miso, unpasteurized ACV, tamari, kefir from goat or sheep
- **Polypheonols\***: Extra virgin olive oil, cranberries, green tea, blueberries, raspberries, blackberries, cherries, pomegranates, red wine, Tartary buckwheat, dark chocolate (the more bitter the better)
- **Healthy fats:** Coconut oil, MCT oil, avocado oil, cod liver oil, grass-fed ghee, flax oil
- **Organic fiber-rich produce:** Avocados, beans, brassicas, nuts & seeds, leafy greens, seaweed, mushrooms
- **Pasture-raised, regeneratively farmed meats**
- **Wild-caught, sustainable seafood:** Alaskan salmon, shrimp, squid, oysters, clams, mussels, sardines, anchovies

\*Supports proliferation of *Akkermansia muciniphila*

# EXERCISE

Physical activity is essential to overall health.

- Upregulates beneficial gut bacteria, including *A. muciniphila* and *R. mucilaginosa* (prevents cancer, speeds up metabolism, reduces inflammation)
- Enhances microbial diversity
- Improves development of commensal bacteria
- Fascia transports water throughout body – stretch to hydrate
- High intensity, short duration better than long cardio to avoid hypoxia



# MANAGE STRESS

- Stress induces catecholamine production which negatively affects the gut microbiome
- Alters ability of microbiota to produce anti-inflammatory short-chain fatty acids
- Contributes to chronic inflammation throughout the body
- Psychological, circadian disruption, sleep apnea



# ELIMINATE TOXINS

- Bisphenol-A: Induces dysbiosis, reduces bacteria diversity
- Phthalates: High exposure in newborns associated with altered gut microbiome
- Mercury
- Fluoride
- NSAIDs
- Proton-pump inhibitors
- Triclosan
- Glyphosate





# THE POWER OF BOTANICALS



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# THE POWER OF BOTANICALS AND THE MICROBIOME

At Biocidin Botanicals we understand that microbes are not an enemy to be eliminated, but an ecology to be nourished. How do we do that? By working with the gift of botanicals.

Plants have developed tools to grow and flourish under the same environmental stressors that we face. They have an innate capacity to protect themselves – producing antimicrobial compounds, antioxidants, biofilm disruptors, and immune modulators. (Yes, plants have immune systems, too!)



# THE SYNERGY OF PLANTS

Each plant offers multiple activities. When layered together in a formula – a powerful synergy occurs.

- Antimicrobial activity
- Activity against biofilms
- Protective antioxidant action
- Immunomodulation

The outcome is not additive but exponential!

Botanicals offer a graceful and mighty solution that cannot be duplicated. The power to achieve and maintain balance.

The power to thrive.





# Serious Science Behind Every Smile®



Biocidin  
Botanicals™

# BOTANICALS & THE ORAL MICROBIOME

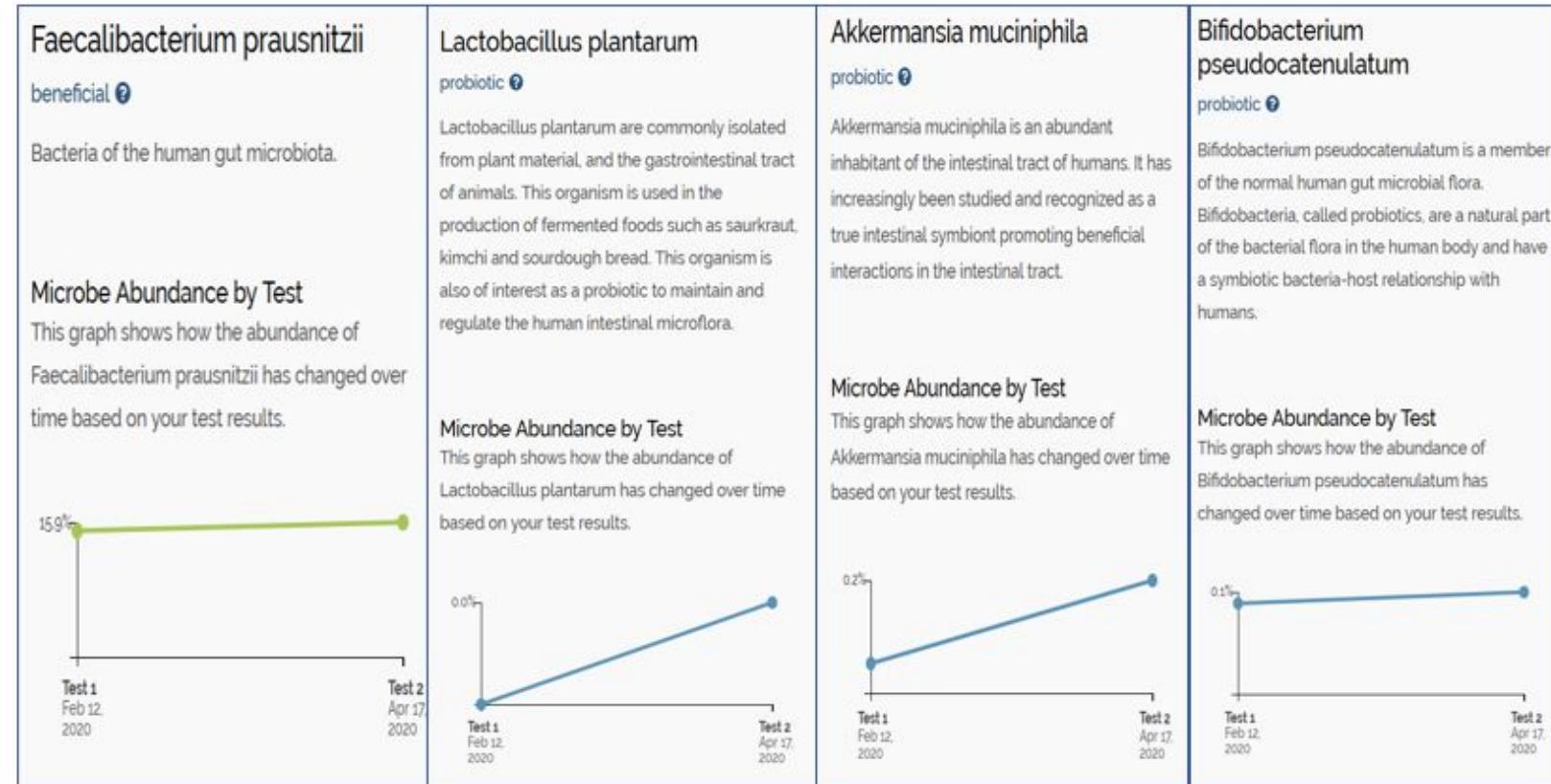
Dental Pilot Study by John Rothchild, DDS

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- 9 Participants
- Used Phase-Contrast Microscopy to identify elevated pathogenic microorganisms (gram-negative rods and spirochetes) in gingival crevicular fluid from periodontal tissues
- Seven out of nine participants had a significant reduction or elimination of pathogens when using Biocidin® LSF for one month

# Botanicals & The Microbiome

- Pilot study was completed in 2020 with 13 participants using Biocidin® Liquid and G.I. Detox™ + for 8 weeks at max dosing.
- 69% (9/13) of the participants had an increase in probiotic abundance.
- 73% (8/11) of the participants had an increase in *Akkermansia muciniphila*.



# BIOCIDIN® - The Power of 18

## BROAD-SPECTRUM FORMULA

### 18 BOTANICAL EXTRACTS & ESSENTIAL OILS

- Bilberry extract
- Noni extract
- Milk thistle
- Echinacea purpurea extract
- Echinacea angustifolia
- Goldenseal
- Shiitake extract
- White willow bark
- Garlic
- Grape seed extract
- Black walnut (hull and leaf)
- Raspberry
- Fumitory extract
- Gentian
- Tea tree oil
- Galbanum oil
- Lavender oil
- Oregano oil



# Dentalcidin®

## ORAL MICROBIOME TOOTHPASTE

- Whitens teeth and freshens breath
- Keeps teeth feeling smooth and clean all day
- Assists in removing oral biofilms (plaque)\*
- Supports periodontal and gingival health\*
- Supports oral microbiome balance for whole-body health\*
- Gentle, effective cleaning – suitable for sensitive teeth



\*This statement has not been evaluated by the Food and Drug Administration.  
This product is not intended to diagnose, treat, cure, or prevent any disease.

# Dentalcidin® LS

## ORAL MICROBIOME RINSE

- Liposomal technology for deeper penetration in the periodontal area\*
- CoQ10, quercetin, clove, and myrrh support gum and gingival health\*
- Use after flossing to help prevent translocation of harmful microorganisms\*
- Supports oral microbiome balance for whole-body health\*
- Broad-spectrum botanicals with tissue-soothing and biofilm-disrupting activity\*
- Pleasant taste - great for children and adults
- Pilot studies indicates results in as little as 4-8 weeks of use\*
- 1-2 pumps (add water if needed), swish 1-2 minutes, spit out after use



\*This statement has not been evaluated by the Food and Drug Administration.  
This product is not intended to diagnose, treat, cure, or prevent any disease.

# Dentalcidin® | ORAL CARE SYSTEM

Dentalcidin® Oral Microbiome Toothpaste

Dentalcidin® Liposomal Rinse

## SMILE

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**Promote oral health.** That's why we've created one-of-a-kind oral health care products. Products with a systemic reach. With demonstrated activity to clear away unwanted oral microbes, and plaque (biofilms). Foundational Dentaceutical™ care – it all begins here.



# BARBARA TRITZ | DENTALCIDIN



# BIOFILMS IN CLINICAL PRACTICE

Proceed with caution!

- The extracellular matrix holds on to cellular and metabolic debris.
  - Histamine
  - Exogenous toxins (heavy metals, organophosphates, etc.)
  - Microbes – new irritants
  - Oxalates
  - Anything that floats by!
- The ECM is composed of PAMPS.
- There will likely be multiple organisms at play.
- Use titration and binders to support patient comfort.





## THANK YOU FOR ATTENDING

Please activate one-time offer for 15% off all products with promo code during the show

**23HTSSDS15**

*Offer expires 04/11/2023, exclusions apply*

