

ANTIMICROBIALS AS A DIAGNOSTIC TOOL

USING BOTANICALS TO ASSESS THE ROLE
OF DYSBIOSIS IN SYSTEMIC CONDITIONS

DR. JOCELYN STRAND



Biocidin
Botanicals™



**MY AHA!
MOMENT(S) WITH
BIOCIDIN®**



**Biocidin
Botanicals™**

IT'S CALLED MEDICAL "PRACTICE" FOR A REASON

At some point I realized that I was using Biocidin for every dysbiosis case, and then...

- I started to watch the cascade of improvements
 - GI symptoms (of course!)
 - Lyme
 - Rheumatoid/Psoriatic Arthritis
 - Chronic Fatigue
 - Insomnia
 - Mood
 - The list goes on
- I could save patients' money
- Not everyone could tolerate it....



HERXING AND BIOFILM BLUNDERS

Biofilm Blues - I didn't understand the importance of Herxing or Biofilms

- I thought people were reacting to the Biocidin
- I may have done harm
- I probably lost the faith of some patients





MICROBES AND SYSTEMIC HEALTH

WHY DID I OBSERVE WHAT I DID?



Biocidin
Botanicals™

THE MICROBIOME AND THE IMMUNE SYSTEM

Ways the intestinal microbiome affects systemic immunity

- Regulation of T cells
- Oral tolerance
- Production of short-chain fatty acids
- Regulation of systemic inflammation

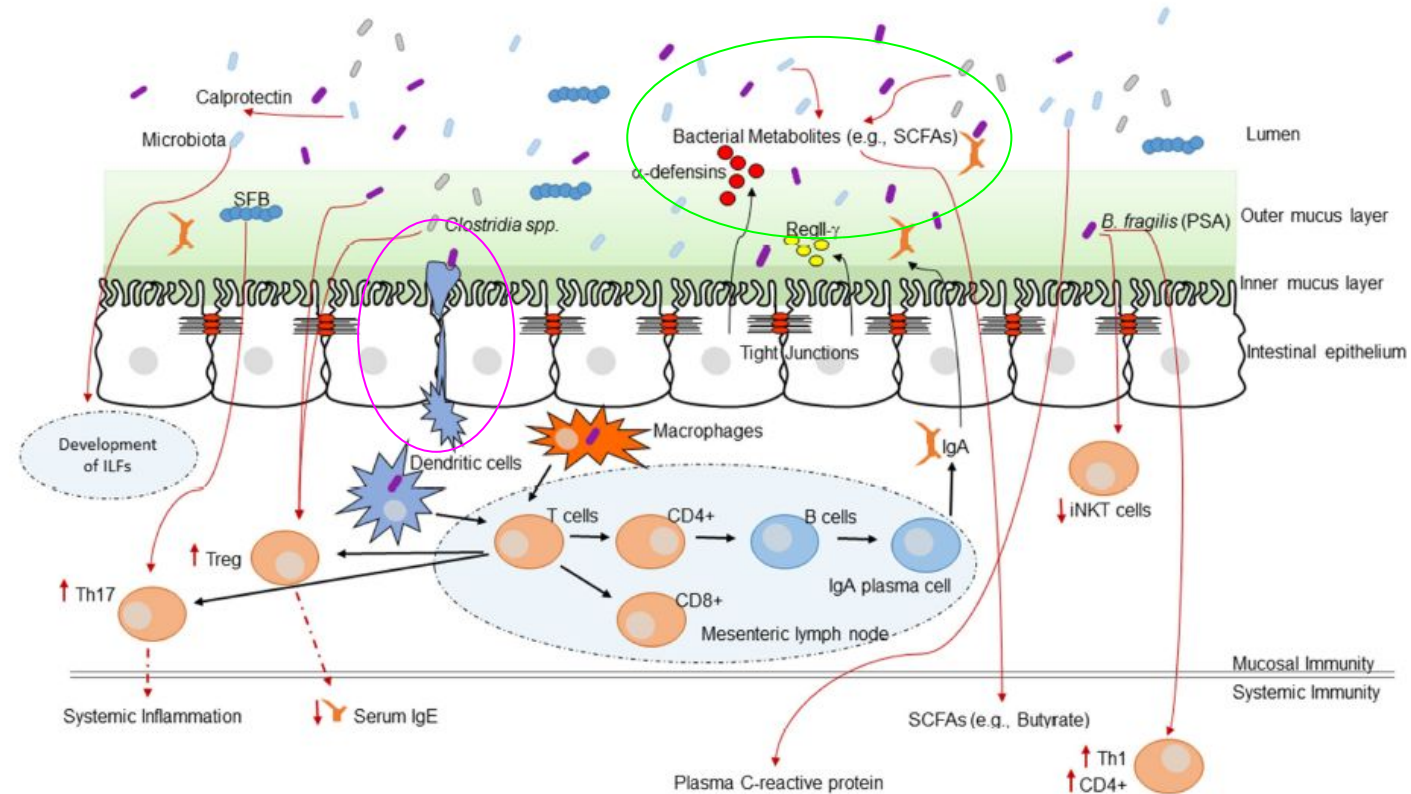


FIGURE 1 | The intestinal microbiota and the host immune system. Interaction between the immune system and the intestinal microbiota. Multiple immune effectors function together to minimize bacterial-epithelial invasion. These include the mucus layer, epithelial antibacterial proteins, and IgA secreted by lamina propria plasma cells. Compartmentalization is accomplished by unique anatomic adaptations that limit commensal bacterial exposure to the immune system. Some microbes are sampled by intestinal DCs. The loaded DCs traffic to the mesenteric lymph nodes through the intestinal lymphatic but do not migrate to distal tissues. This compartmentalizes live bacteria and induction of immune responses to the mucosal immune system. Induced B cells and T cell subsets recirculate through the lymphatic and the bloodstream back to mucosal sites, where B cells differentiate into IgA-secreting plasma cells. Thus, the intestinal microbiota shapes host mucosal as well as systemic immunity. ILFs, isolated lymphoid follicles.

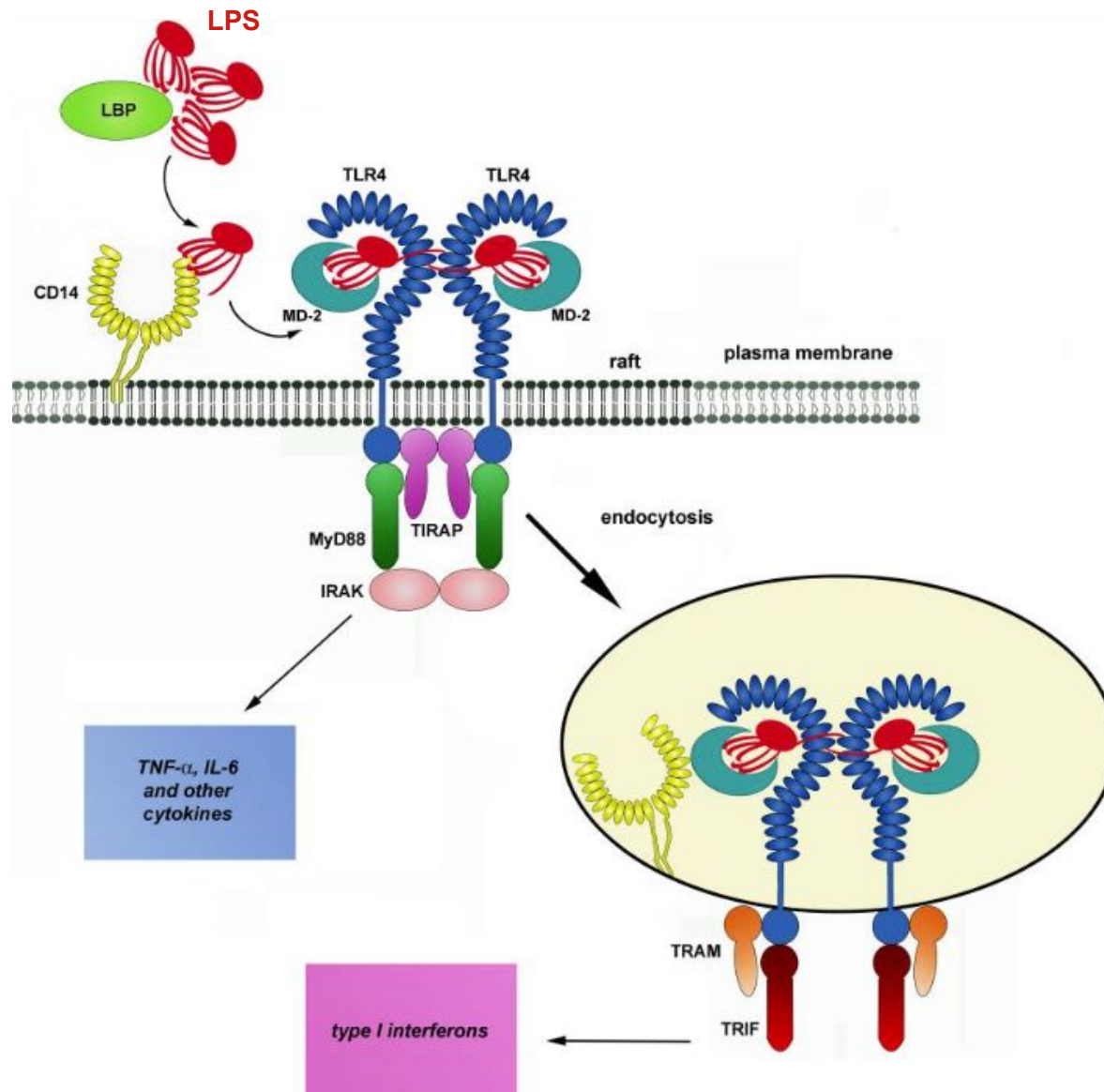
LPS REVIEW

- Lipopolysaccharide (LPS) is an endotoxin derived from the outer membrane of gram-negative bacteria
- Detected in the portal venous blood – enters through damaged GI epithelium or chylomicrons
- Dietary and microbial LPS is consistently absorbed through the intestinal epithelia
- Present in triglyceride-rich, very low density lipoproteins (VLDL) in systemic blood flow
- Is transported by LDL
- A component of biofilms
- Causes immunologic and metabolic disruption



LPS, TLR4, AND INFLAMMATION

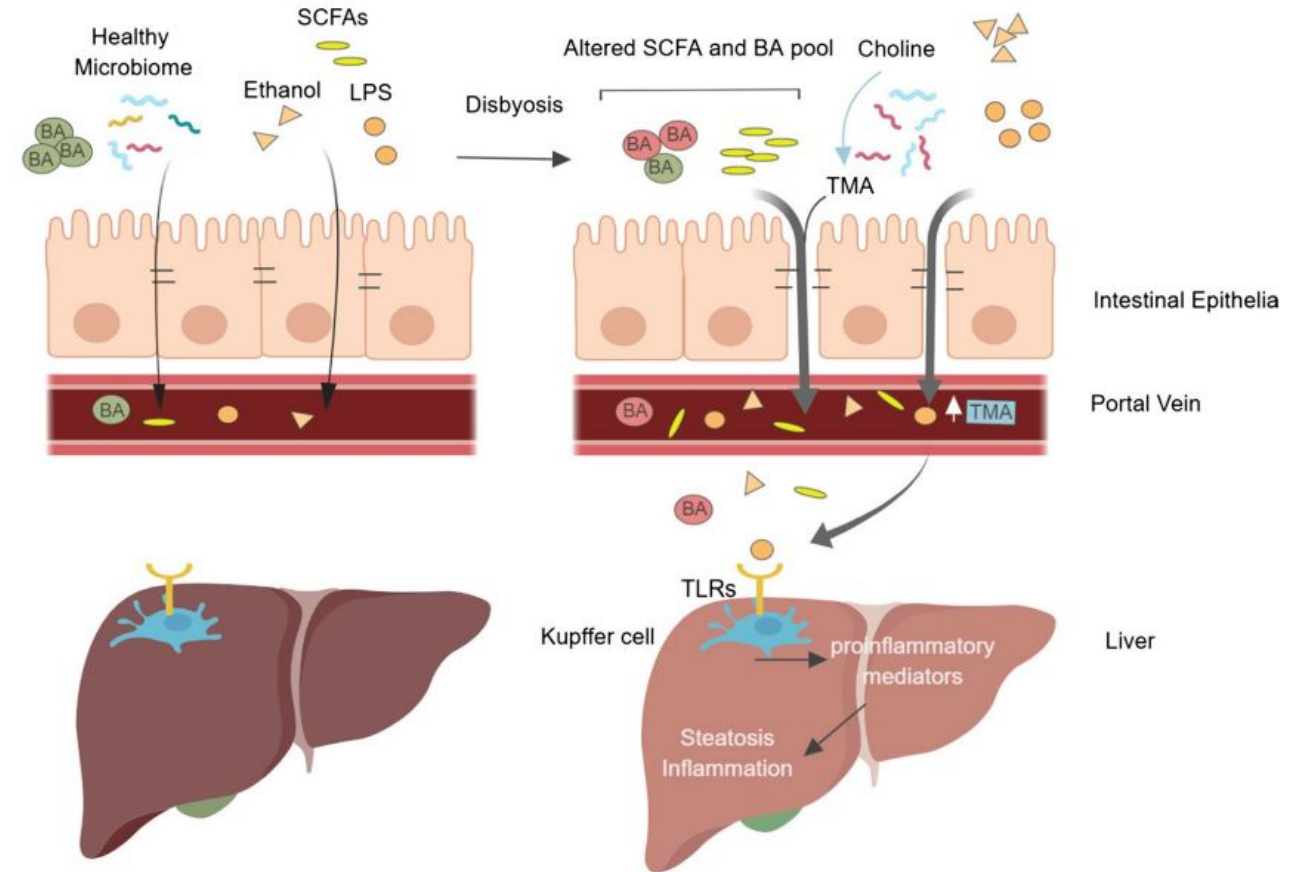
- LPS is the most potent immune stimulant known.
- TLR4 is a pattern recognition receptor – it means “Wow!” in German, because the discovery was so exciting.
- TLR4 receptors have evolved to recognize PAMPS and DAMPS to activate innate and adaptive immunity and protect the host.
- TLR4 binding activates NF Kappa-Beta, increasing proinflammatory cytokines including TNF-alpha and IL-6



THE MICROBIOME AND THE LIVER

THE GUT-LIVER AXIS

- GLA plays an essential role in the development of NAFLD
- Blood comes from intestines and contains products produced by the microbiome
 - Phenols
 - Acetaldehyde
 - Ammonia
 - Proinflammatory bacterial components
 - Peptidoglycan
 - LPS
- Immune cells of the liver (lymphocytes, macrophages, dendritic cells and natural killer cells) respond to DAMPS and PAMPS
- Toll-like receptor binding results in hepatic damage and inflammation



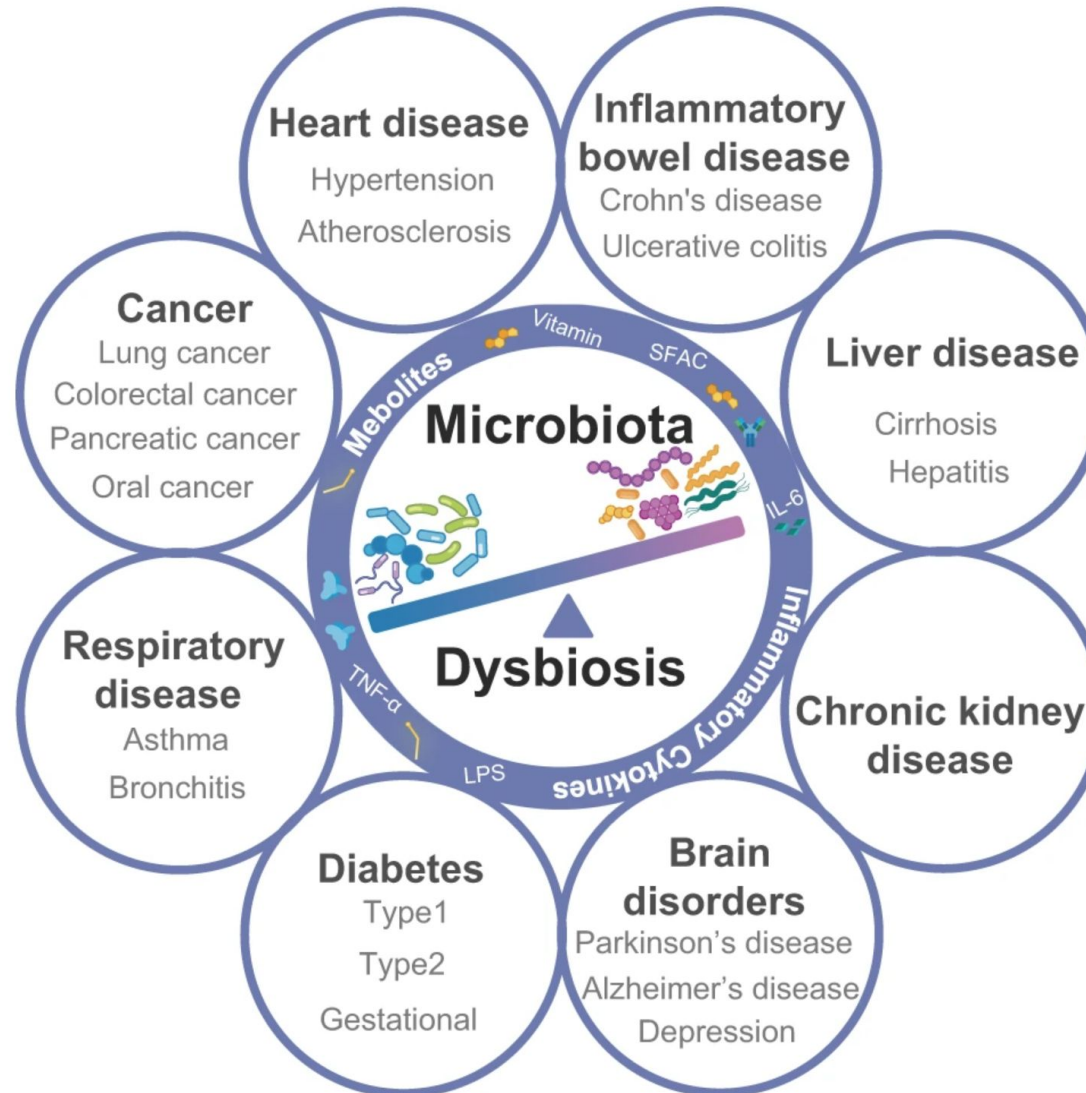
BIOFILMS

- LPS and other metabolites produced continually
- Ineffective immune response, generating chronic inflammation
- Inflammatory damage to hepatocytes
- Retention of toxins in the extracellular matrix (heavy metals, organophosphates)
- Retention of endogenously produced toxins (oxalates, ROS)
- Ongoing source of dysbiotic organisms preventing balance in the GI tract



THE MICROBIOME IN HUMAN DISEASE

“Microbiomes exist in every human ecological niche that has been examined, the oral cavity, skin surface, intestinal tract, oesophagus, lungs and other.”



Common mechanisms of microbiota modulation of host

Colonization resistance
Local immunomodulatory

Developmental
Intestinal barrier

↑ Microbes promote increase in
↓ Microbes promote decrease in

Beneficial interaction
Detrimental interaction
Either, depending on host

Endocrine

Both *direct* and *indirect* effects of a variety of microbes drive developmental and metabolic host phenotypes.

Diseases

- Diabetes (type 1 & 2)
- Metabolic syndrome/obesity
- Fatty liver and PSC

Major mechanisms

- ↑ β cell proliferation
- ↑ Insulin production and glucose regulation
- ↑ Inflammation
- ↑ Fat and cholesterol storage
- ↑ Lipase and bile acid production

Nervous

Beneficial microbes *indirectly* stimulate neurodevelopment and reduce behavioral disorders and neuroinflammation.

Diseases

- Anxiety and depression
- Autism
- Parkinson's
- Multiple sclerosis

Major mechanisms

- ↑ Neurogenesis, synaptogenesis, and myelination
- ↑ Microglia number
- ↓ Inflammation
- ↑ Sociability
- ↑ Serotonin

Skin

Both skin and gut microbiota modulate inflammation, to *directly* and *indirectly* influence disease.

Diseases

- Acne
- Psoriasis, eczema, and dermatitis
- Melanoma
- Chronic wound infection

Major mechanisms

- ↑ Inflammation
- ↑ Pathogen resistance

Immune

Microbes play a major role in both local (*direct*) and systemic (*indirect*) immune cell development and function.

Diseases

- Lupus
- Graft vs. host
- Sepsis

Major mechanisms

- ↑ Inflammation
- ↑ Tolerance
- ↑ Pathogen resistance

Cardiovascular

Systemic dissemination of gut & oral microbes *directly* inflame vascular tissues, exacerbated by *indirect* effects of microbes that promote fat/cholesterol storage.

Diseases

- Blood cancers
- Atherosclerosis
- Heart attack and stroke

Major mechanisms

- ↑ Heart size
- ↑ Trimethylamine
- ↑ Inflammation
- ↑ Fat and cholesterol
- ↑ Toxic metabolites

Respiratory

Both lung and gut microbiota modulate inflammation, to *directly* and *indirectly* influence disease.

Diseases

- Allergy/asthma
- COPD and cystic fibrosis
- Pneumonia and tuberculosis
- Lung cancer

Major mechanisms

- ↑ Mucus production
- ↑ Inflammation
- ↑ O₂ consumption

Upper GI

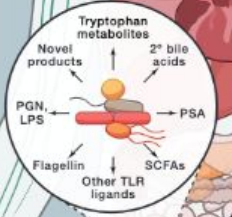
Overabundance of detrimental microbes with *direct* effects on host tissues tend to drive disease.

Diseases

- Oral, esophageal, and stomach cancers
- Periodontitis and gastritis
- Ulcers

Major mechanisms

- ↑ Carcinogenic metabolites
- ↑ Inflammation
- ↑ Epithelial proliferation
- ↑ Injection of toxins



Lower GI

Close proximity to host epithelia results in a multitude of *direct* effects on host physiology.

Diseases

- IBD/colitis
- Celiac disease
- Colon, pancreatic, and liver cancers
- Hirschsprung's

Major mechanisms

- ↑ Epithelial proliferation
- ↑ Mucus production and peristalsis
- ↑ Immune cell recruitment and development
- ↑ Carcinogenic metabolites
- ↑ Injection of toxins

Skeletomuscular

Gut microbes have multiple *indirect* influences on muscle and bone development and local immune modulation.

Diseases

- Rheumatoid and osteo-arthritis
- Muscle atrophy
- Osteoporosis

Major mechanisms

- ↑ Inflammation
- ↑ Muscle and bone mass
- ↑ Insulin growth factor
- ↑ Serotonin
- ↑ Osteoblast function

Urinary/reproductive

Vaginal *Lactobacillus* spp. play important roles in female reproductive health, and gut microbes *indirectly* influence local inflammation.

Diseases

- Reduced fertility
- Fetal development
- Infection

Major mechanisms

- ↑ Pathogen resistance
- ↑ Sperm count
- ↑ Inflammation

SnapShot: Microbiota effects on host physiology

Jennifer H. Hill and June L. Round
Department of Pathology, Division of Microbiology and Immunology,
University of Utah School of Medicine, Salt Lake City, UT 84112, USA



<https://pubmed.ncbi.nlm.nih.gov/33989551/>



THE POWER OF BOTANICALS



Biocidin
Botanicals™

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.

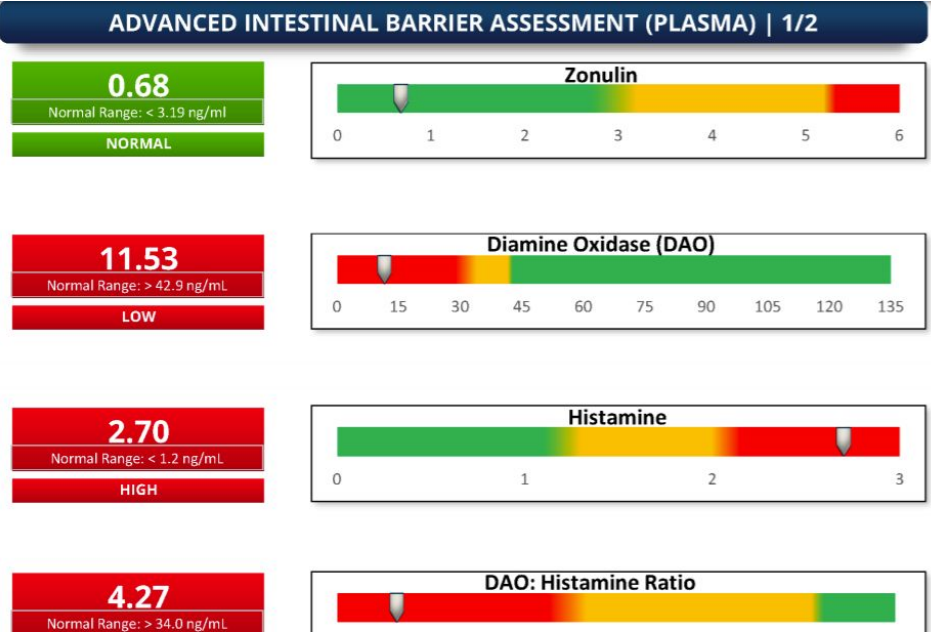
The power to thrive.



BIOCIDIN[®], G.I. DETOX[™] + & HISTAMINE

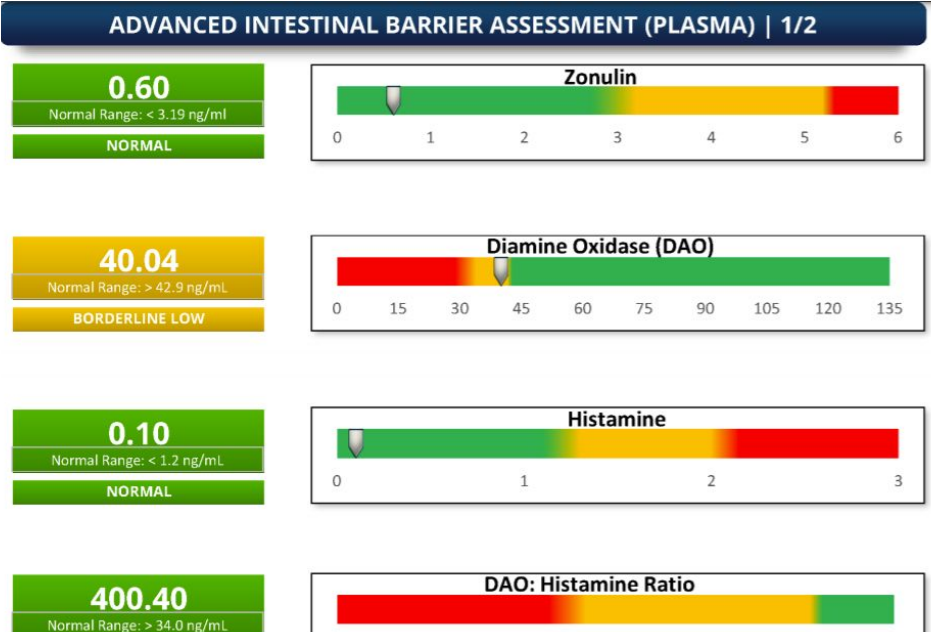
Participant #1

Pre-test 5/11/21



Participant #1

Post-test 6/23/21



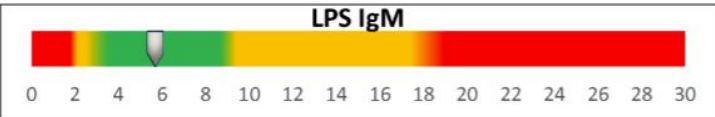
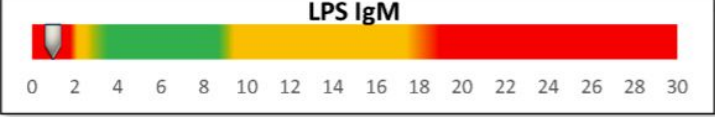
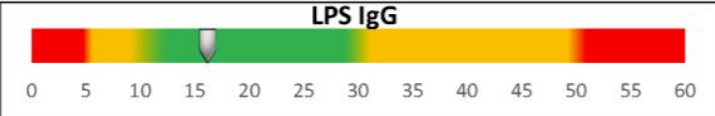
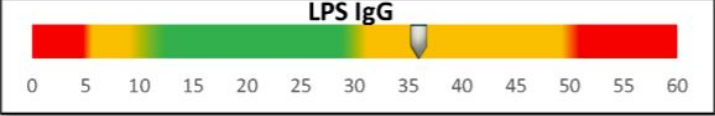
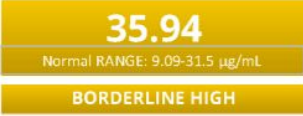
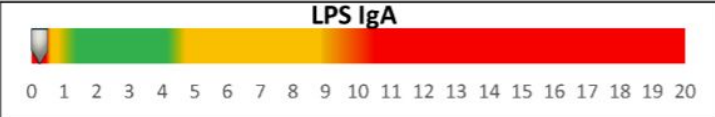
BIOCIDIN[®], G.I. DETOX[™] + & LPS

Participant #1

Pre-test 5/11/21

Participant #1

Post-test 06/23/21



BIOCIDIN[®] DAO & HISTAMINE

12/10/21

03/08/22

ADVANCED INTESTINAL BARRIER ASSESSMENT (PLASMA) | 1/2

ADVANCED INTESTINAL BARRIER ASSESSMENT (PLASMA) | 1/2

1.05

Normal Range: < 3.19 ng/ml

NORMAL

Zonulin



0.67

Normal Range: < 3.19 ng/ml

NORMAL

Zonulin



30.54

Normal Range: > 42.9 ng/mL

LOW

Diamine Oxidase (DAO)



66.57

Normal Range: > 42.9 ng/mL

NORMAL

Diamine Oxidase (DAO)



1.68

Normal Range: < 1.2 ng/mL

BORDERLINE HIGH

Histamine



0.30

Normal Range: < 1.2 ng/mL

NORMAL

Histamine



18.21

Normal Range: > 34.0 ng/mL

BORDERLINE LOW

DAO: Histamine Ratio



224.14

Normal Range: > 34.0 ng/mL

NORMAL

DAO: Histamine Ratio



BIOCIDIN[®] & LPS

12/10/21

03/08/22

ADVANCED INTESTINAL BARRIER ASSESSMENT (PLASMA) | 2/2

ADVANCED INTESTINAL BARRIER ASSESSMENT (PLASMA) | 2/2

5.71

Normal RANGE: 0.83-4.47 µg/mL

BORDERLINE HIGH

LPS IgA



1.55

Normal RANGE: 0.83-4.47 µg/mL

NORMAL

LPS IgA



74.58

Normal RANGE: 9.09-31.5 µg/mL

HIGH

LPS IgG



3.27

Normal RANGE: 9.09-31.5 µg/mL

LOW

LPS IgG



19.27

Normal RANGE: 2.5-9.4 µg/mL

HIGH

LPS IgM



7.93

Normal RANGE: 2.5-9.4 µg/mL

NORMAL

LPS IgM



DYSBIOSIS AND MAFLD

A CASE STUDY

	09/02/21	10/22/21	BCP	01/11/22	02/01/22	02/24/22	04/20/22	05/26/22	06/09/22	07/22/22	11/02/22	03/03/23
Alk Phos (40-150)		67		56			51			55	58	64
ALT (6-40)	51	66		40			40	44	46	44	37	48
AST (10-40)	43	50		31			32	36	37	36	43	30
Hgb A1C (<5.7)	5.7				5.5	5.3						
Glucose (70-99)	117				111	105		105	111			116 (NF)
Total Cholesterol (114-200)	233					148					164	121
HDL (40-60)	28					29					27	22
LDL (<100)	133					93					85	65
Triglycerides (10-200)	358					130					130	170

MAFLD

Pre Biocidin 3/15/21	Post Biocidin 2/2/23
CAP (Steatosis) Score: 387 dB/m (severe)	CAP (Steatosis) Score: 293 dB/m (mild)
Fibrosis Score: 9.5 kPa (significant)	Fibrosis Score: 6.3 kPa (insignificant)

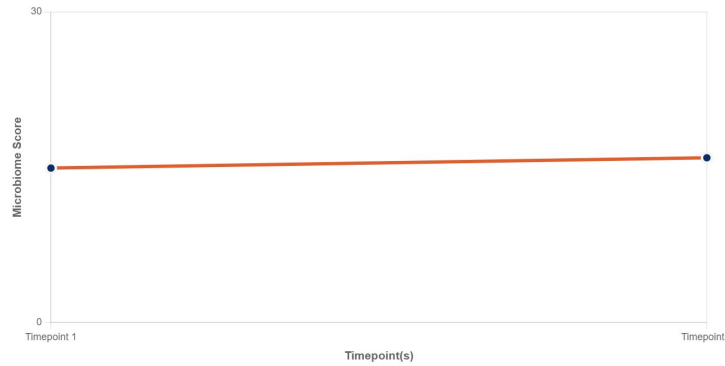
“I am also very grateful to be in this study that has so much benefited me. I am excited to see how the supplement regimen affects me next. Again, I want to reiterate just how much gratitude I have in my heart for you both and for Biocidin Botanicals and the research they do. I can see so many benefits to people. No wonder you have so much passion for your work, Jocelyn. I totally get it now.

My hepatic numbers are so much better. I was so surprised when my PA from Essentia Health's Gastroenterology gave me the good news.”

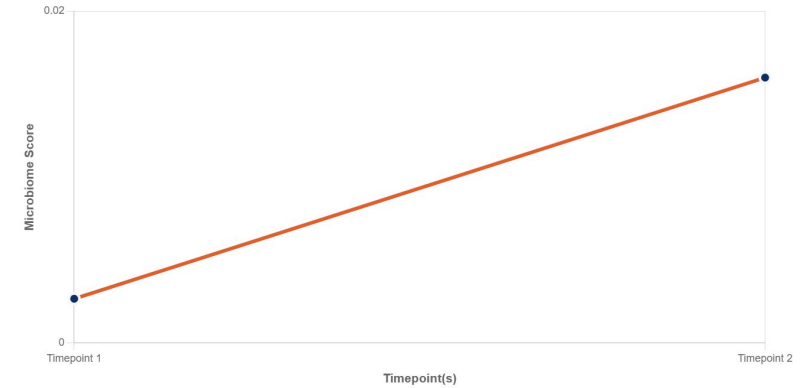
BOTANICALS & THE MICROBIOME

- 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*.

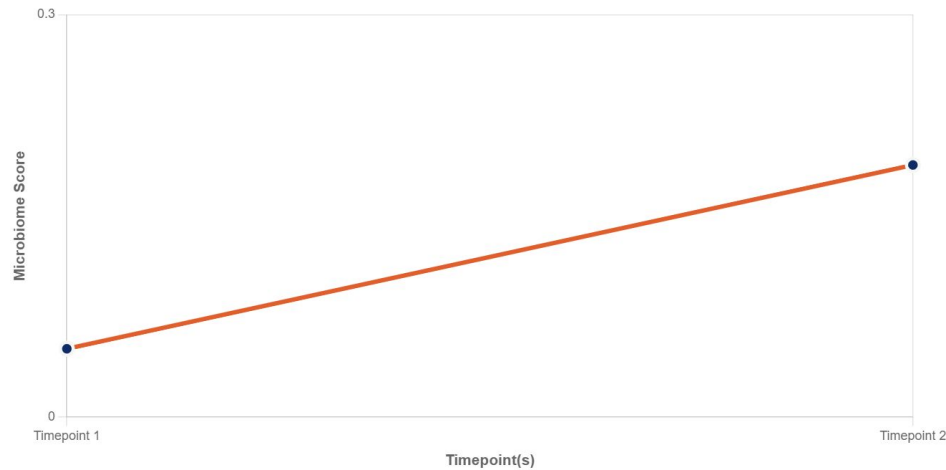
Faecalibacterium prausnitzii



Lactobacillus plantarum



Akkermansia muciniphila



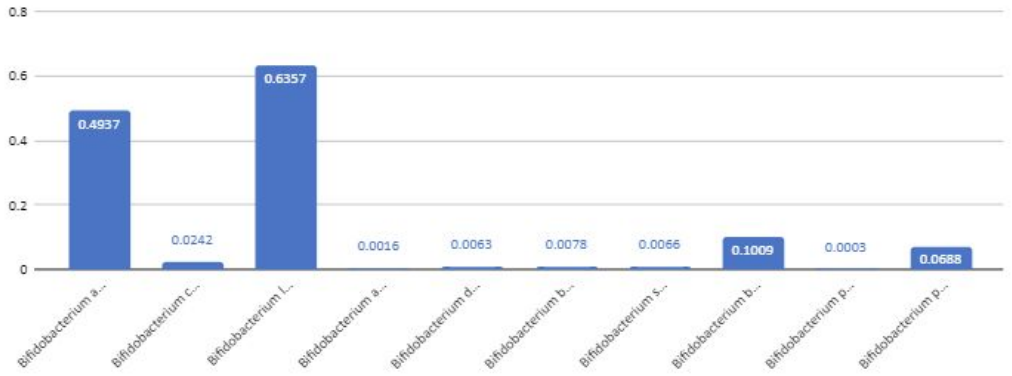
BOTANICALS & THE MICROBIOME

Probiotic Organisms Abundance(%)	23000064	23000099	23000065	23000096	23000070	23000078	23000061	23000068	23000057	23000090	23000101	23000060	23000084	23000085	23000055	23000051	23000052	23000054	23000088	24000359	23000083	24000366	23000086	24000499	23000076	23000077
Akkermansia muciniphila	0%	0.33%	0.05%	0.19%	0%	0%	0.94%	11.26%	0.06%	1.31%	0.03%	1.36%	0.28%	2.13%	0.00%	0.00%	0.45%	1.38%	0.56%	0.00%	3.91%	4.15%	0.48%	0.05%	0.45%	0.19%
Oxalobacter formigenes	0.03%	0.10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.13%	0.07%			0.03%	0.07%
Bifidobacterium pseudocatenulatum	0.09%	0.04%	0.08%	0.09%	0.01%	0.03%	0%	0%	0.16%	0.35%	0%	0%	0%	0%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0%		0.25%			
Bifidobacterium longum	0.27%	0.04%	0%	0%	0.33%	0.32%	0.20%	0.13%	0.67%	3.45%	0%	0%	0.94%	0.75%	0.00%	0.00%	0.07%	0.06%	1.00%	0.00%	0.02%	1.01%	1.43%	2.19%	0.01%	
Lactococcus lactis	0.00%	0.01%	0.01%	0.02%	0.01%	0%	0.14%	0.11%	0.02%	0.07%	0.02%	0.25%	0.14%	0.02%	0.03%	0.13%	0.02%	0.05%	1.00%	0.01%	0.01%	0.22%	0.02%		0.03%	0.02%
Bifidobacterium pseudolongum	0.01%	0.00%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%		0.20%		
Lactobacillus plantarum	0%	0%	0%	0.01%	0%	0%	0%	0%	0%	0%	0%	0.02%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%				
Bifidobacterium bifidum	0%	0%	0%	0%	0.26%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.02%			
Streptococcus thermophilus	0%	0%	0%	0%	0.01%	0%	0.04%	0.01%	0%	0.06%	0.73%	0.08%	0.07%	0%	0.03%	0.04%	0.03%	0.00%	4.00%	3.30%	0.01%					0.02%
Bifidobacterium adolescentis	0%	0%	0%	0%	0%	0.08%	2.05%	1.51%	0%	0%	0%	0%	0%	0%	0.00%	0.00%	5.30%	2.84%	0.00%	0.00%	0.00%	8.29%	1.80%	6.25%		
Lactobacillus reuteri	0%	0%	0%	0%	0%	0%	0%	0.01%	0%	0%	0%	0%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					
Bifidobacterium sp.12_1_47BFAA	0%	0%	0%	0%	0%	0%	0%	0%	0.02%	0.17%	0%	0%	0.03%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%		0.01%		
Saccharomyces cerevisiae	0%	0%	0%	0%	0%	0%	0%	0%	0.04%	0%	0%	0%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					
Bifidobacterium breve	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.04%	0%	0%	0%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.01%		
Lactobacillus paracasei	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.11%	0.03%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					
Lactobacillus casei	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.01%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.02%			
Lactobacillus rhamnosus	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.44%	0%	0%	0%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					
Bifidobacterium animalis	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.00%	0.00%	0%	0%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%		0.01%			
Bacillus Subtilis	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%												0.03%	0.00%			
Bifidobacterium Catenulatem																						0.02%	0.01%	0.01%		
Total Abundance	0.40%	0.52%	0.14%	0.31%	0.62%	0.43%	3.37%	13.03%	0.97%	5.45%	0.95%	2.19%	1.46%	2.94%	0.06%	0.19%	5.95%	4.33%	5.56%	3.31%	4.08%	13.84%	4.01%	8.73%	0.52%	0.30%

Lactobacillus Average

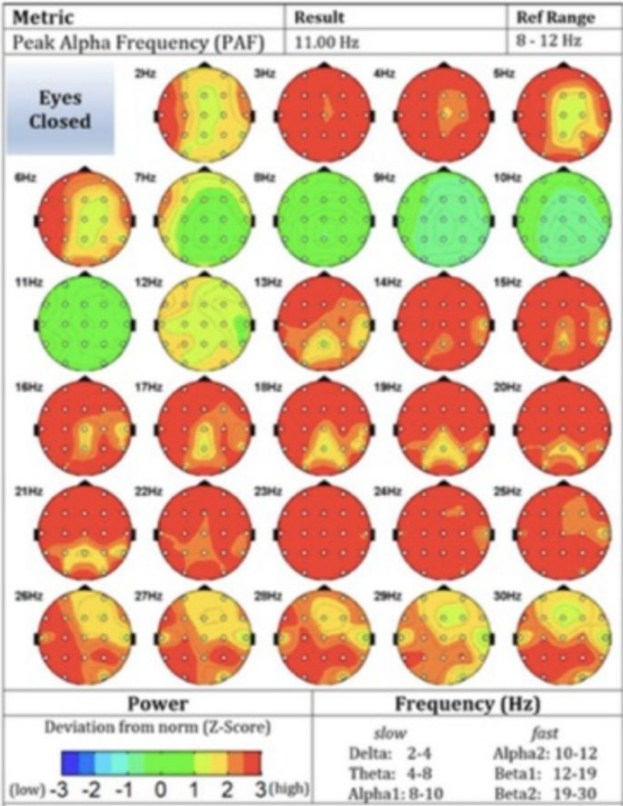


Bifidobacterium Avg

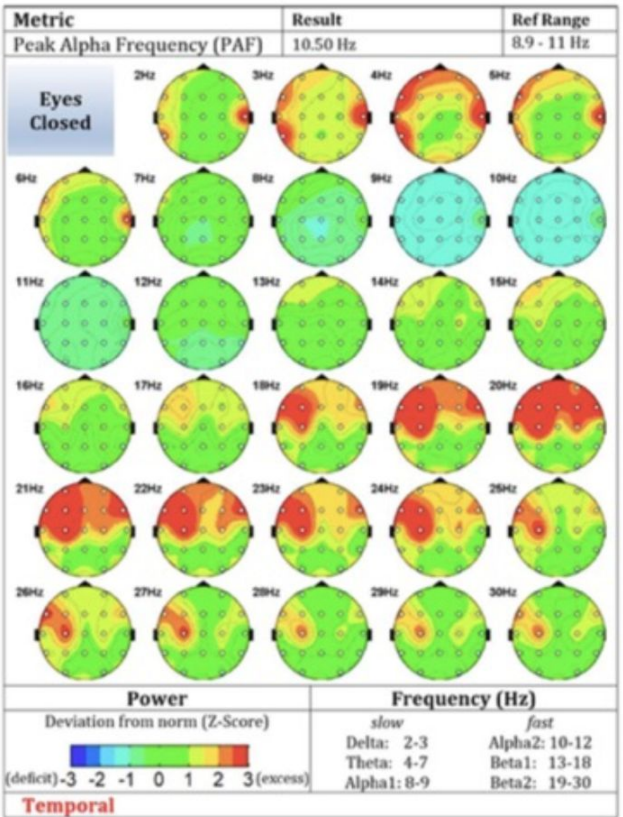


NEUROINFLAMMATION CASE STUDY

11.21.18 Baseline



7.9.19 Post



Improved alpha peak

Much improved delta and theta power.

Much improved reduction in what is believed to be neuro-inflammation

BIOCIDIN®

BROAD-SPECTRUM LIQUID FORMULA AND LIQUID CAPSULES

- Selectively supports simultaneous clearance of multiple classes of harmful organisms*
- Disrupts and dismantles biofilm formations*
- Clinical research shows immunomodulatory activity*
- Addresses inflammation through multiple activities*
- May improve regularity and reduce bloating and gas*
- Helps improve vitality and mental clarity*
- Supports healthy mobility and body comfort*



**Biocidin
Botanicals™**

*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.



G.I. DETOX™+

ZEOLITE, CHARCOAL, & HERBAL FORMULA

- Assists in “mop up” of microbial and biofilm components*
- Supports healthy detoxification and full-body cleansing*
- Supports clearance of mold metabolites*
- Helps in the neutralization of histamine*
- Supports a more comfortable cleansing experience*
- May reduce bloating and gas*
- Supports microbiome balance*
- Recommended for use with Biocidin®



**Biocidin
Botanicals™**

*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.

