



# MENTAL WELLNESS



## The Brain-Body-Biome (How Mental Wellness Drives a Multi-Faceted Impact on Physical Health)

Shawn Talbott, PhD  
CNS, LDN, FACSM, FAIS, FACN



## Dr. Shawn Talbott

Amare's Chief Science Officer

PhD, CNS, LDN, FACSM, FAIS, FACN

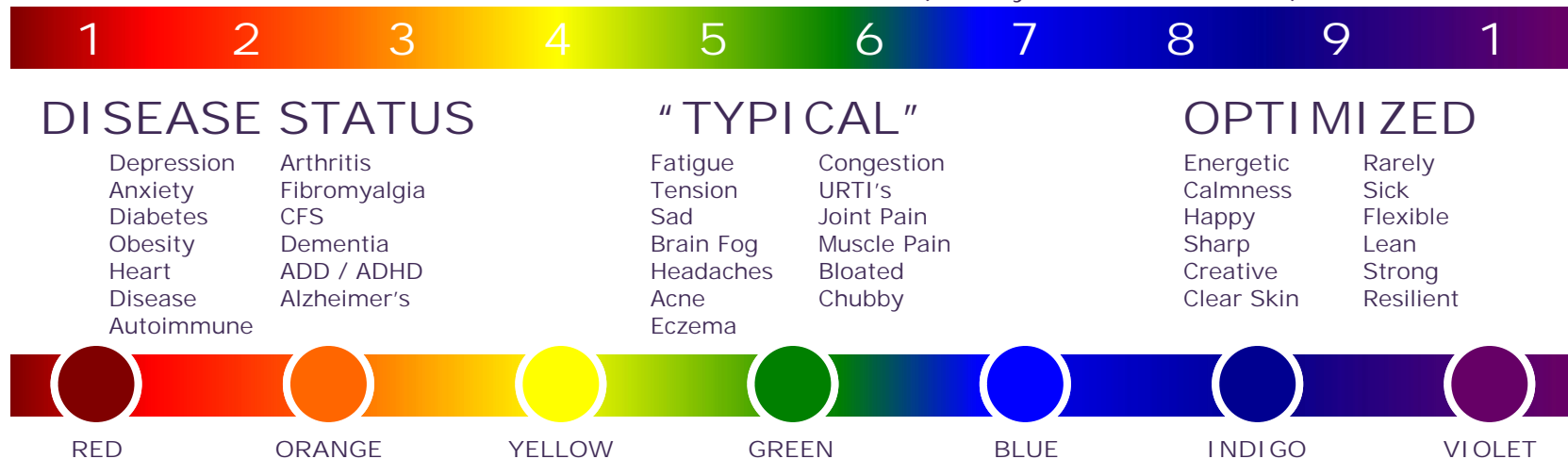
- 20+ years of experience developing nutritional products
- Fellow of the American College of Nutrition, the American College of Sports Medicine, and the American Institute of Stress
- Author of two academic textbooks, an award-winning documentary film, and several best-selling books that have been translated into multiple languages.
- Featured guest on The Dr. Oz Show, Ask Dr. Nandi, The TED stage and the White House
- Served as a nutrition educator for elite-level athletes
- Diplomate of the International Olympic Committee's (IOC) Sports Nutrition program
- [ShawnTalbott.com](http://ShawnTalbott.com) / [Amare.com](http://Amare.com)



100

1. How you feel is not just in your head – it's also in your gut.
2. Our "second brain" includes the Microbiome and plays a major role in mental wellness.
3. You can now DO something NATURALLY to improve your mental wellness.

WHERE ARE YOU ON THE MENTAL WELLNESS CONTINUUM? (Circle your current number)



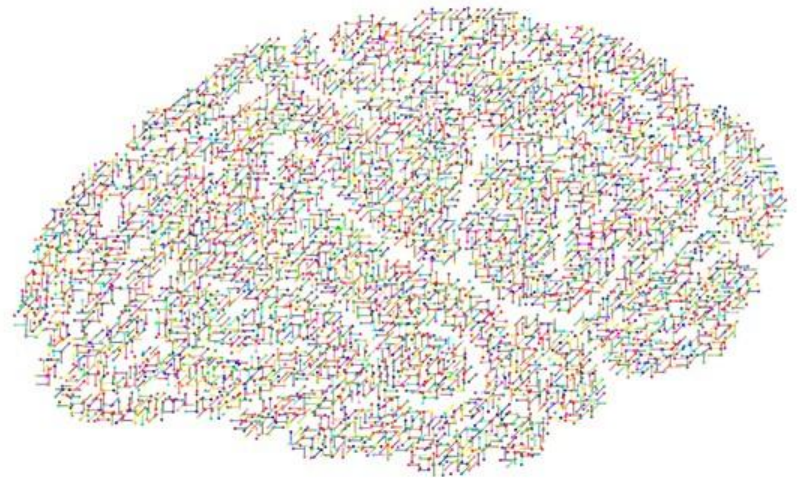


# The NEW Science of Mental Wellness

Science has forever focused on the BRAIN as the primary source to addressing mental wellness problems & answers.

We've been relying highly on antidepressants and other forms of serotonin reuptake inhibitors (SSRIs) to resolve these issues.

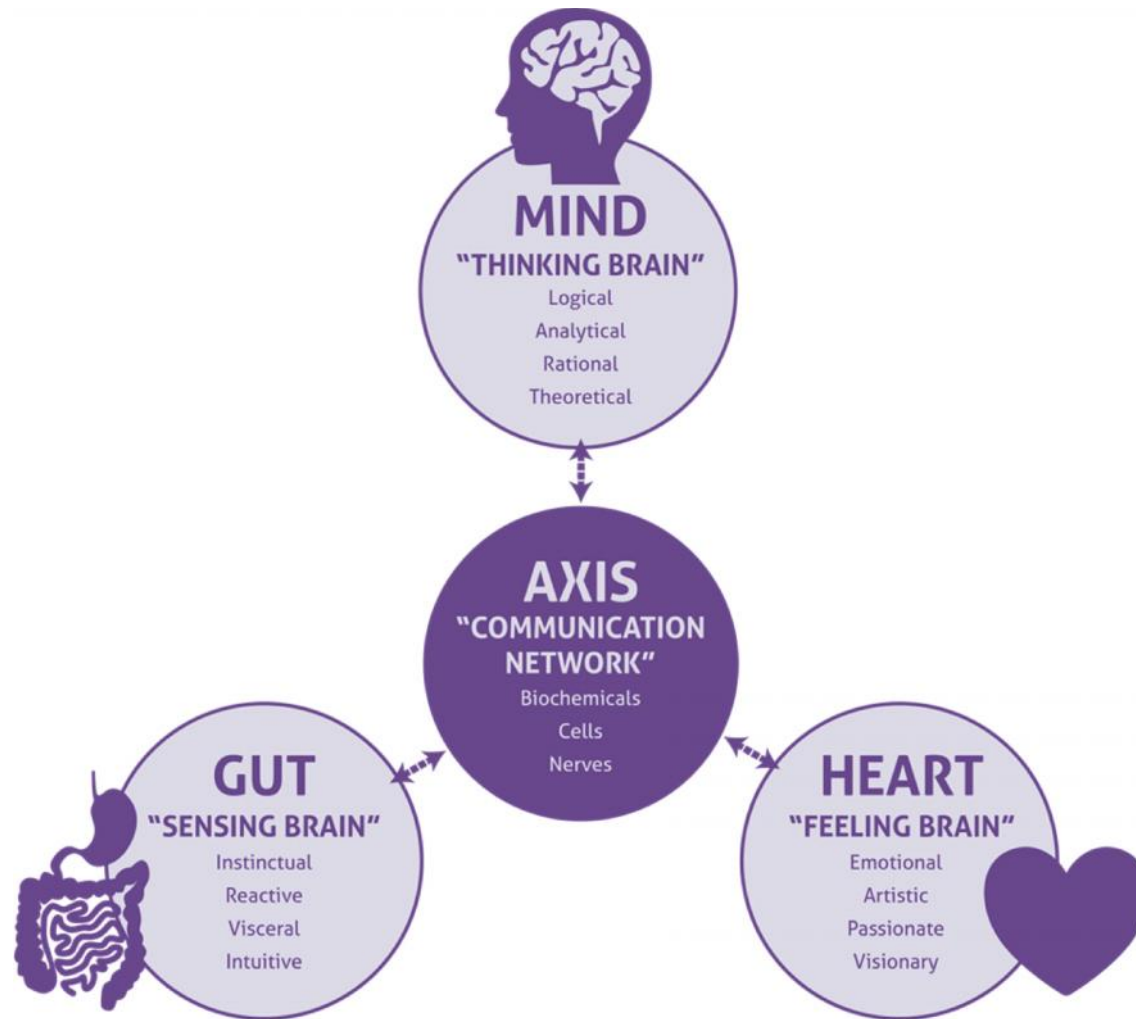
**BUT IS THIS THE RIGHT SOLUTION?**



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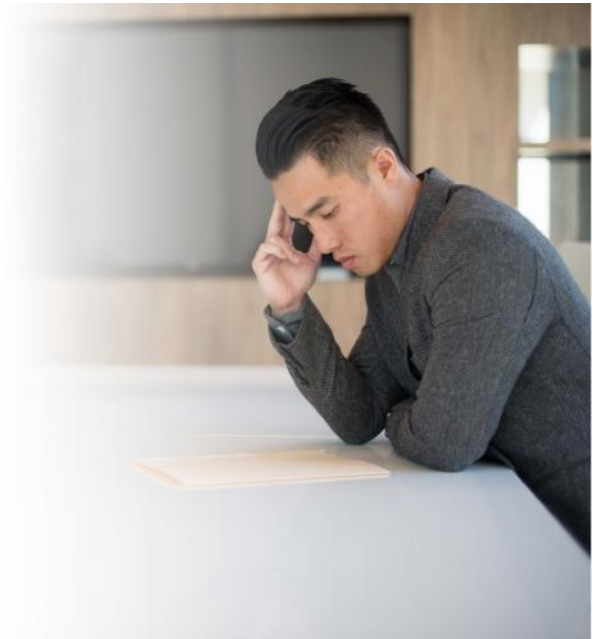
**Problem – Old science = how you feel is *not* just in your head**



**What if you could harness the *new* science (gut-heart-brain-axis)**

# GRIM REALITY

- Americans spend over \$100 billion annually on “feel better” products, from painkillers and anti-depressants to alternative and complementary therapies
- 100 million Americans suffer from chronic pain – this is one of the top reasons for the \$100 billion expenditure
- 350 million people globally are affected by depression each year – another major reason for the \$100 billion expenditure
- 90% of adolescents have a depressive disorder before the age of 18



# GRIM REALITY

- 800,000 people die of suicide each year – that's over 2000 suicides per day
- 24 million people, some as young as 12 years old, received treatment for illicit drug or alcohol abuse in 2016
- 1 in 5 new mothers in the U.S. report postpartum depression each year
- The World Health Organization calls stress "the health epidemic of the 21st century"
- 85% of the nation's 20 million college students reported feeling overwhelmed by stress - and more than 35% reported feeling "depressed" to the point of dysfunction









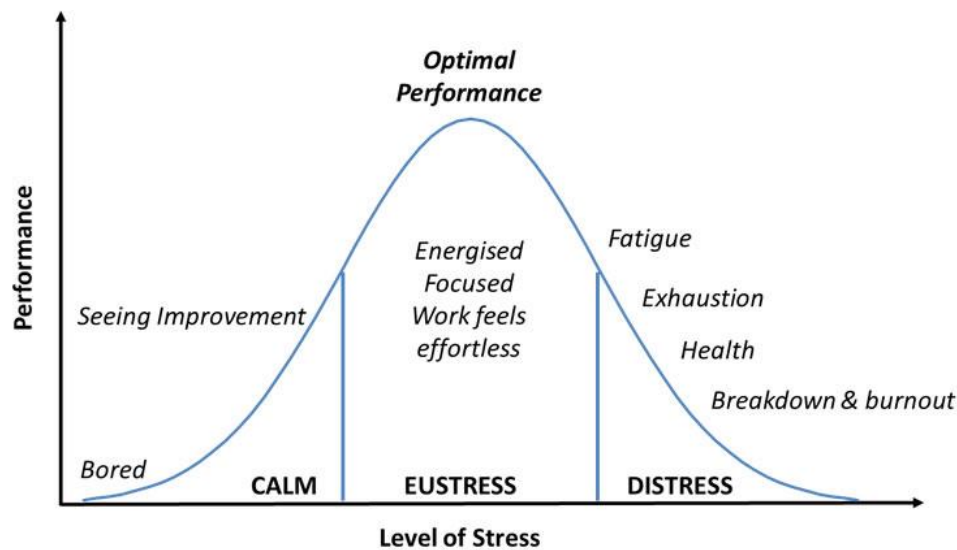
### **ACUTE STRESS**

- brief
- normal circadian rhythm
- adaptive

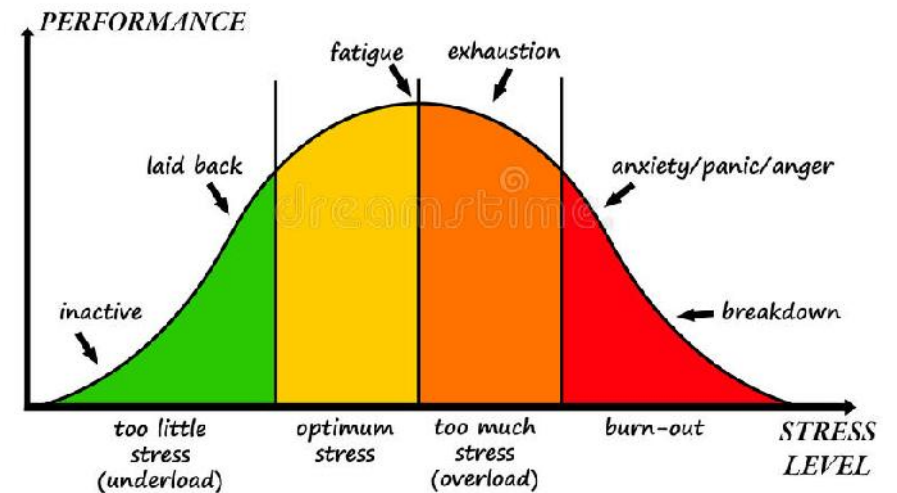
### **CHRONIC STRESS**

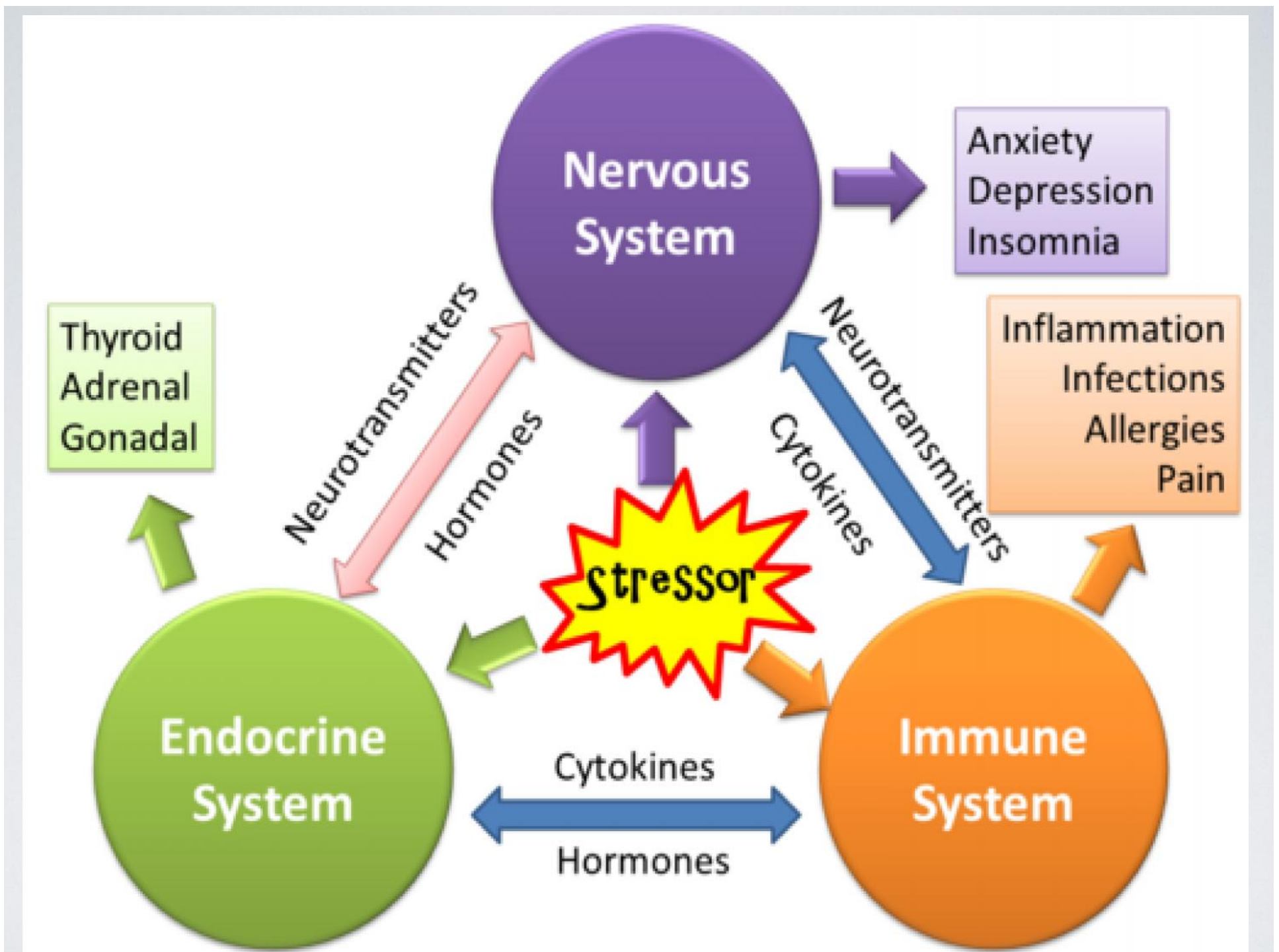
- prolonged & repeated
- disrupted circadian rhythm
- maladaptive

## Yerkes-Dodson Curve of Human Performance



## STRESS CURVE





## Why Zebras Don't Get Ulcers...

Robert Sapolsky, PhD  
*Stanford University*  
*Stress Physiology*

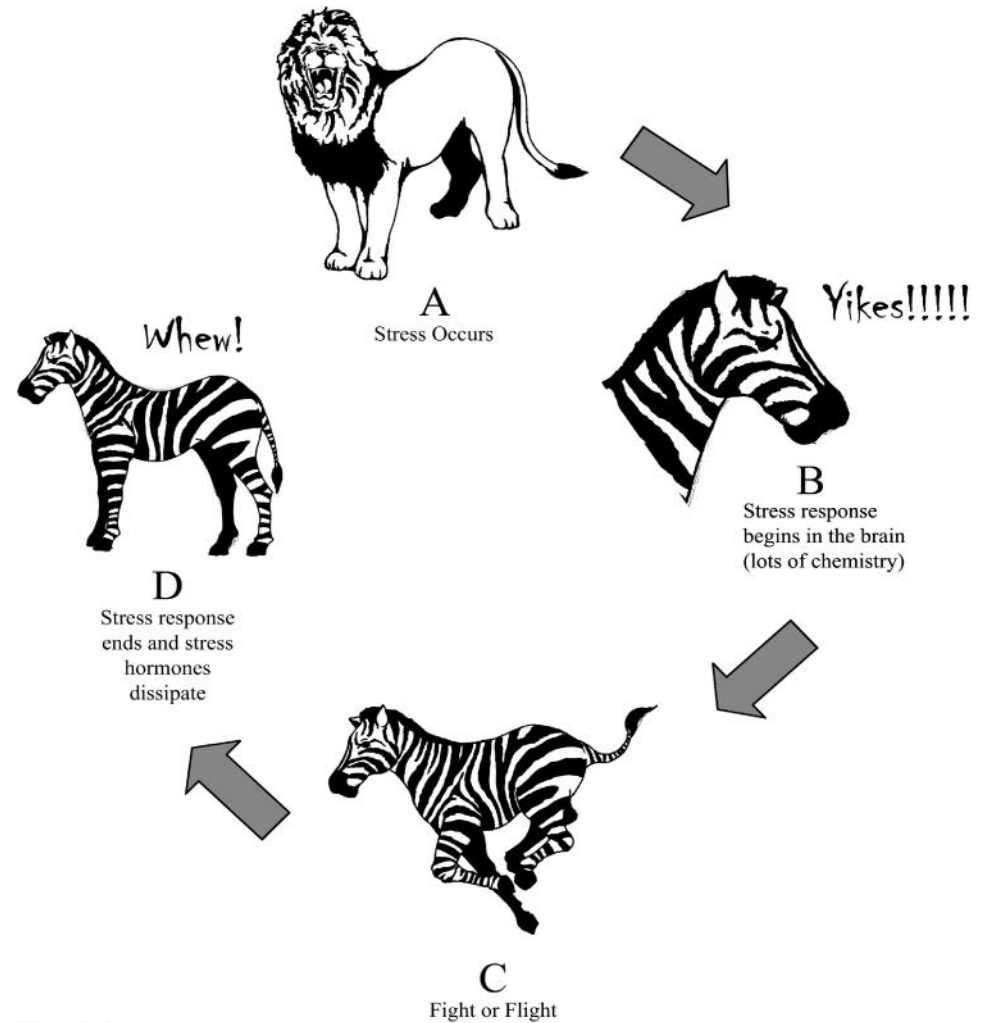


Figure 1.1  
The "normal" stress response

## Humans are *not* Zebras...

...and are not meant to harbor *chronic* stress

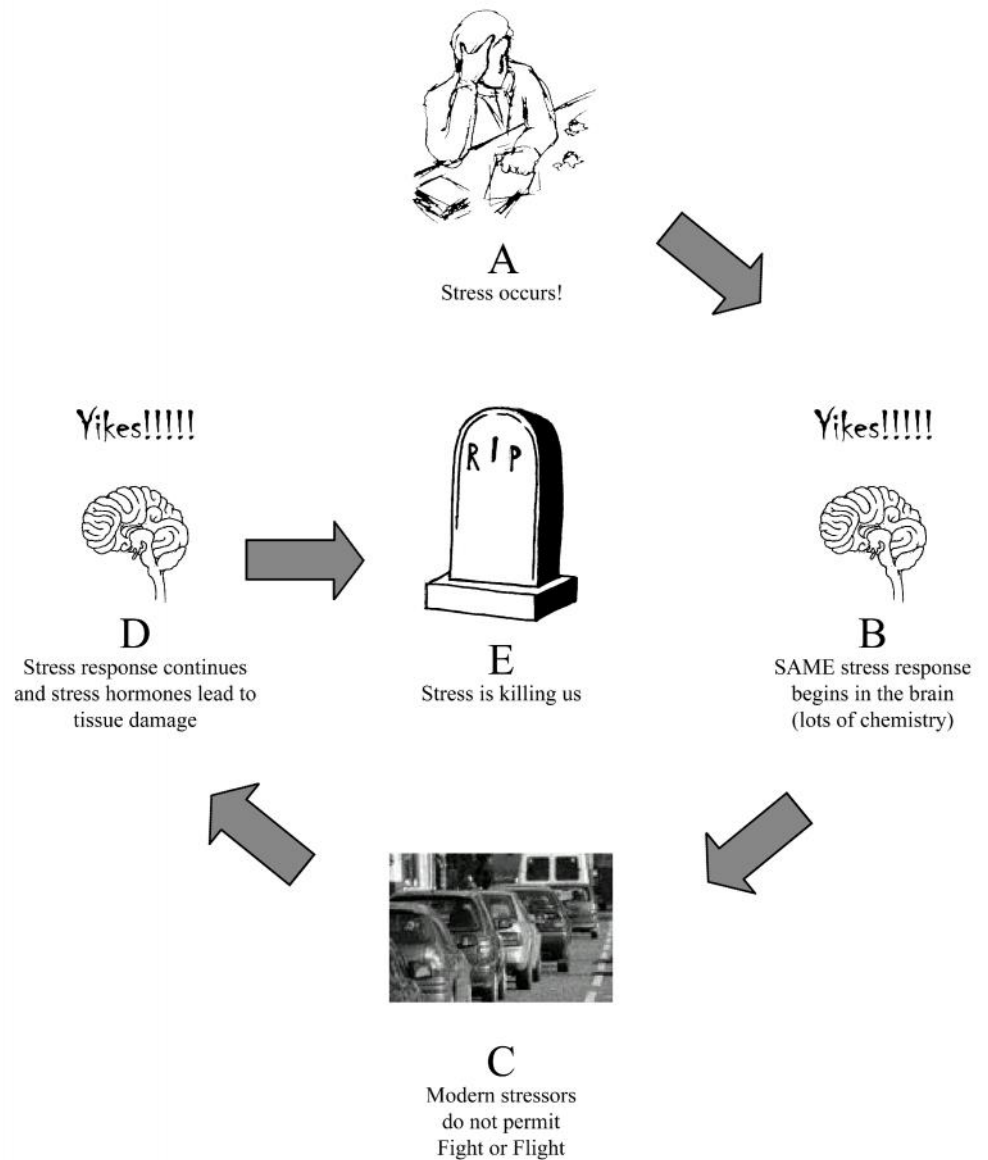
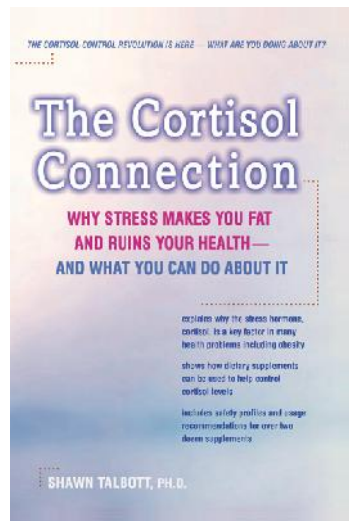
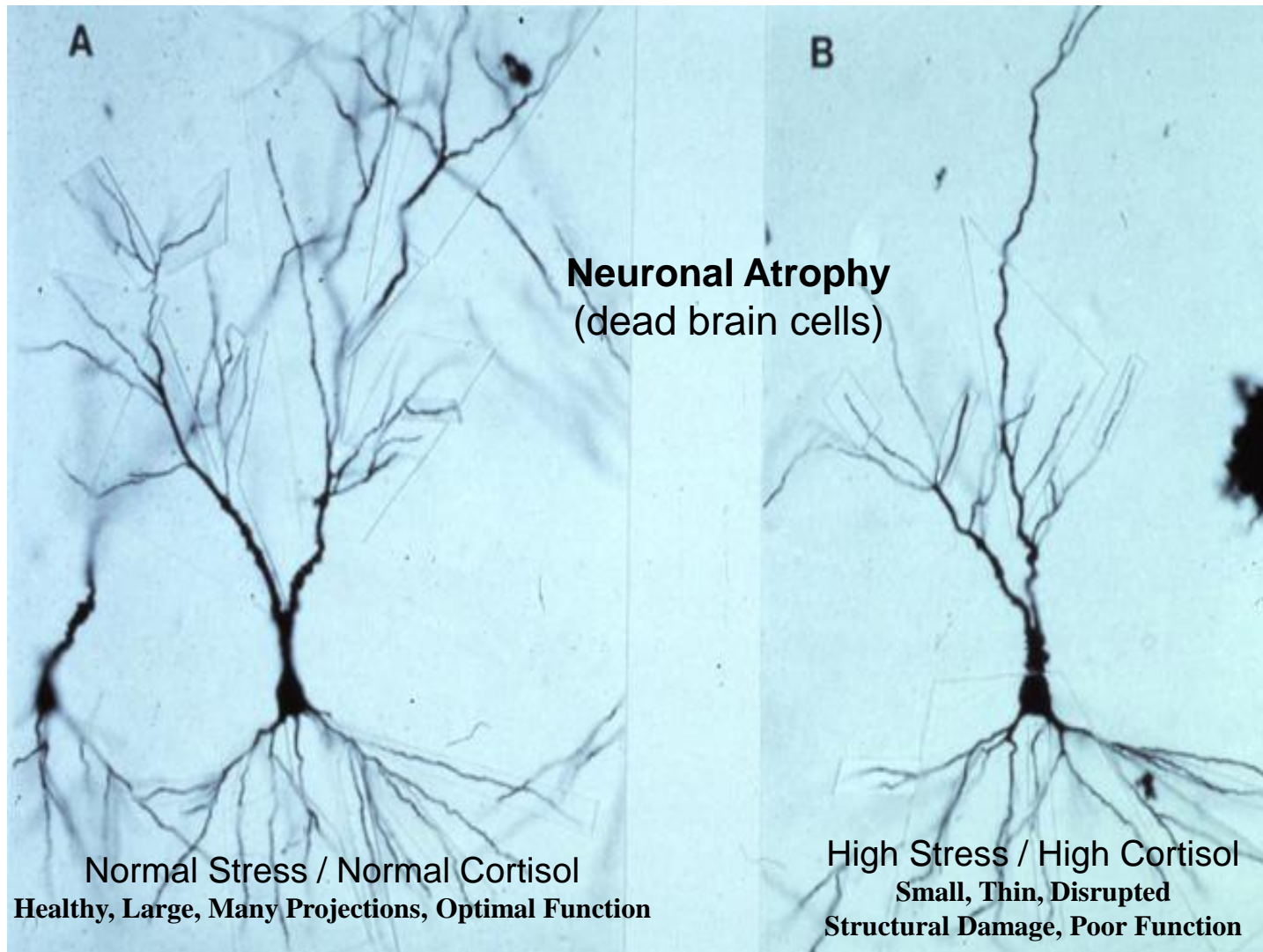


Figure 1.2  
The "Type C" personality (The HUMAN stress response)

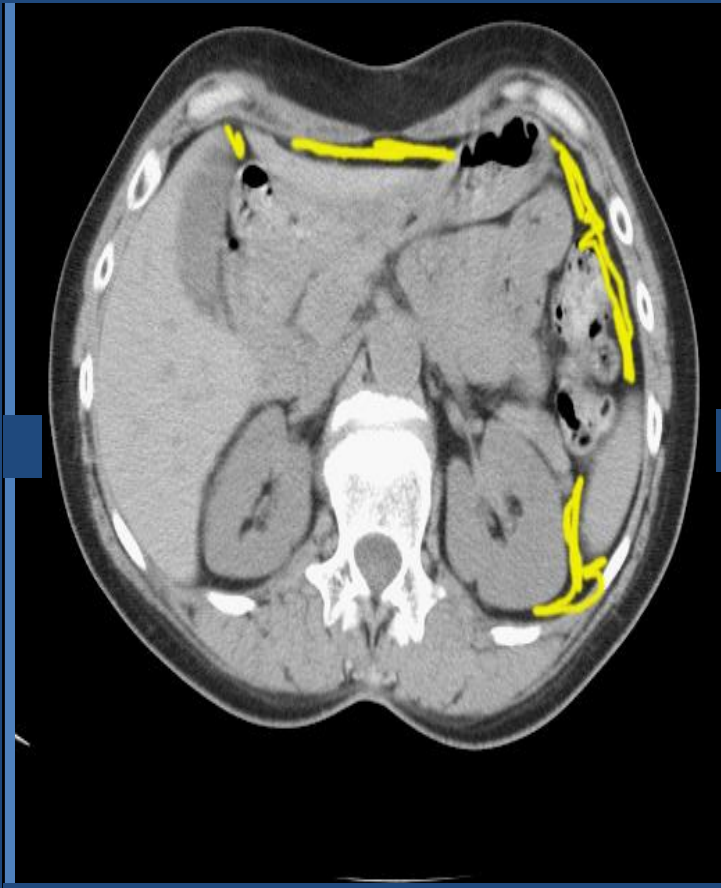




## Abdominal Fat Accumulation



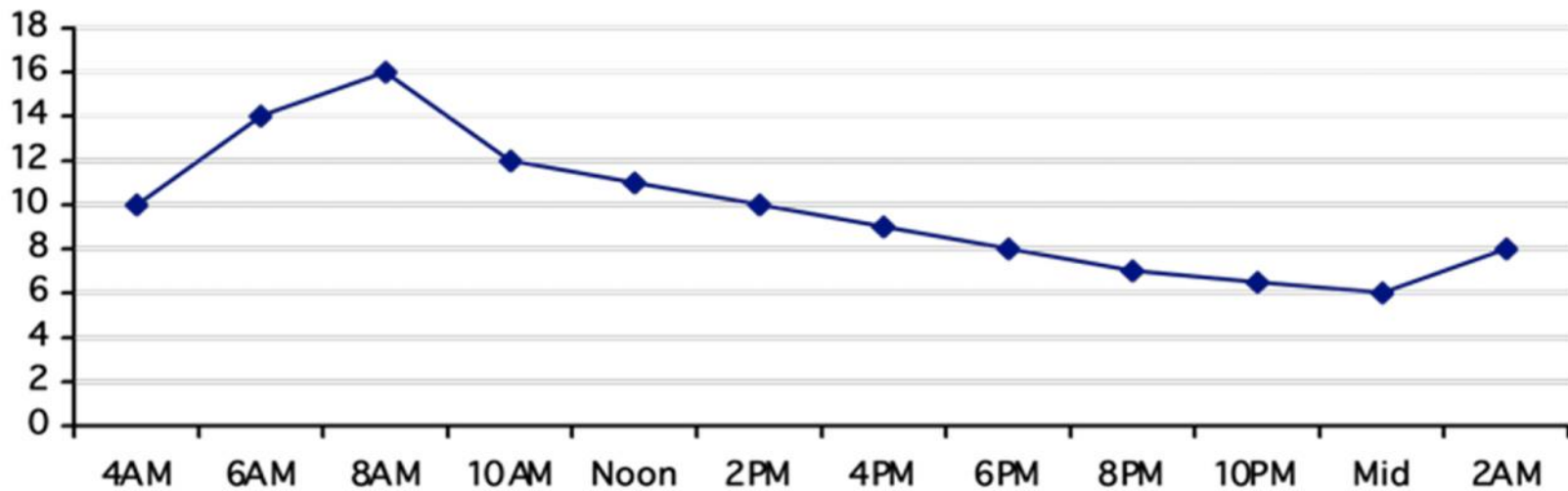
High Stress / High Cortisol



Normal Stress / Normal Cortisol

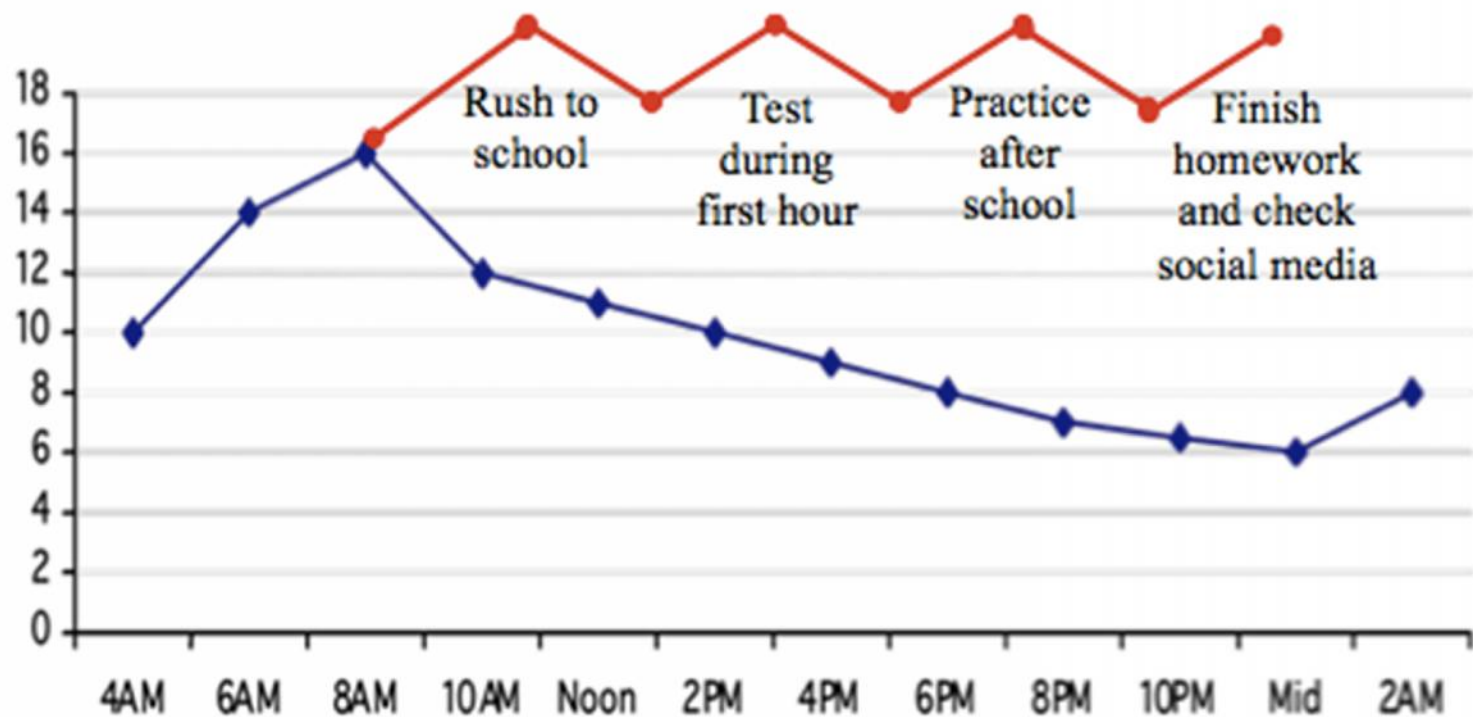
# "Normal" Diurnal Cortisol Rhythm

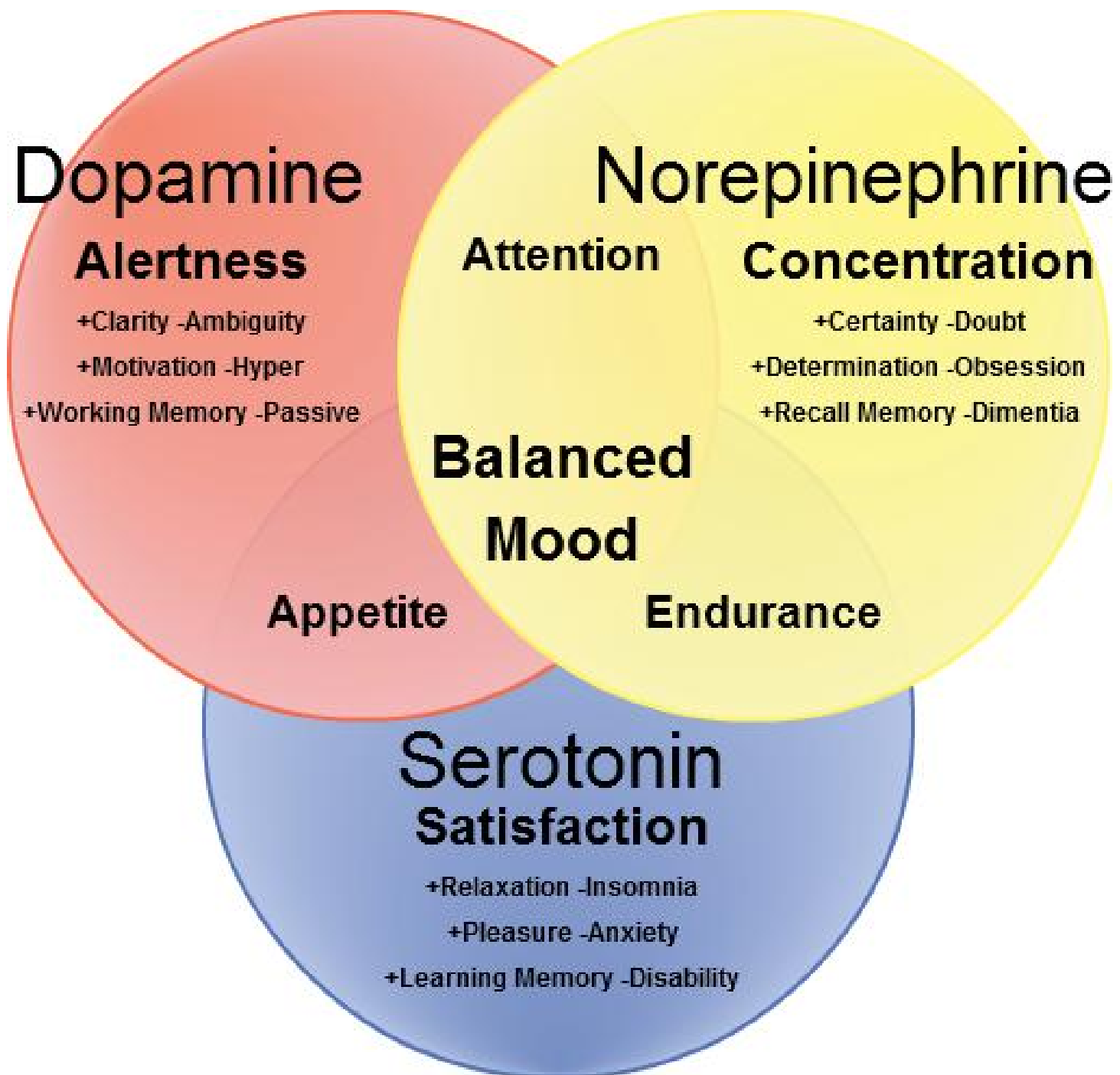
Cortisol Levels Throughout the Day



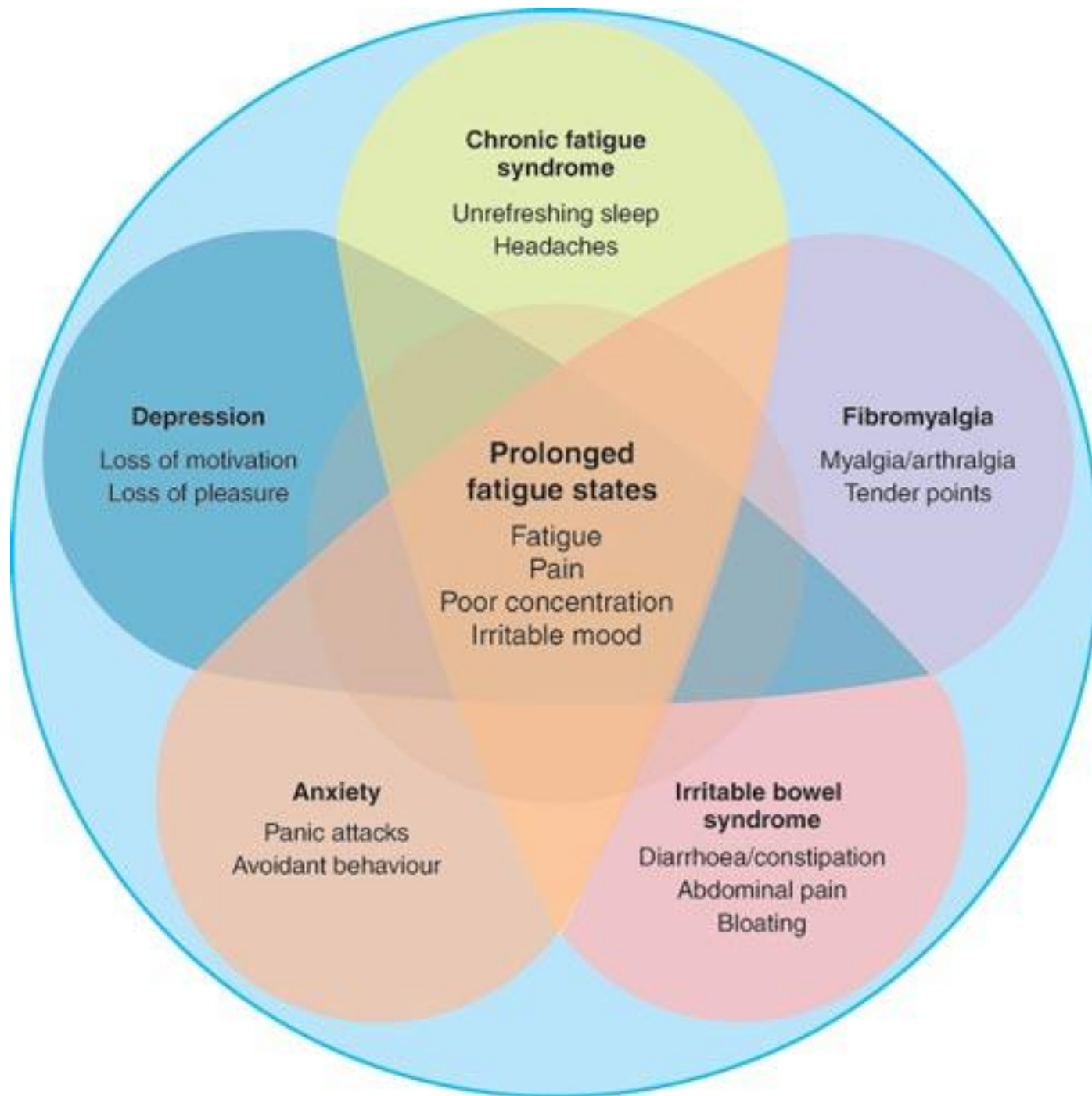
# "Modern" Adolescent Cortisol Rhythm

Cortisol Levels Throughout the Day









# RECENT SCIENTIFIC DISCOVERIES

- Science now tells us that we actually have a **SECOND BRAIN**!
- There has been a massive scientific shift towards the **MICROBIOME**, also known as our gut and second brain, as being the source to addressing mental wellness issues.



# DID YOU KNOW?

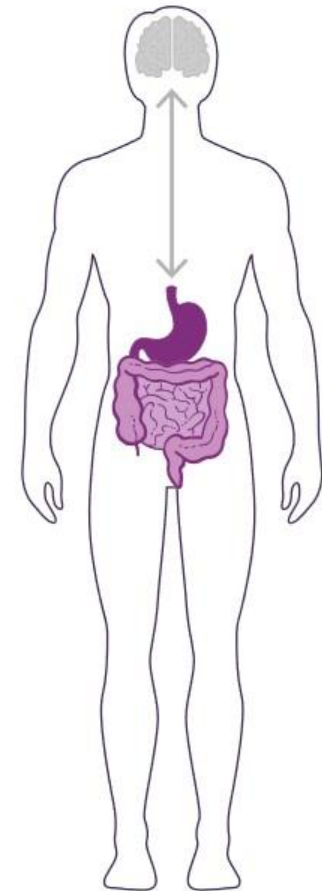
- **90% of the cells in your body are non-human**
  - Human genes = ~23,000
  - Bacterial genes = ~20 million (~1,000x **MORE** than human genes)
- **Microbiome is an ecological community of trillions of bacteria living symbiotically in/on our body**
  - "2<sup>nd</sup> Brain" = 3-4 lbs (approximately the same size as our 1<sup>st</sup> brain)

**YOUR GUT IS CONSIDERED  
YOUR SECOND BRAIN**



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# HOW IMPORTANT IS YOUR MICROBIOME?

- Communicates with the brain to regulate health, weight, immune function, digestive function, mood, and overall mental health.
- What we put in our bodies affects the microbiome, which in turn affects our mind and other crucial bodily systems

## IN BALANCE

Feeling Great

## OUT OF BALANCE

Feeling fatigue, sad, tense, hungry, heavy, bloated, confused, stiff/sore

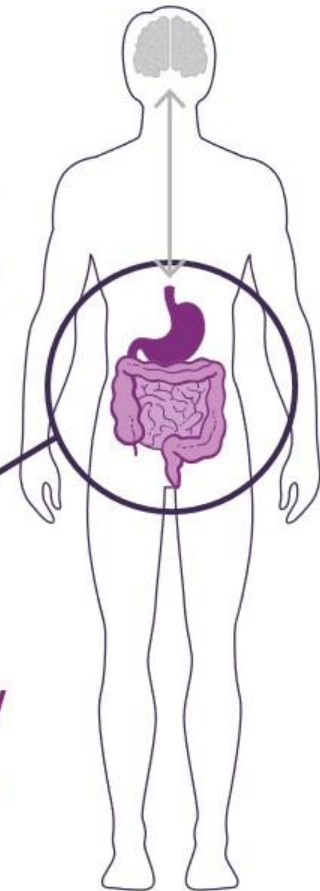


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The microbiome plays an important role in the way you feel mentally & physically.



This explains why you have those "GUT-FEELINGS"





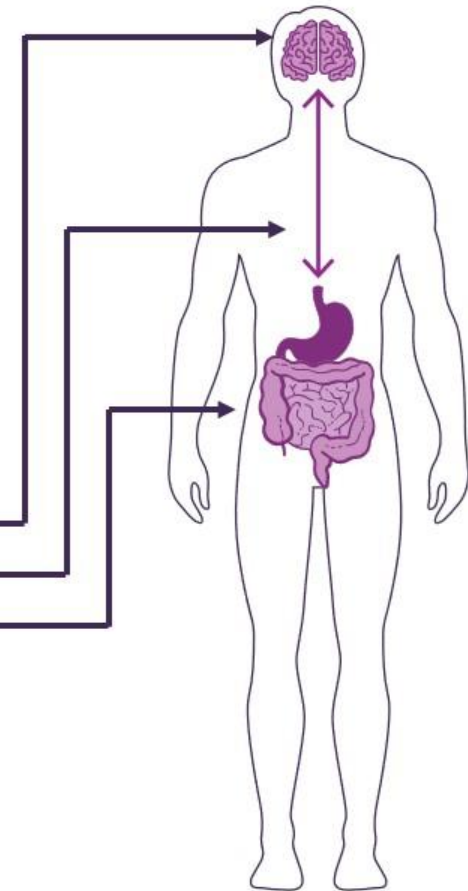
# HOW DO YOUR “TWO BRAINS” COMMUNICATE?

Our “two brains” communicate through a highly extensive network, known as the **gut-brain axis (GBX)**.

## NETWORK CONSISTS OF:

- “wires” – nerves
- “chemicals” – neurotransmitters/hormones
- “cells” – immune system

The GBX connects our **nervous system (brain)**, **immune system (axis)**, and **gastrointestinal system (gut)** with a vast array of cellular and biochemical messengers throughout the entire body, which include the microbiome, hormones, cytokines, and neurotransmitters.



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**Obese  
Overeating**



Obesogenic  
microbiota

**Lean**



Germ-free

**Obese  
Overeating**



Obesogenic  
microbiota

**Timid  
“Introvert”**



Normal gut  
microbes

**Outgoing  
“Extrovert”**



Germ-free

**Timid  
“Introvert”**



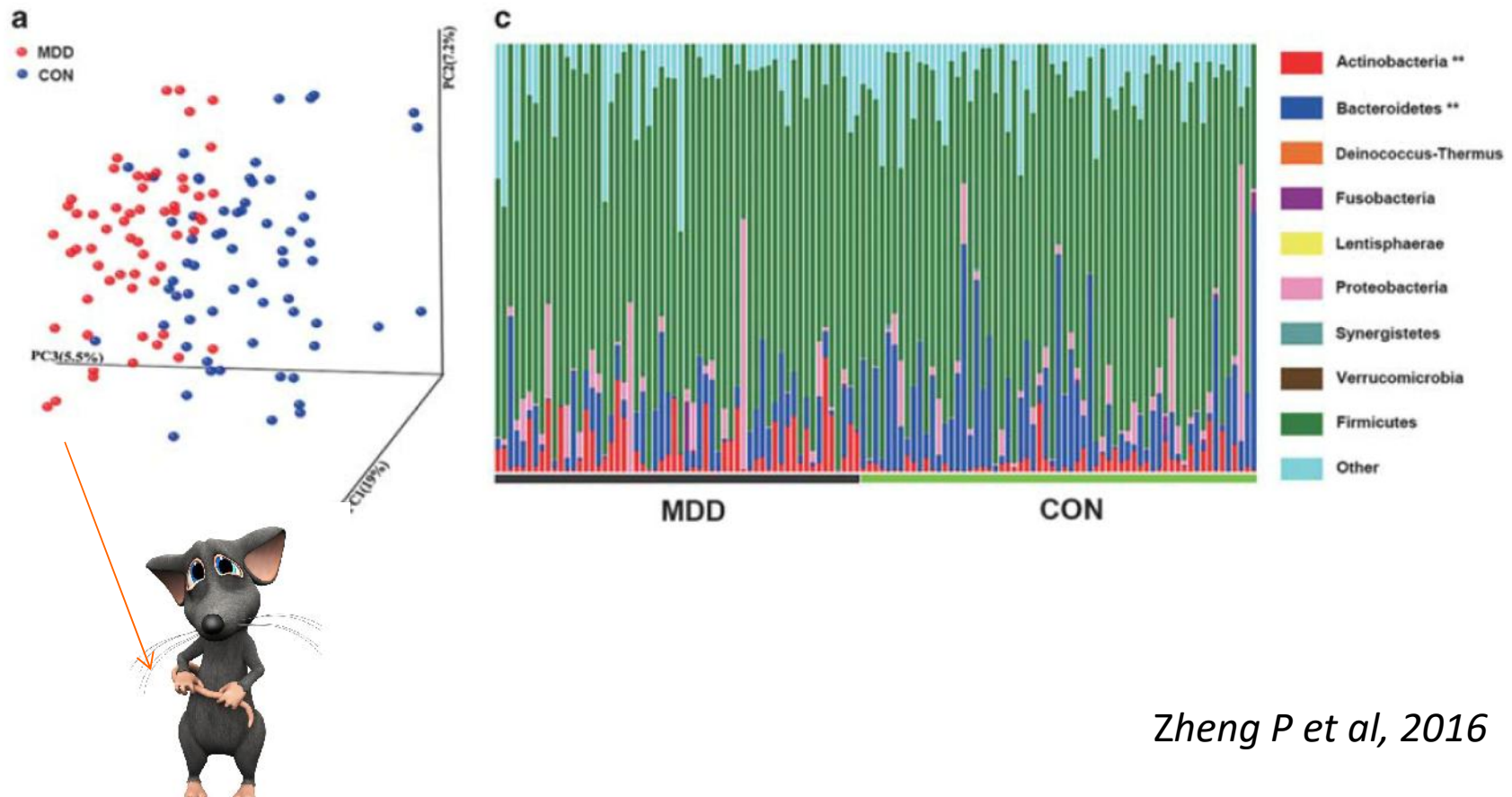
Transplanted



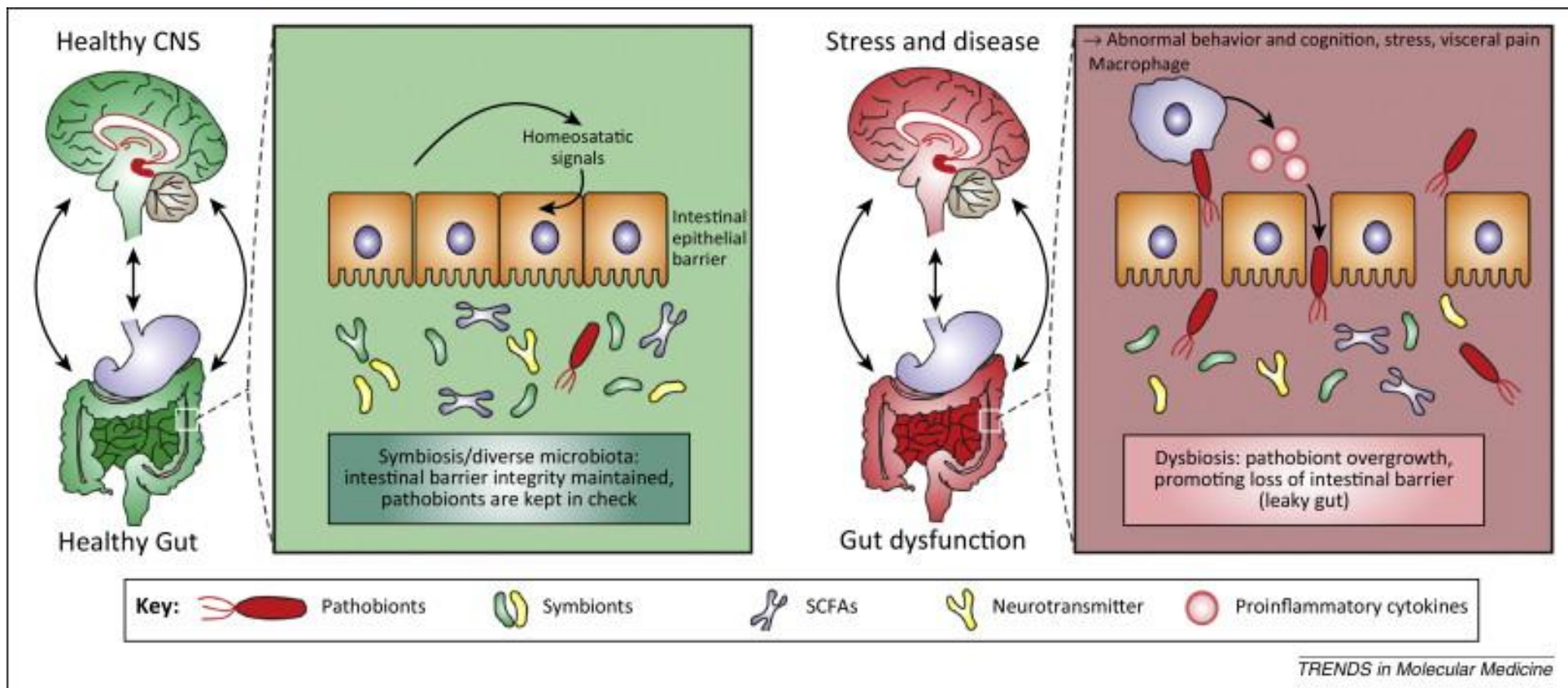
# Depression

## ORIGINAL ARTICLE

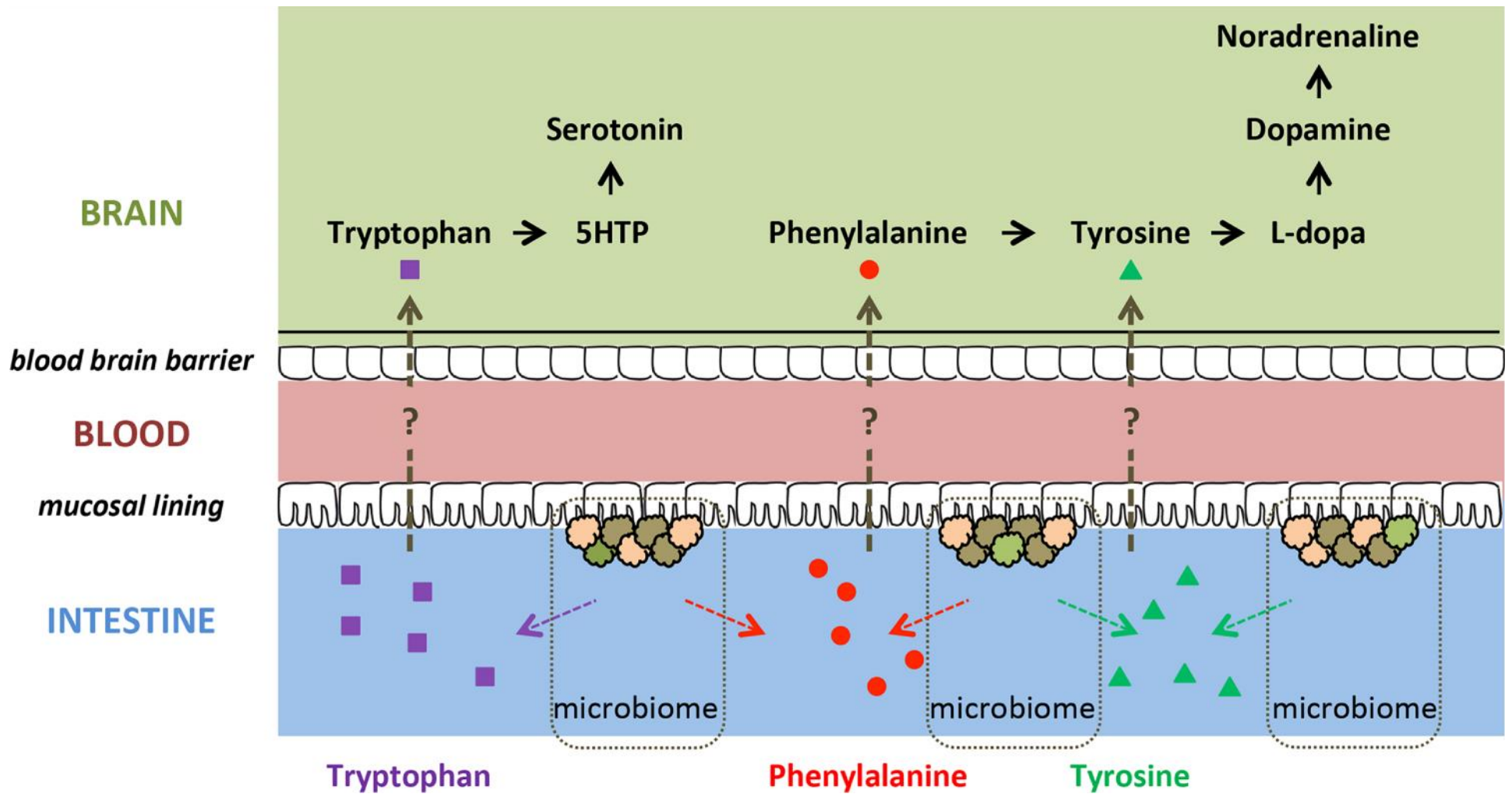
Gut microbiome remodeling induces depressive-like behaviors through a pathway mediated by the host's metabolism



Zheng P et al, 2016

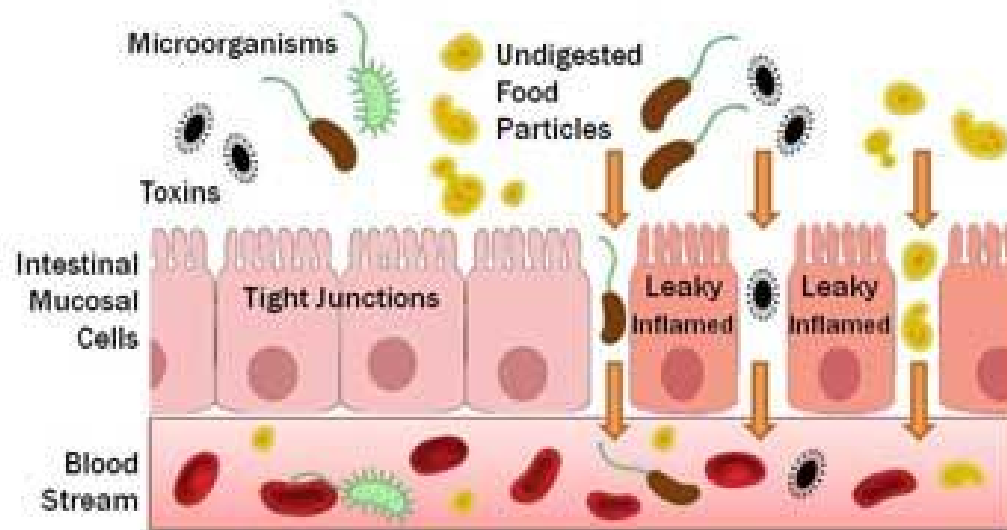








# The Leaky Gut Syndrome



## RESPONSE BY IMMUNE SYSTEM

Breach of Blood-Brain Barrier

Food Intolerances & Allergies

Autoimmunity & Inflammation

Malabsorption & Nutrient Deficiency

### Metabolic Syndrome

Obesity, T2 Diabetes,  
Hypercholesterolemia,  
Hypertension

### Neurological Disorders

Depression, Anxiety,  
ADD, ADHD, Autism,  
Dementia, Epilepsy

### Autoimmune Disorders

Irritable bowel  
syndrome, Crohn's,  
Celiac, Allergies, Cancers

probiotic treatment of mice with autism features

alters the composition  
of the gut microbiota

improves epithelial  
barrier integrity

reduces leakage of  
particular GI metabolites

restores serum metabolites

ameliorates specific autism-related behavioral abnormalities



RESEARCH

Open Access



# A prebiotic intervention study in children with autism spectrum disorders (ASDs)

Roberta Grimaldi<sup>1,2\*</sup>, Glenn R. Gibson<sup>1</sup>, Jelena Vulevic<sup>2</sup>, Natasa Giallourou<sup>3</sup>, Josué L. Castro-Mejía<sup>4</sup>, Lars H. Hansen<sup>5</sup>, E. Leigh Gibson<sup>6</sup>, Dennis S. Nielsen<sup>4</sup> and Adele Costabile<sup>6</sup>

*Original Article*

Advance Publication

## Dietary supplementation with partially hydrolyzed guar gum helps improve constipation and gut dysbiosis symptoms and behavioral irritability in children with autism spectrum disorder

Ryo Inoue,<sup>1,\*</sup> Yuko Sakaue,<sup>2</sup> Yuki Kawada,<sup>1</sup> Ryuji Tamaki,<sup>1</sup> Zenta Yasukawa,<sup>3</sup> Makoto Ozeki,<sup>3</sup> Satoko Ueba,<sup>4</sup> Chihiro Sawai,<sup>2</sup> Kazuo Nonomura,<sup>4</sup> Takamitsu Tsukahara<sup>5</sup> and Yuji Naito<sup>6</sup>

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<sup>3</sup>Taiyo Kagaku Co., Ltd., 1-3 Takaramachi, Yokkaichi, Mie 510-0844, Japan

<sup>4</sup>Moriyama Municipal Hospital, 4-14-1 Moriyama, Shiga 524-0022, Japan

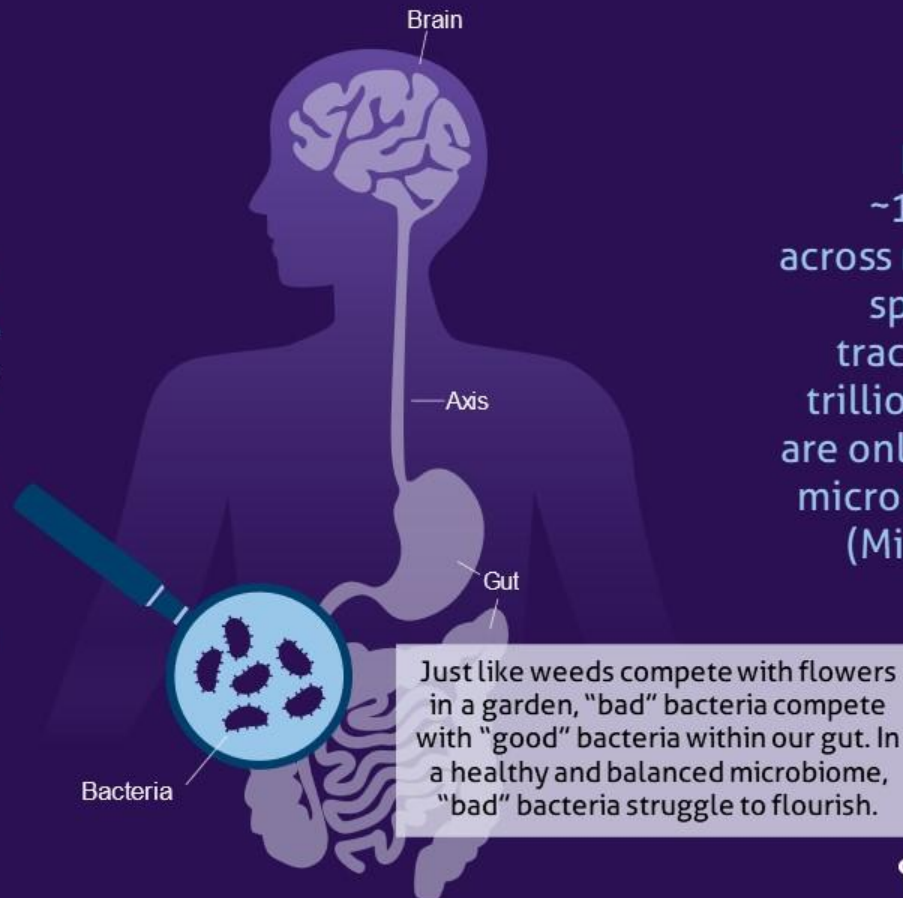
<sup>5</sup>Kyoto Institute of Nutrition & Pathology, Ujitawara, Kyoto 610-0231, Japan

<sup>6</sup>Department of Molecular Gastroenterology and Hepatology, Kyoto Prefectural University of Medicine, Kamigyo-ku, Kyoto 602-8566, Japan

# HEALTHY GUT HEALTHY MIND

## TWO Brains?

Did you know that we have two brains? One in our head and one in our gut- the **2nd brain**. They are connected by a communication axis. The emerging science of the **Gut-Brain Axis** (GBX) indicates that many mental wellness issues originate as imbalances in the GBX.



## 100% Human

Did you know that we have ~100 trillion microorganisms across more than 10,000 different species (Microbiota) in our GI tract? Compare that to our ~10 trillion human body cells and we are only **10% human!** Those same microbiota have ~9 million genes (Microbiome) compared to our ~23,000 human genes.

Therefore based on gene count, we are **less than 1% human!**



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# BAD vs GOOD

A Balanced Microbiome Supports:

## BAD Bacteria

Campylobacter Jejuni & Salmonella Enterica  
– Results in food poisoning and inflammation

Enterococcus Faecium  
– Causes post-surgical infections and inflammatory bowel conditions

Clostridium Difficile  
– Creates effects ranging from diarrhea to life-threatening inflammation

## BACTERIA

## GOOD Bacteria \*

Lactobacillus Helveticus R0052 \*  
– Improves mood by decreasing neuro-inflammation & increasing serotonin metabolism

Bifidobacterium Longum R0175 \*  
– Enhances calmness by decreasing anxiety indices & enhances cognitive function

Lactobacillus Rhamnosus R0011\*  
– Reduces stress by lowering cortisol exposure & improving GABA neurotransmission



Healthy Inflammatory Balance

Robust Immune Protection



Optimal Digestive Process

\*featured in MentaBiotics™



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# IT GOES BOTH WAYS...

## The Brain Can Affect the Gut

"Butterflies in our stomach" form when we're in love or anxious



Fear or sadness makes us "sick to our stomach"



Acute stress can suppress our appetite (short-term), while chronic stress can increase appetite and cravings for comfort foods (stress-eating)



## The Gut Can Affect the Brain

When we eat, receptors in the gut cause the release of enzymes to aid digestion



Gut cells, including microbiome bacteria, send signals to the brain via nerves and hormones to indicate hunger or satiety (fullness)



The gut produces as much as 60%-90% of neurotransmitters involved in mental wellness, including dopamine and serotonin



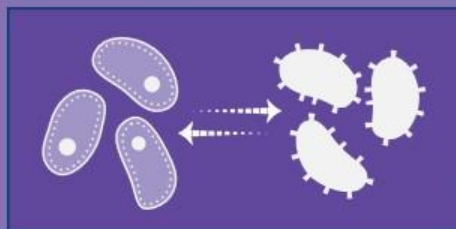
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# THE GUT BRAIN AXIS

The “**Axis**” between the Gut and the Brain coordinates communications



Nerves— such as the vagus nerve, provide a “hard-wired” connection between the gut and the



Cells— including the immune system, interact with the gut microbiota



Biochemicals – including hormones, neurotransmitters, and cytokines transmit signals through the blood stream



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# Balance the GUT with NUTRITION

## PROBIOTICS

Probiotic foods contain live "good bacteria" which support mental wellness and aid digestion. Examples include fermented foods such as yogurt, kefir, kimchi, kombucha, sauerkraut, miso, tempeh, and Probiotic supplements.



## PREBIOTICS

Prebiotic foods contain fibers and carbohydrates that can be fermented and digested by gut bacteria to serve as a fuel source and encourage growth of beneficial bacteria. Examples include asparagus, bananas, green leafy vegetables, garlic, leeks, onions, chicory, ginger, and Prebiotic supplements.



## PHYTOBIOTICS

Phytobiotic foods are rich in flavonoids which protect good bacteria and establish a hospitable environment for the growth of good and displacement of bad bacteria.

Examples include apples, grapes, dark chocolate, and berries.



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# Balance the MIND with LIFESTYLE Choices

Take time for a  
**MIND BREAK**

## **Sleep**

Inadequate or poor quality sleep increases stress hormone exposure (cortisol) and interferes with mood and mental function

Take time to  
**MOVE**



z  
z  
z  
z



## **Mindfulness**

Practice such as meditation, yoga, gratitude, and mindful breathing reduce stress and anxiety

Take time to  
**SLEEP**

## **Physical Activity**

Regular exercise is shown to reduce stress, anxiety, and depression as effectively as antidepressant drugs



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# FOR YOUR GUT...

## THE PROBIOTIC STRAIN MATTERS



### ***Lactobacillus rhamnosus R0011:***

Reduces stress by lowering cortisol exposure and improves GABA neurotransmission\*



### ***Bifidobacterium longum R0175:***

Enhances calmness by decreasing anxiety indices and improves cognitive function\*



### ***Lactobacillus helveticus R0052:***

Improves mood by decreasing neuro-inflammation and increasing serotonin\*

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



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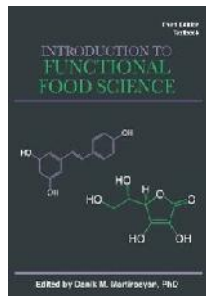
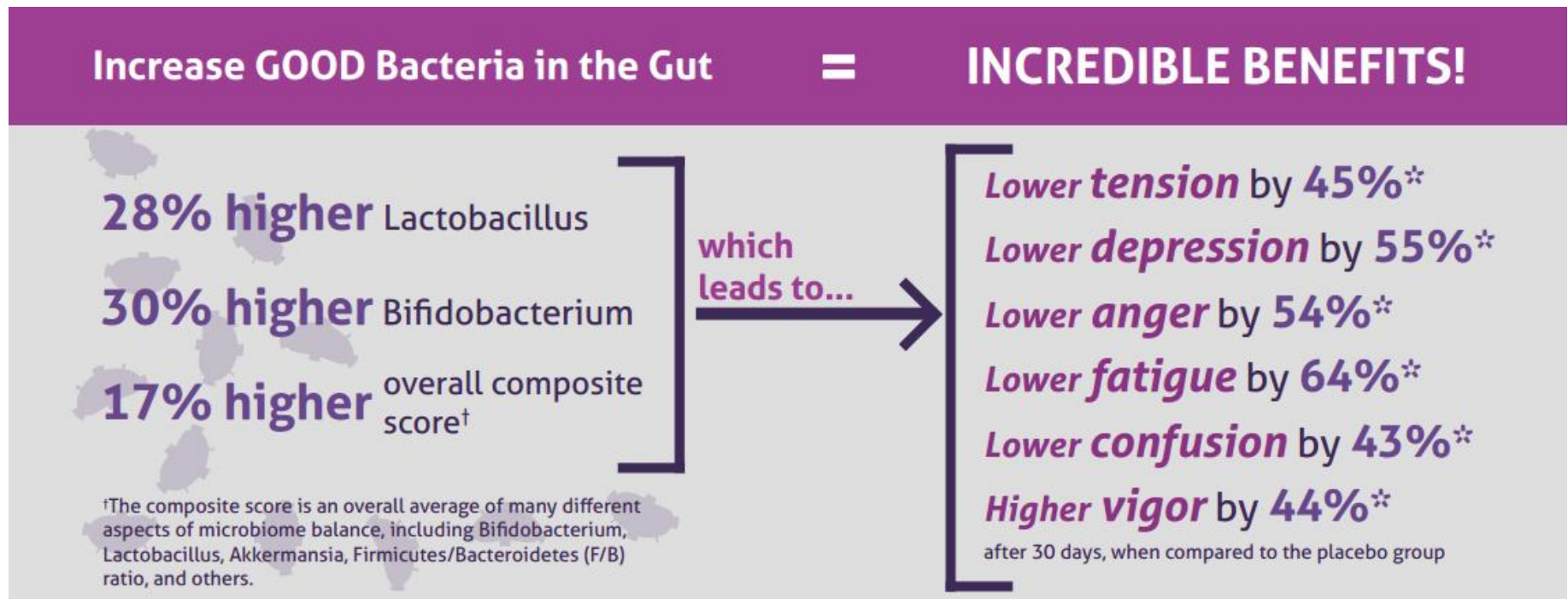
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## Effect of Coordinated Probiotic/Prebiotic/Phytobiotic Supplementation on Microbiome Balance and Psychological Mood State in Healthy Stressed Adults

Published = Functional Foods in Health & Disease Journal ([www.FFHDJ.com](http://www.FFHDJ.com))



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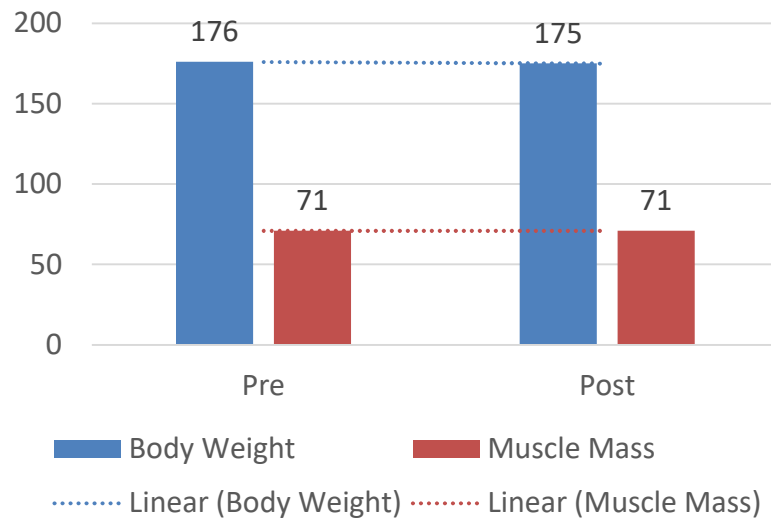
# Project b3 Study

- 33 Volunteers (10 Men / 23 Women)
- Age ~ 45y
- Weight = 176 lbs
- Fat = 27%
- 6 Weeks on Project b3 — *As Recommended...*
  - Reboot+
  - Amare FundaMentals Pack®
  - GBX Protein
  - GBX SuperFood
  - GBX SeedFiber

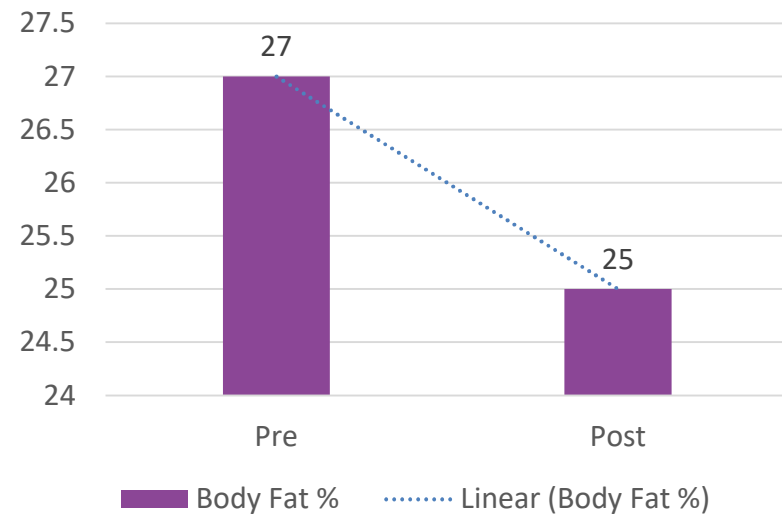


# Project b3 — 6 Weeks

## Body Weight & Muscle Mass

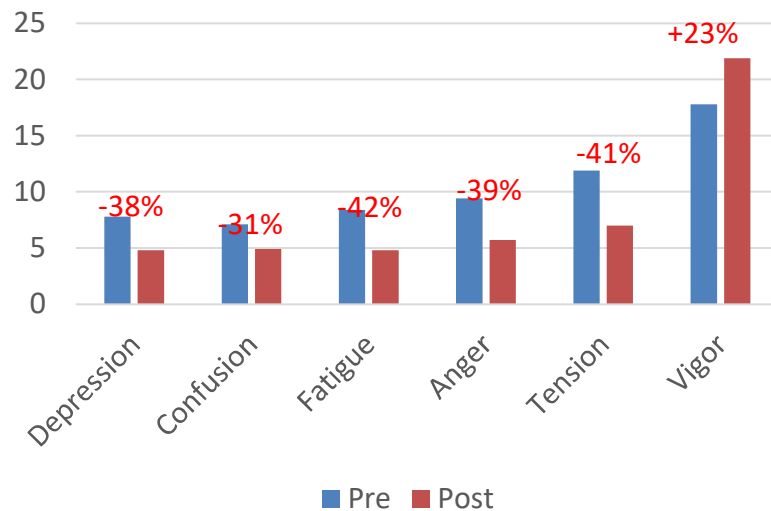


## Body Fat %

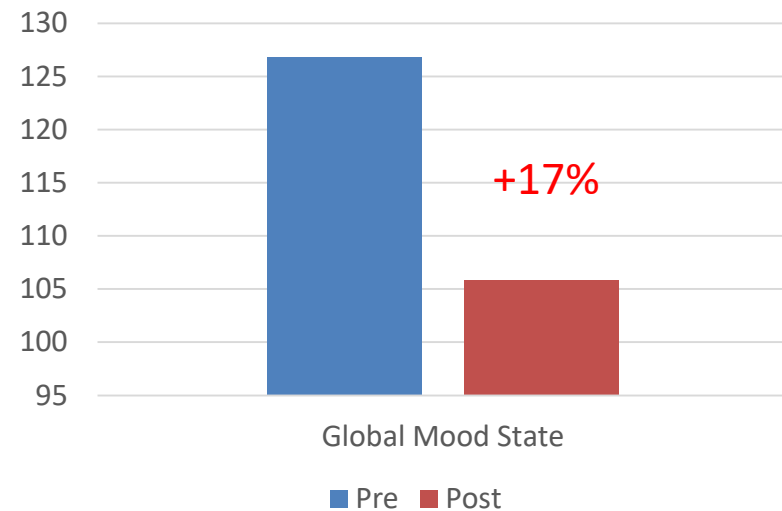


# Project b3 — 6 Weeks

## POMS Subscales

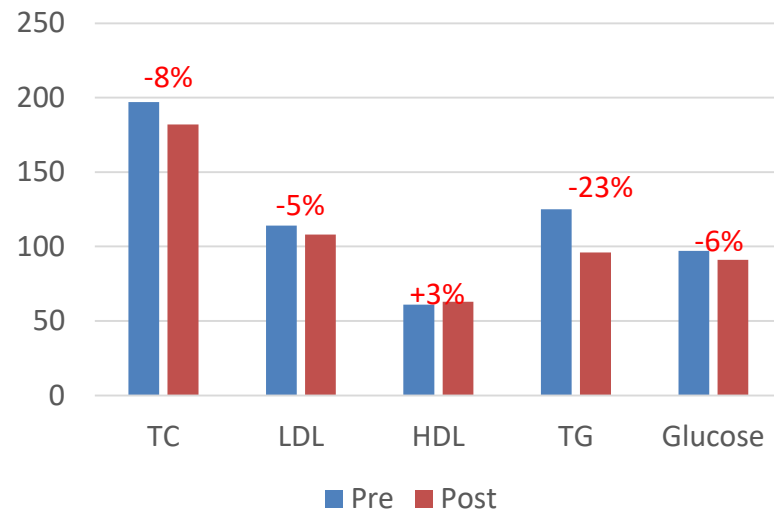


## Global Mood State

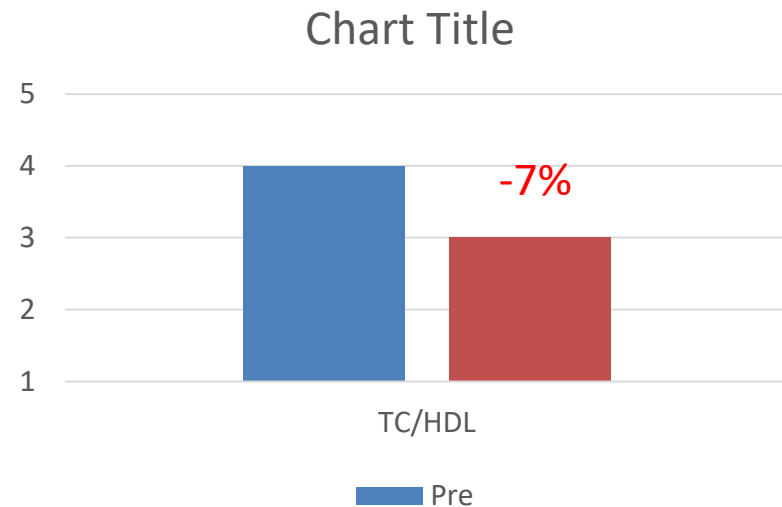


# Project b3 — 6 Weeks

## Blood Chemistry



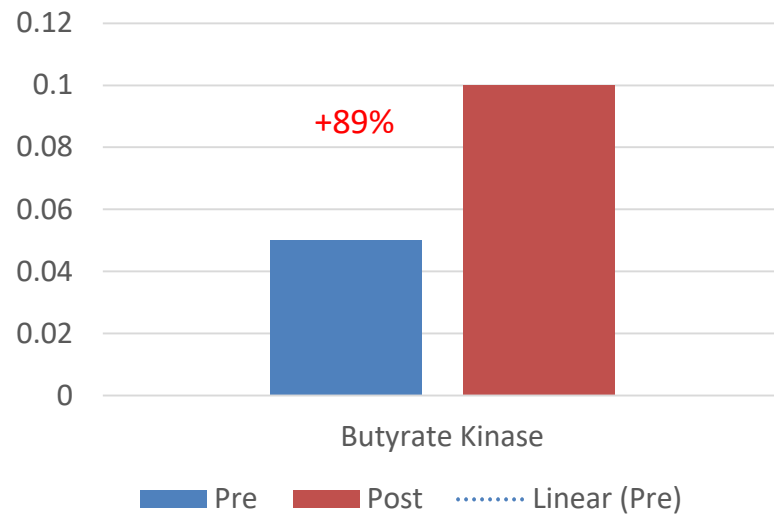
## Cardiac Risk



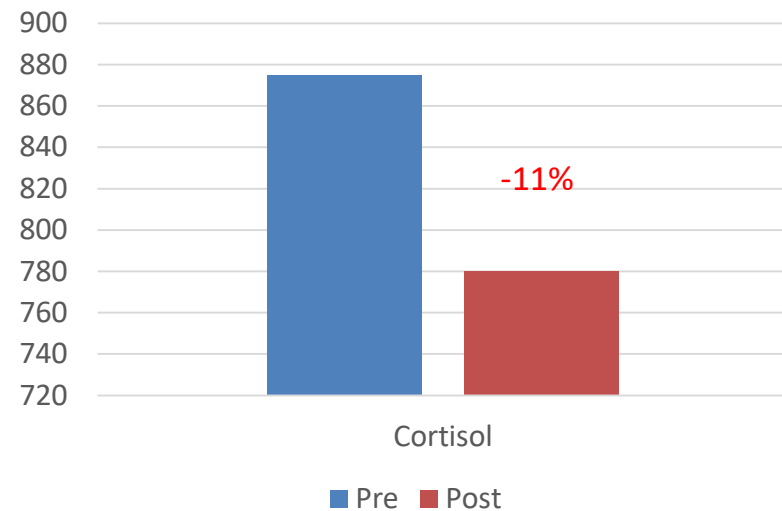


# Project b3 — 6 Weeks

## Butyrate Kinase

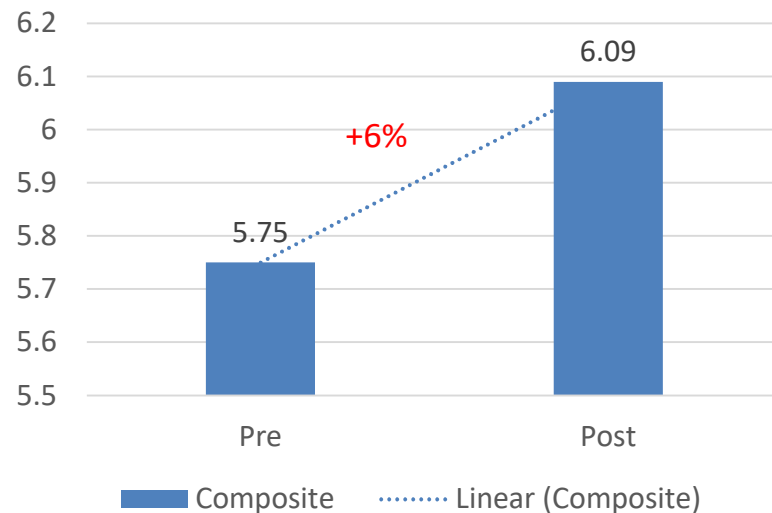


## Cortisol

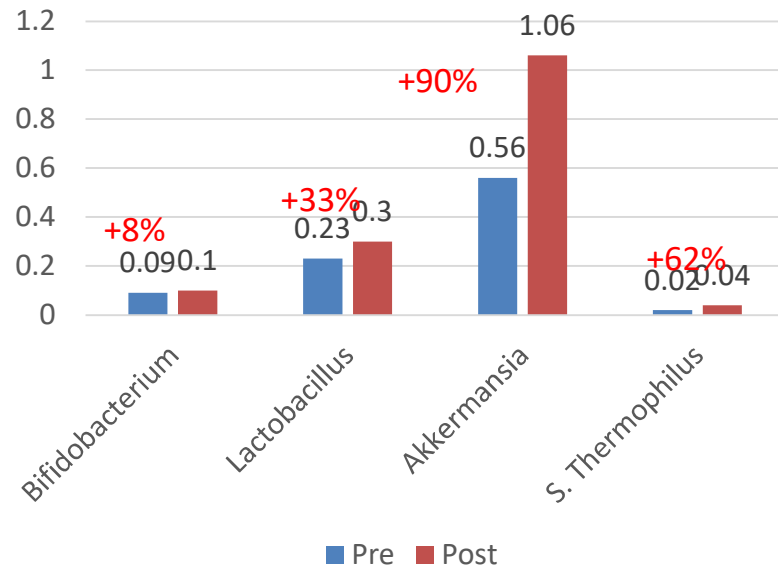


# Project b3 — 6 Weeks

## Microbiome Composite Score

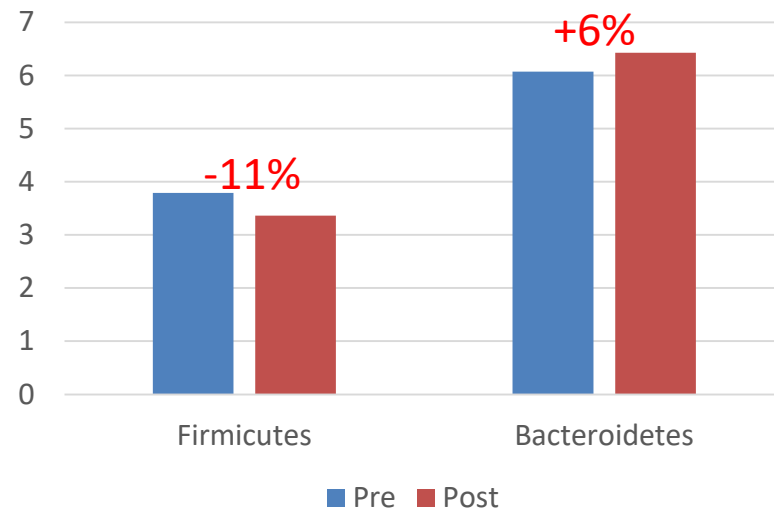


## Microbiome Species

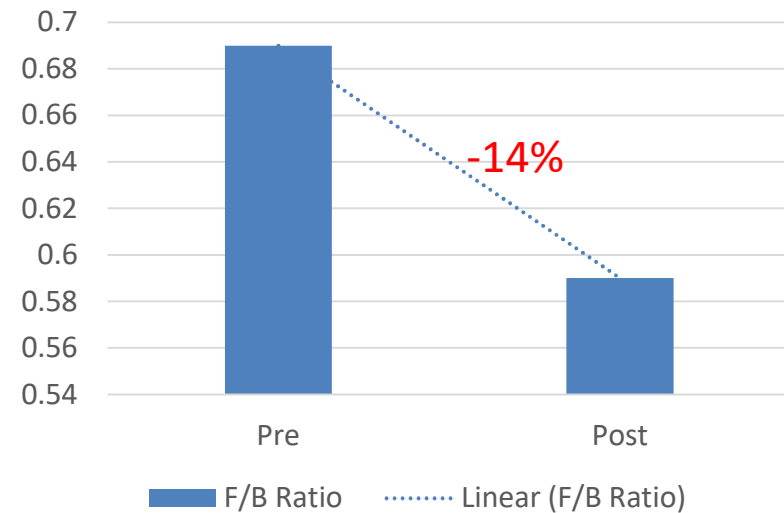


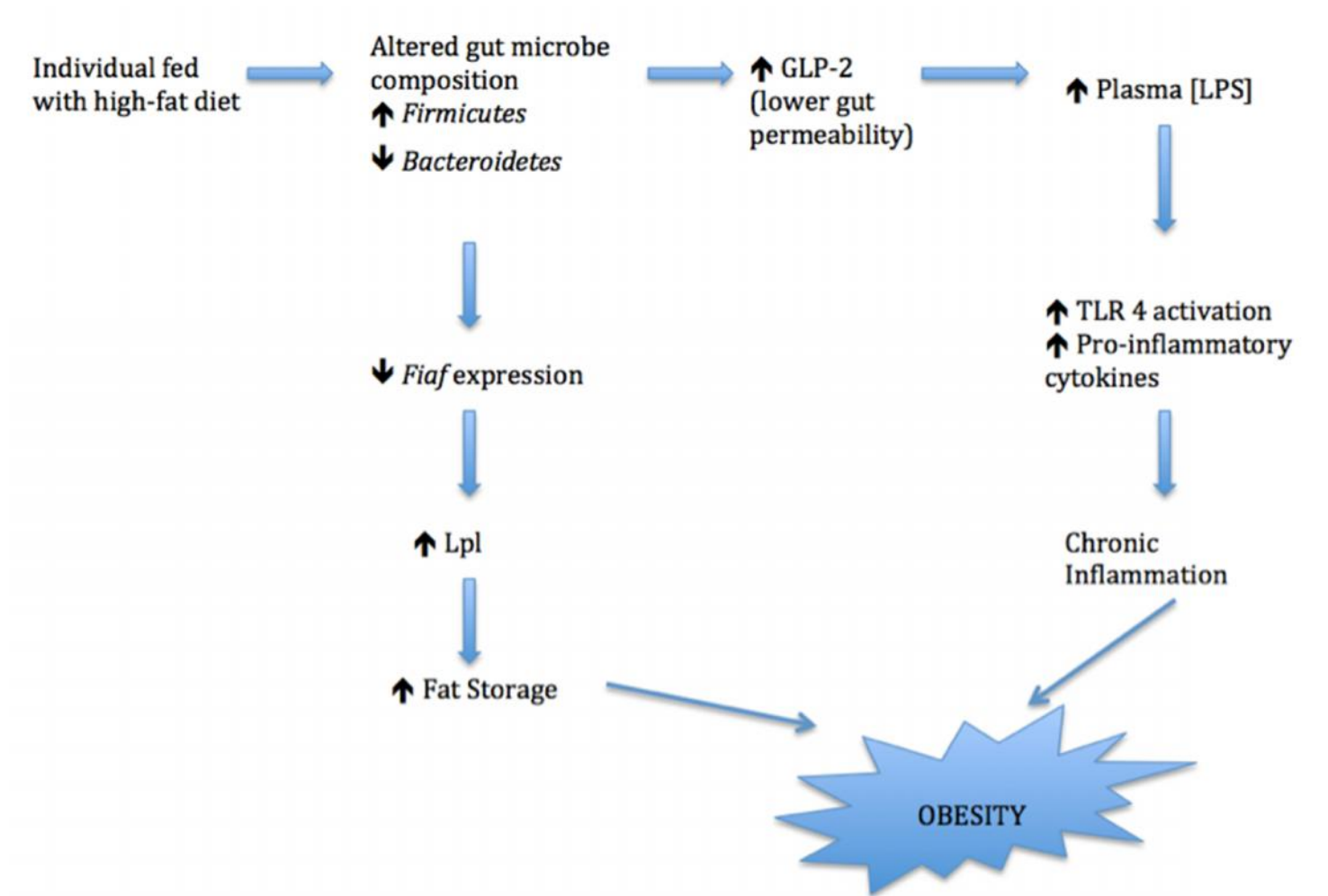
# Project b3 — 6 Weeks

## Metabolic Ratio

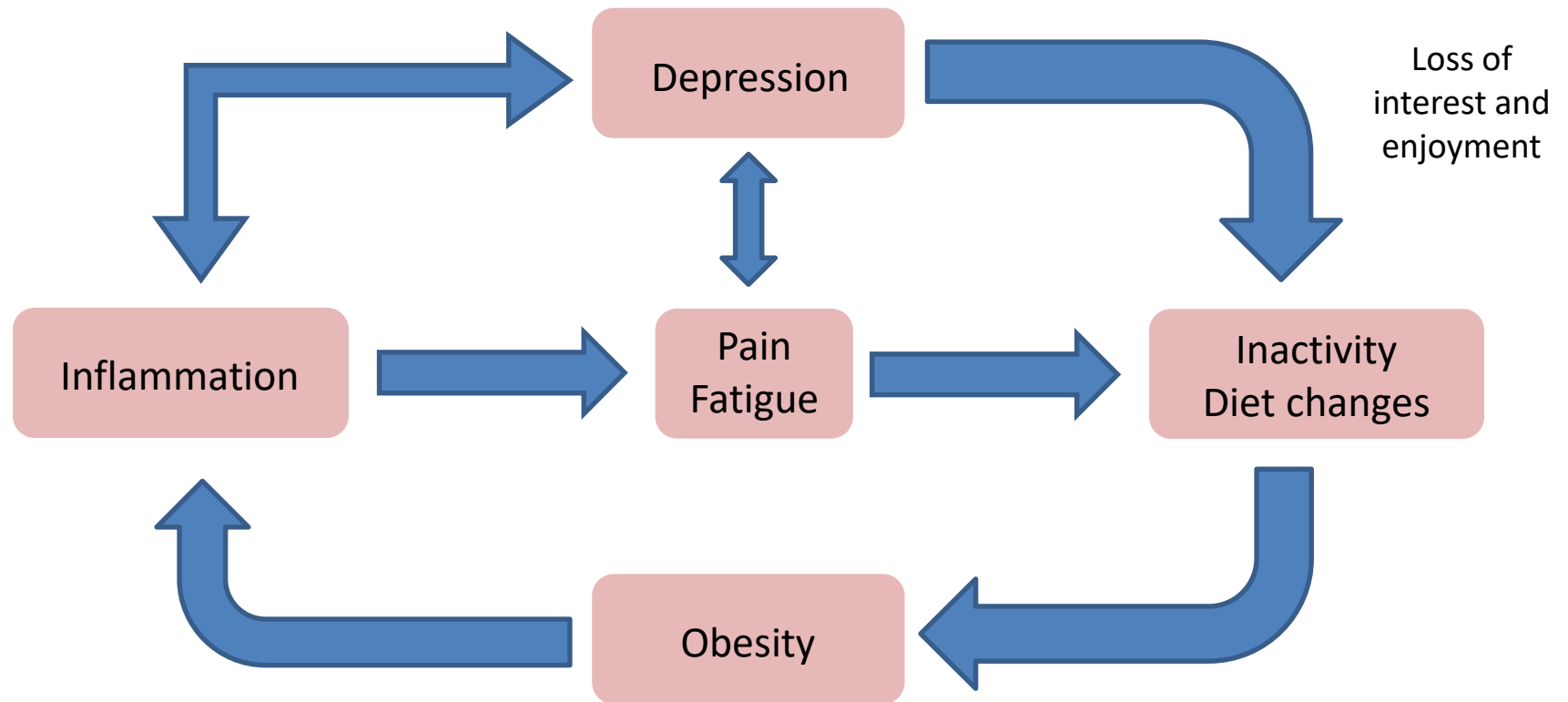


## F/B Ratio

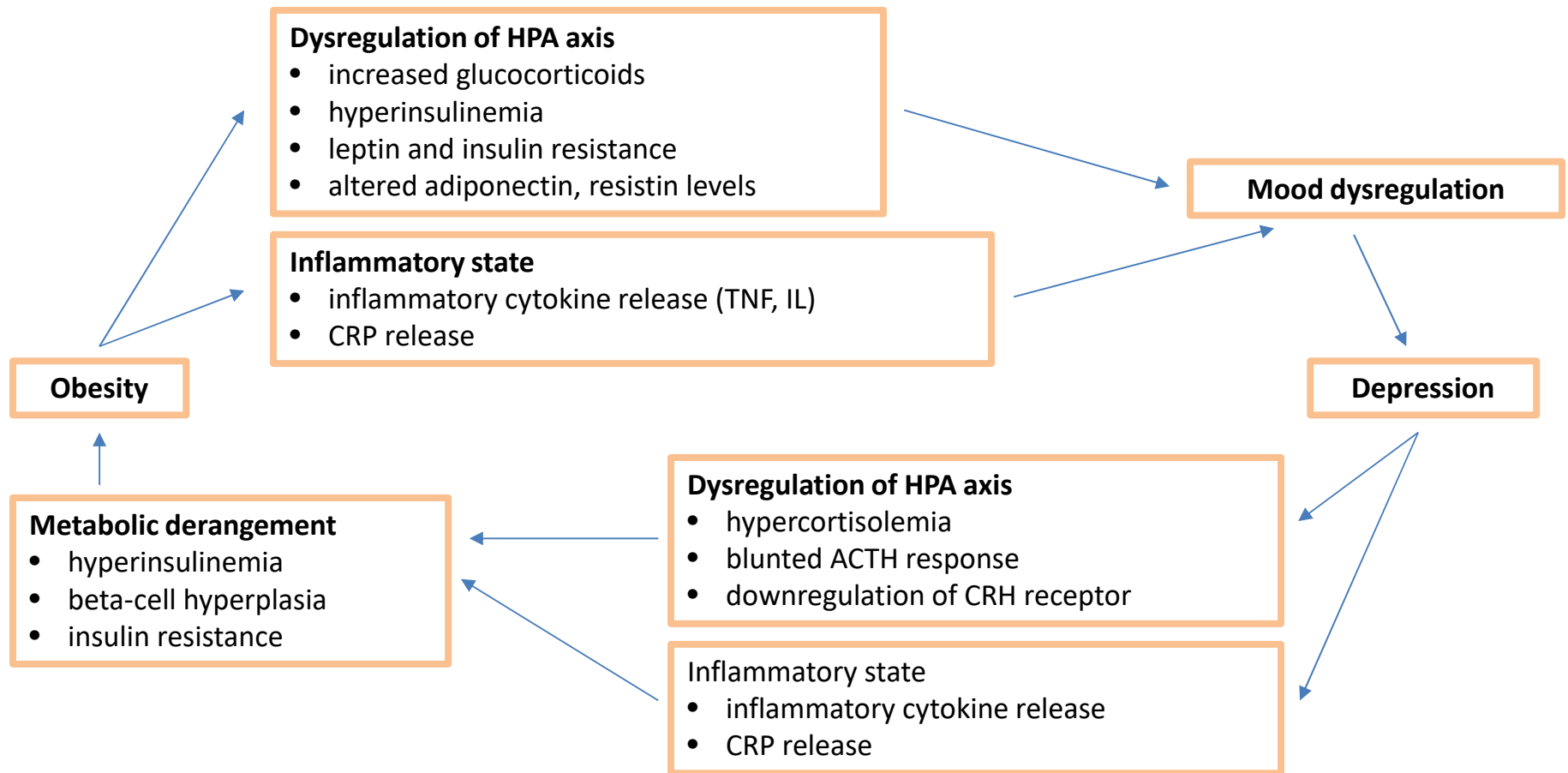




## Obesity – inflammation - depression cycle





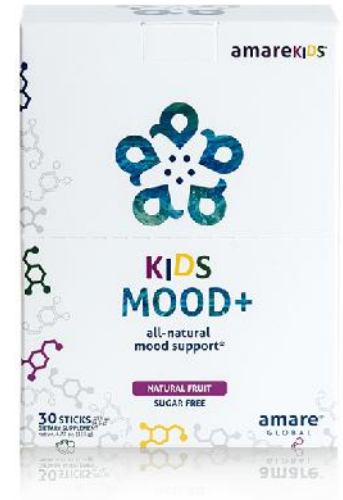


### Proprietary Blend (54 mg):

- affron® standardized **Saffron** (*Crocus sativus* L.) Stigma extract
- **Tulsi Holy Basil** (*Ocimum sanctum*) Leaf extract
- **Rosemary** (*Rosmarinus officinalis*) Leaf extract
- **Oregano** (*Origanum vulgare*) Leaf extract
- **Clove** (*Syzygium aromaticum*) Flower extract

### Delivery Base:

- IsoFiber™ Prebiotic Fiber (isomaltooligosaccharides)
- **Natural Sweetener Blend** (Xylitol, Erythritol, Stevia Leaf extract)
- **Natural Fruit Flavors Blend** (orange fruit, grapefruit, lemon fruit, vanilla, turmeric, citric acid)
- **Plant Cellulose** (to improve dissolution)
- **Rice Hull Concentrate** (to reduce clumping)



10/10 kids saw improvements in focus, mood and mental performance

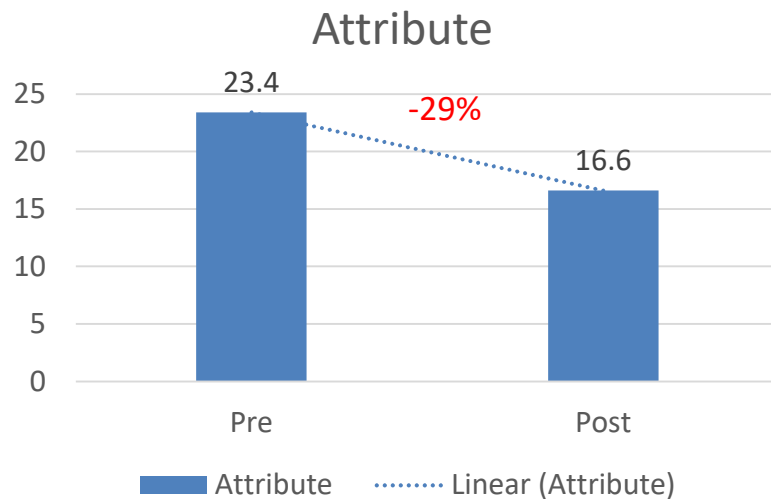


# Kids Mood+

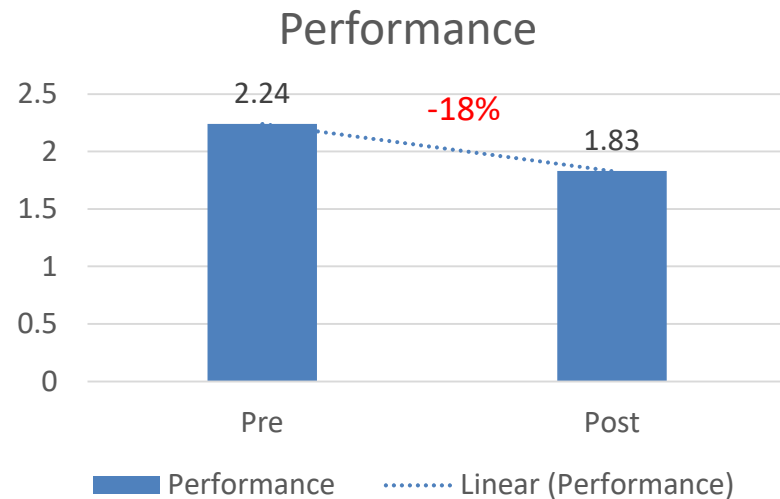
*EB/APS = April 2020*

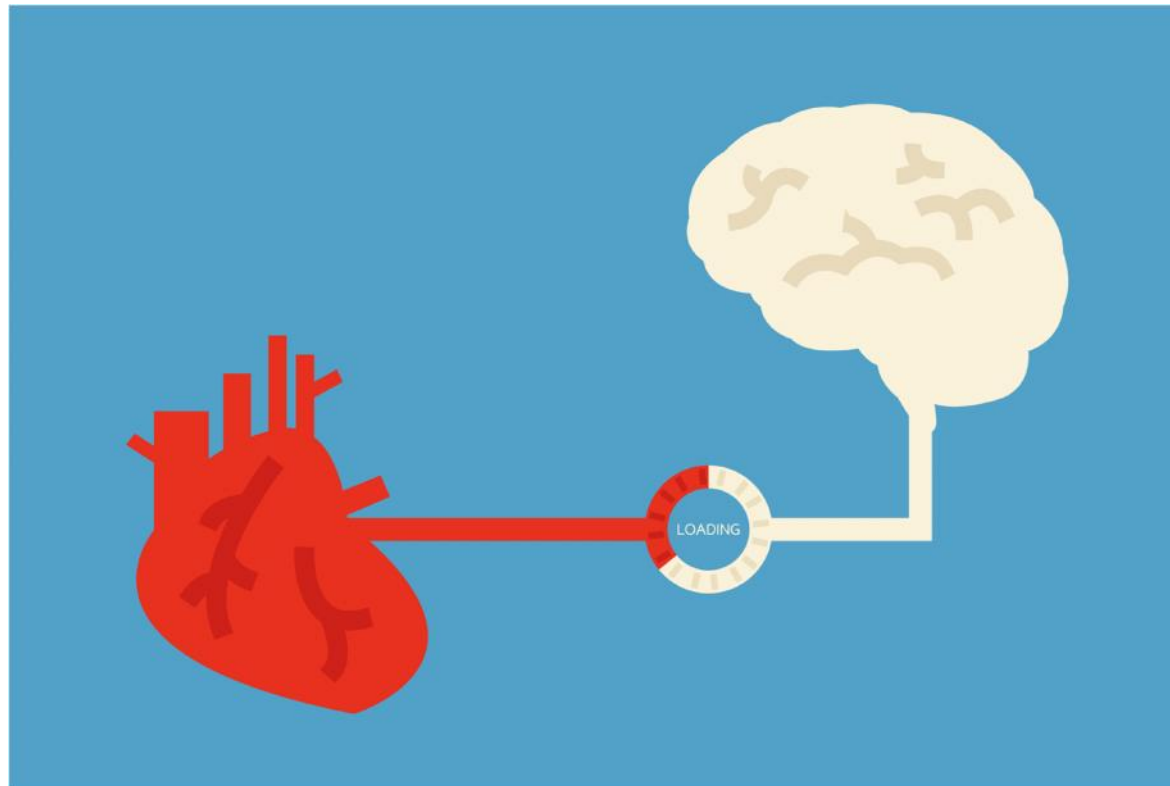
*Targeted Dietary Supplementation Improves Mental Performance in Children*

**Focus, Attention, Mood,  
Listening, Tension, Irritation**



**School work, Math, Reading,  
Writing, Social Relationships**

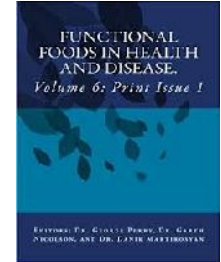




Depressed patients = higher risk for heart attack  
Heart attack patients = higher risk for depression

# Heart-Brain Axis

*Functional Foods in Health & Disease Journal* Vol 9, No 8  
(Aug 2019)



“Physical” heart benefits and “Mental” brain benefits are related via the psychophysiological “heart-brain-axis” with simultaneous improvements in both physical and mental wellness. Our studies have shown targeted supplementation to improve parameters associated with heart health (antioxidant, fat oxidation, endurance) and brain health (neuro-inflammation, cognition, antidepressant/anxiolytic) — with further previously-undescribed benefits for psychological mood state (depression, fatigue, vigor).



BDNF = Brain-Derived Neurotrophic Factor

Cardio-Electro-Physiology

Cholesterol

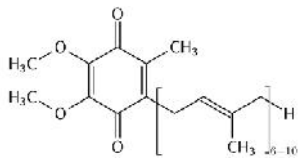


Cardiac Rhythm

Inflammation

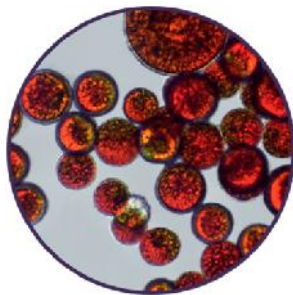


Cardiac Efficiency



Cardiac Output

Oxidation (Free Radicals)



Blood Flow

Blood Pressure

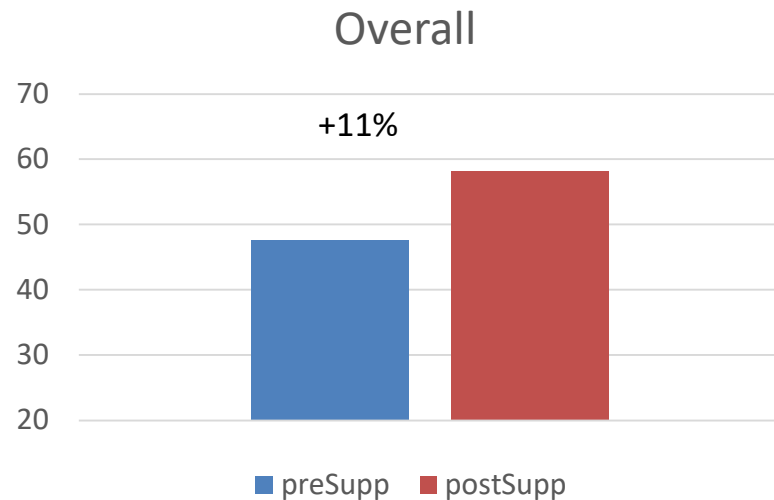


# MentaHeart Clinical Pilot Study

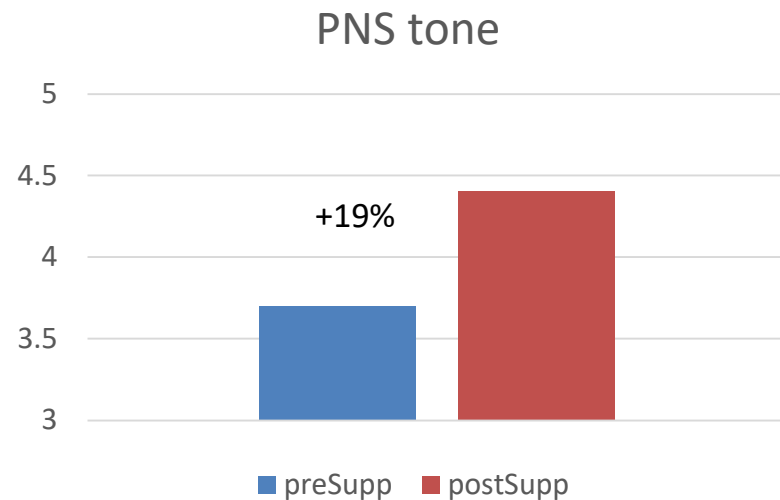
(ACSM May 2020)

Optimization of Heart-Brain-Axis Signaling Improves Mental and Physical Performance

## HRV / SDNN (msec)



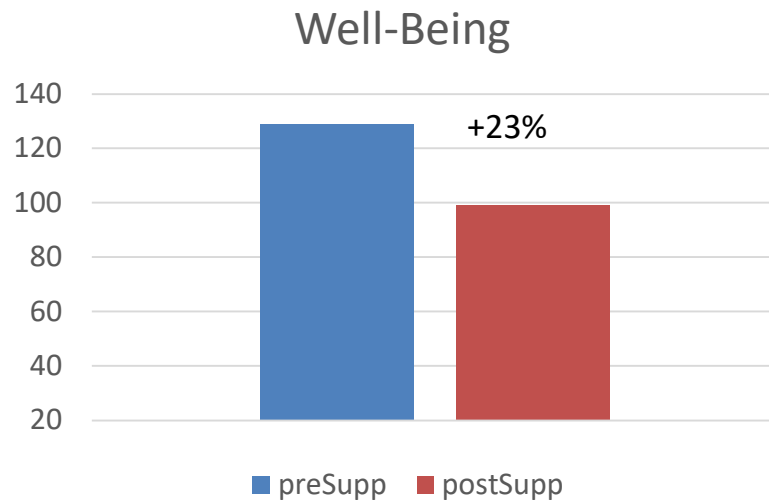
## HRV / RMSSD



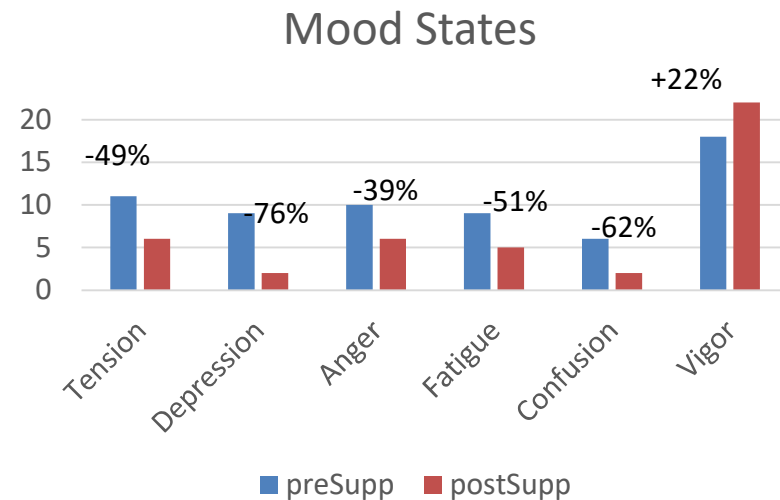
SDNN = standard deviation of N-N intervals  
RMSSD – root mean square of successive differences

# MentaHeart Clinical Pilot Study

## Global Mood State



## POMS Sub-Scales

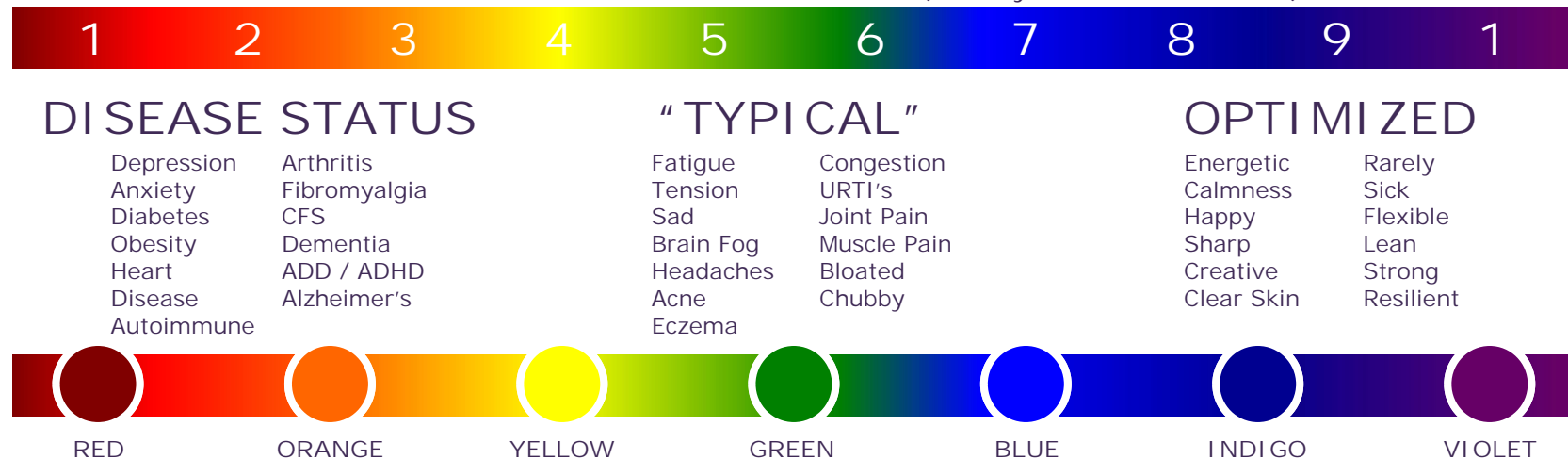


SDNN = standard deviation of N-N intervals  
RMSSD – root mean square of successive differences

100

1. How you feel is not just in your head – it's also in your gut.
2. Our “second brain” includes the Microbiome and plays a major role in mental wellness.
3. You can now DO something NATURALLY to improve your mental wellness.

WHERE ARE YOU ON THE MENTAL WELLNESS CONTINUUM? (Circle your current number)



# Thank You!

