

# Intersection of Nutrition and Mental Health

February 2, 2023 9:05 - 10:00 AM  
Mental Health Symposium:  
Impact of Food Insecurity on Well-Being



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# Well-being, Mental Health, Brain Health, Wellness

## Well-being

“a state of happiness and contentment, with low levels of distress, overall good physical and mental health and outlook, or good quality of life.”



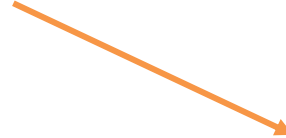
## Mental Health

“a state of mind characterized by emotional well-being, good behavioral adjustment, relative freedom from anxiety and disabling symptoms, and a capacity to establish constructive relationships and cope with the ordinary demands and stresses of life.”



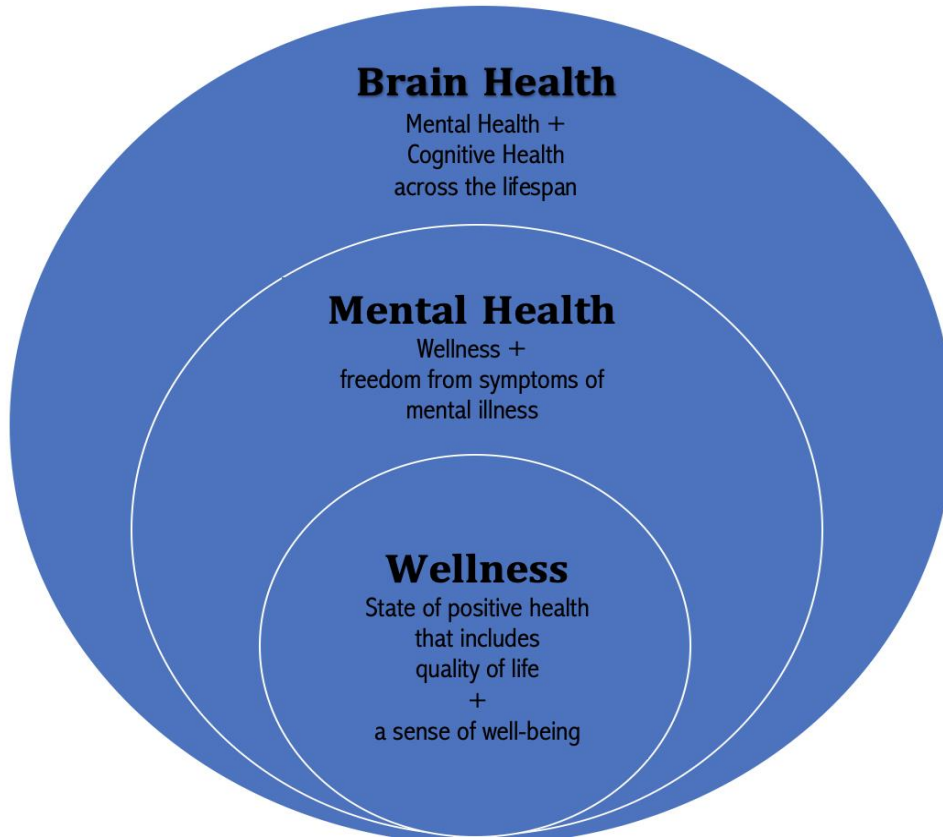
## Brain Health

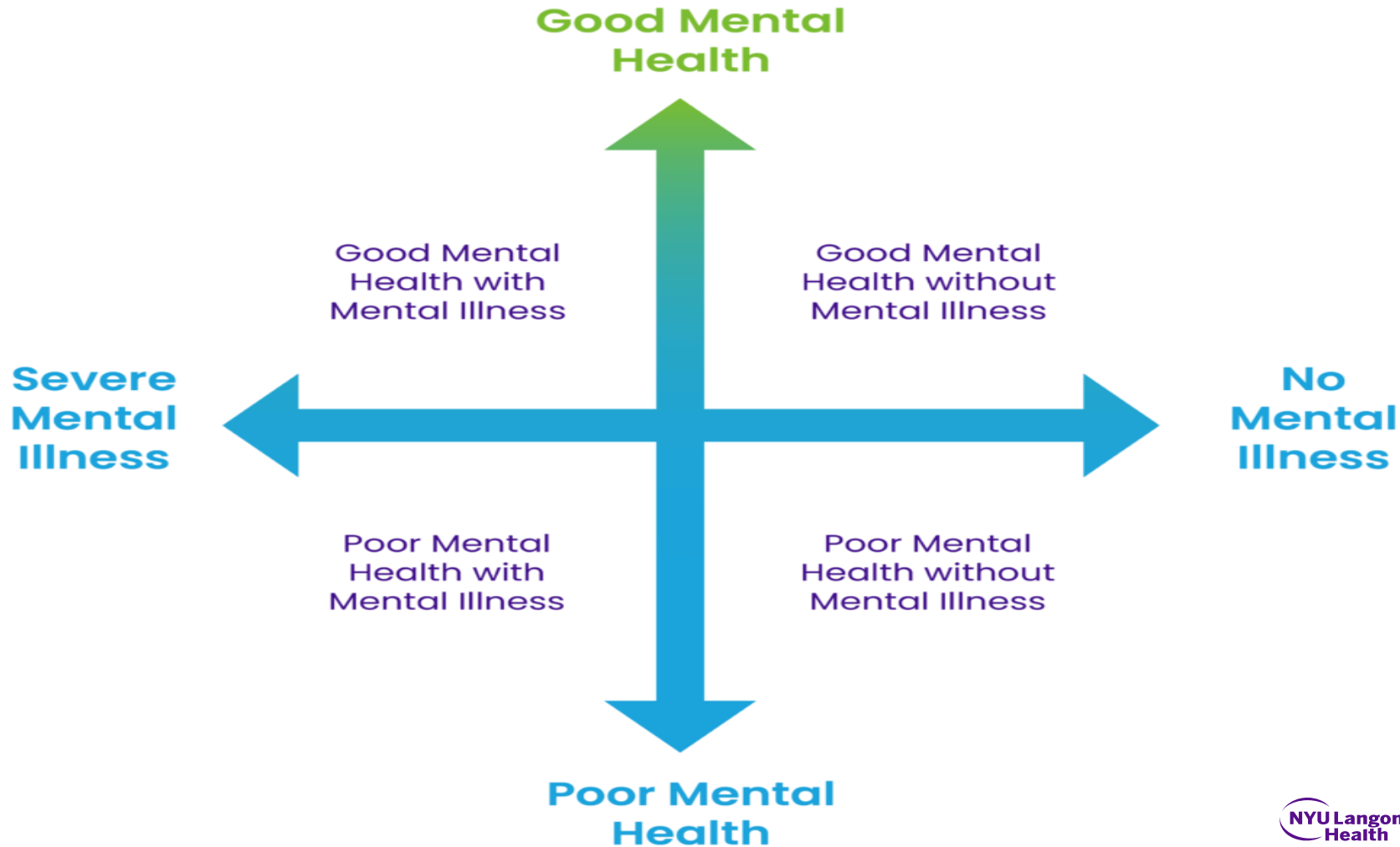
Defined by WHO as the fostering of optimal brain development, cognitive health, and well-being throughout the entire lifespan.



## Wellness

“a multidimensional state of being describing the existence of positive health in an individual as exemplified by quality of life and a sense of well-being.”

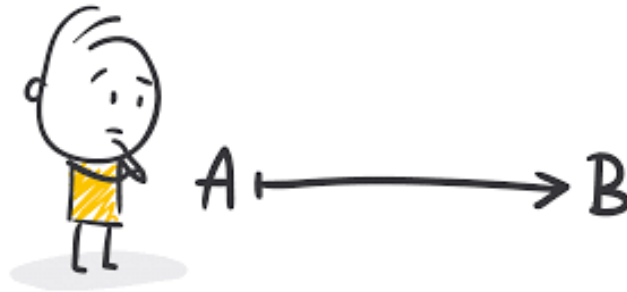




# Why Behavior Change?

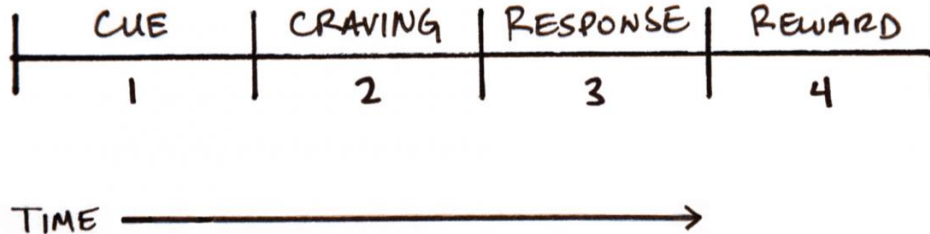
Official definition from American Psychological Association (APA):

- a. A systematic approach to changing behavior through the use of operant conditioning.
- b. Any alteration or adjustment of behavior that affects a patient's functioning, brought about by psychotherapeutic or other interventions or occurring spontaneously.



# Challenges for Changing Behavior

## THE FOUR STAGES OF HABIT



# Health Behaviors: Risk Factors or Protective Factors?



NUTRITION



EXERCISE



SUBSTANCE  
ABUSE



HEALTHY  
RELATIONSHIPS

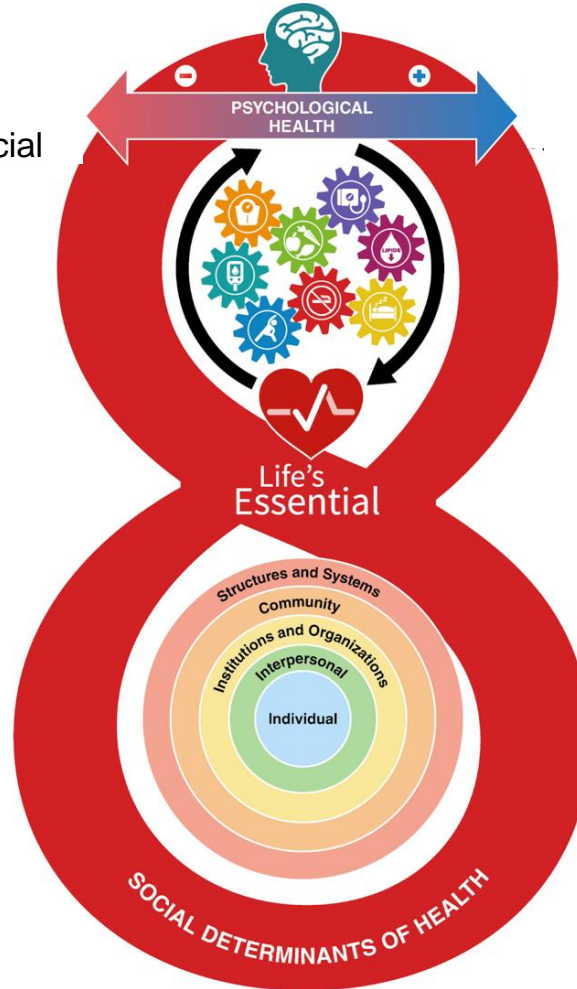


STRESS



SLEEP

- Anxiety
- Anger & Hostility
- Chronic Stress & Social Stressors
- Pessimism
- Depression



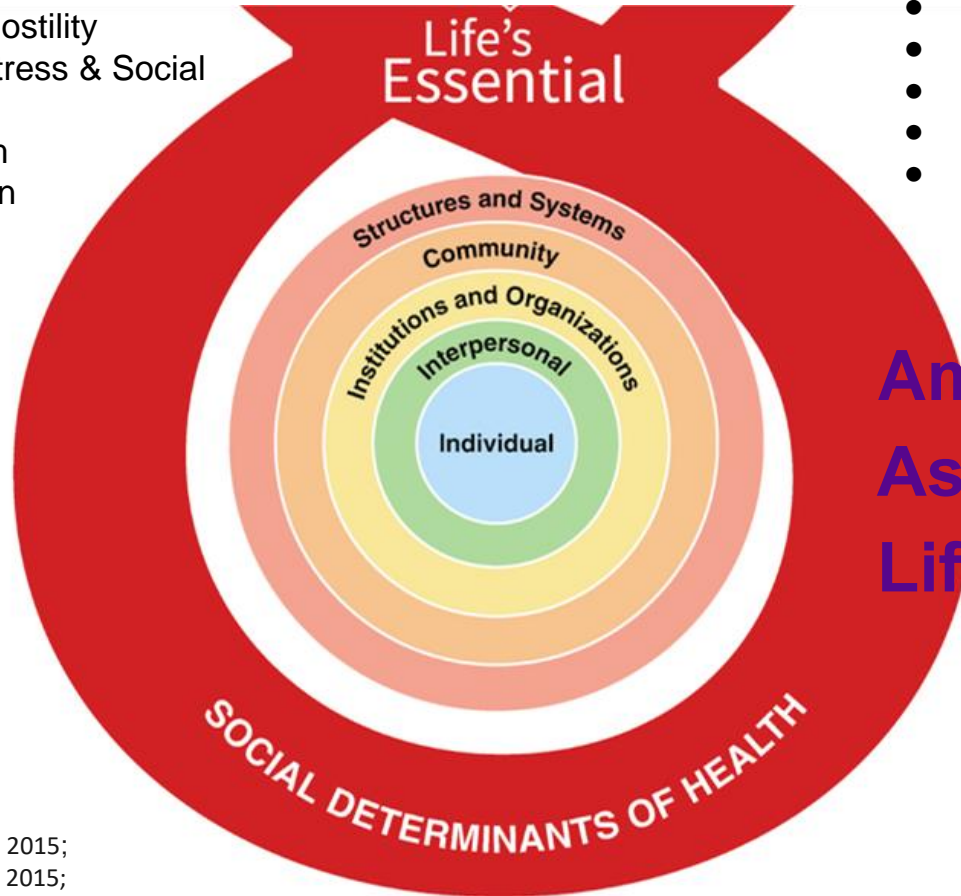
- Psychological Well-being
- Mindfulness
- Gratitude
- Optimism
- Sense of Purpose

## American Heart Association's Life's Essential 8



- Anxiety
- Anger & Hostility
- Chronic Stress & Social Stressors
- Pessimism
- Depression

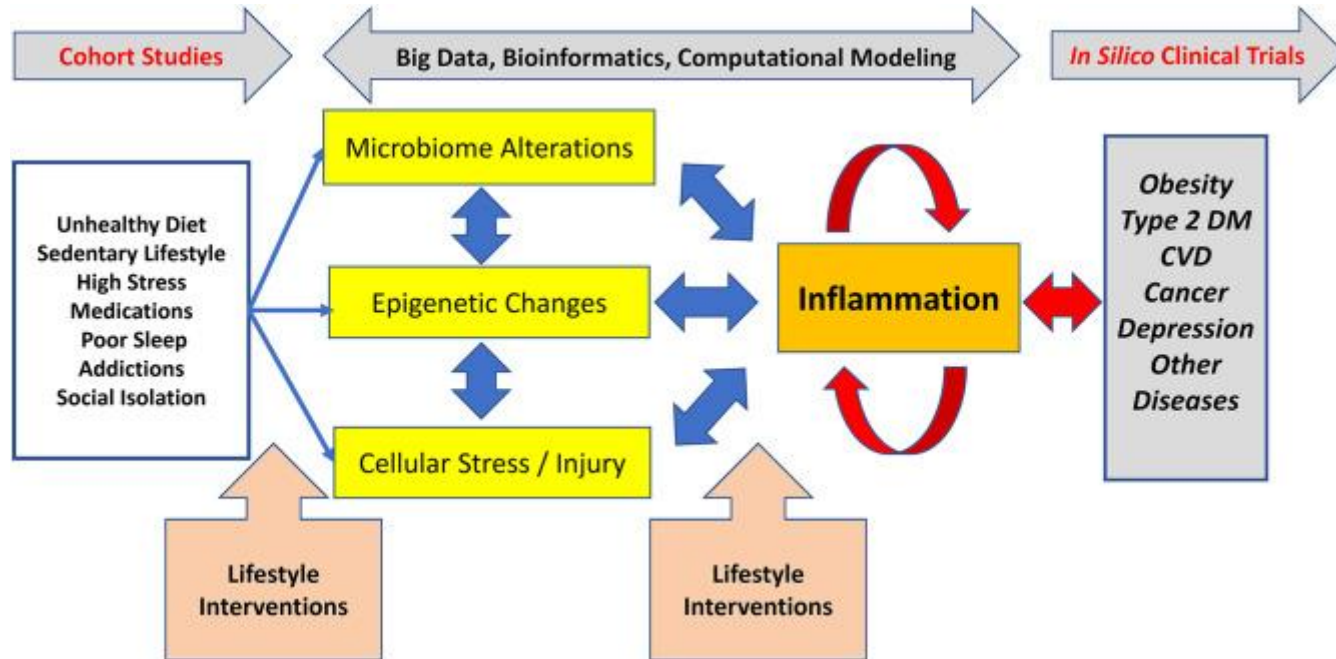
- Psychological Well-being
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## American Heart Association's Life's Essential 8



# What happens in our bodies?



# Metabolic Contributors to Mental Illness

- **Inflammation**

- 25% of patients with psychiatric conditions show inflammatory signs

- **Oxidative Stress**

- Through free radical formation

- **Mitochondrial Dysfunction**

- Depression, bipolar, ADHD, autism spectrum disorder, and schizophrenia have been associated with mitochondrial dysfunction
  - Standard American diet shows abnormal mitochondrial biogenesis

- **Gut Microbiota**

- **Tryptophan-Kynurenine Metabolism**

- **Epigenetics**

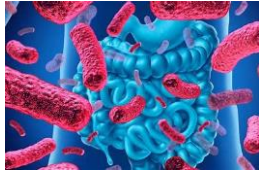
- **HPA axis**



# The Gut Microbiota definitions

## Microbiota

The microorganisms that live in an established environment



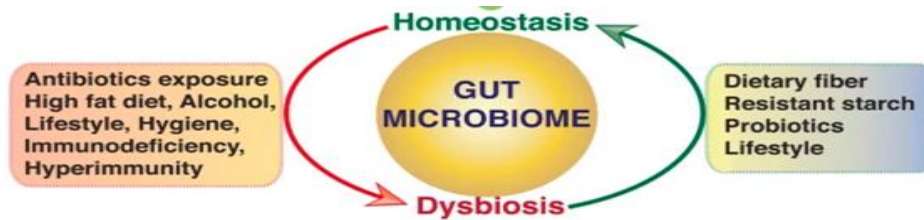
## Microbiome

The combined genetic material of the microorganisms in a particular environment



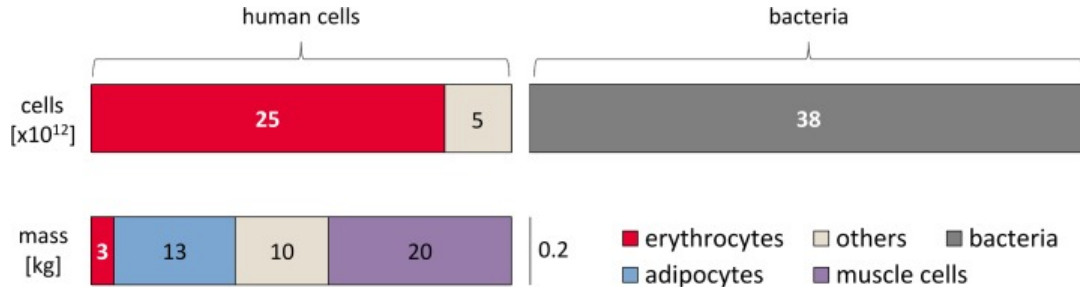
## Dysbiosis

A derangement in the microbiota

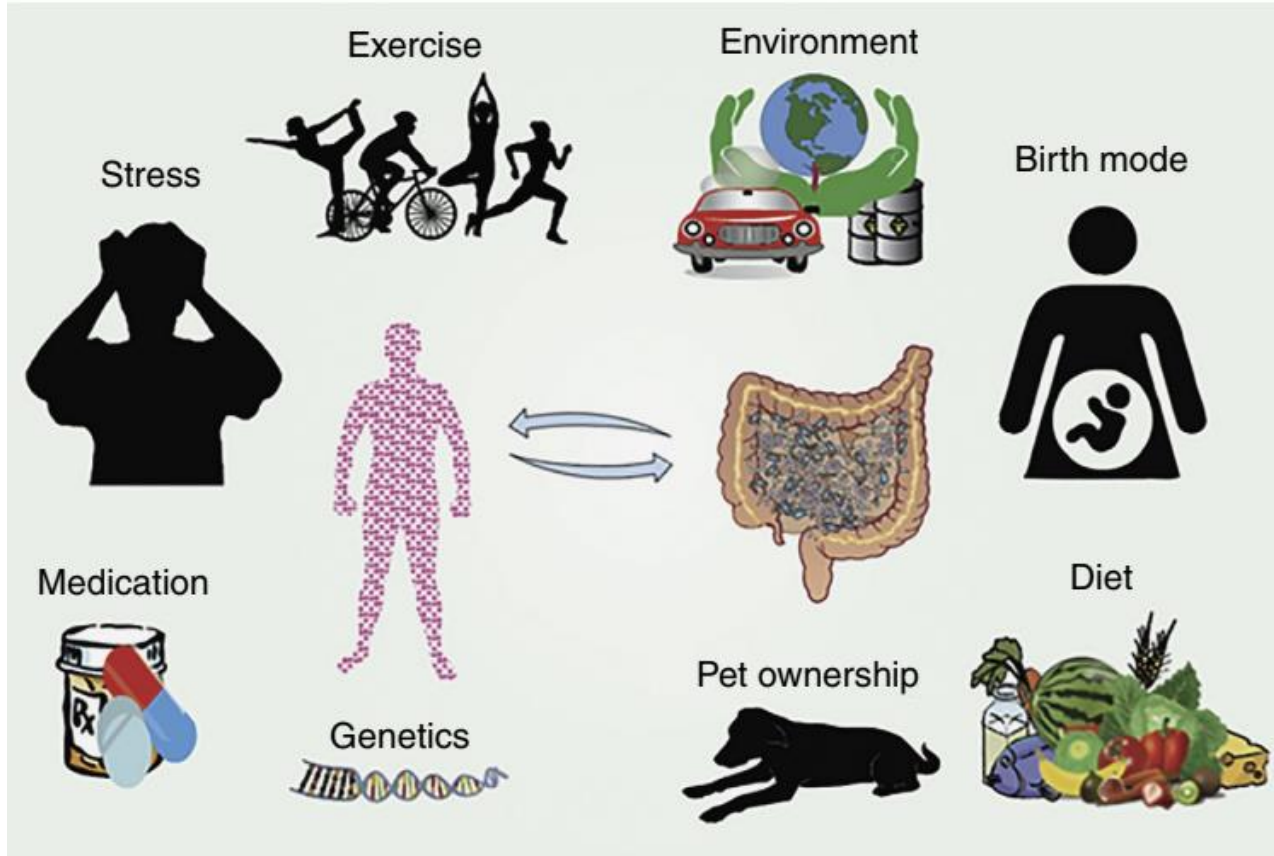


# Brain-Gut-Microbiota (BGM) System

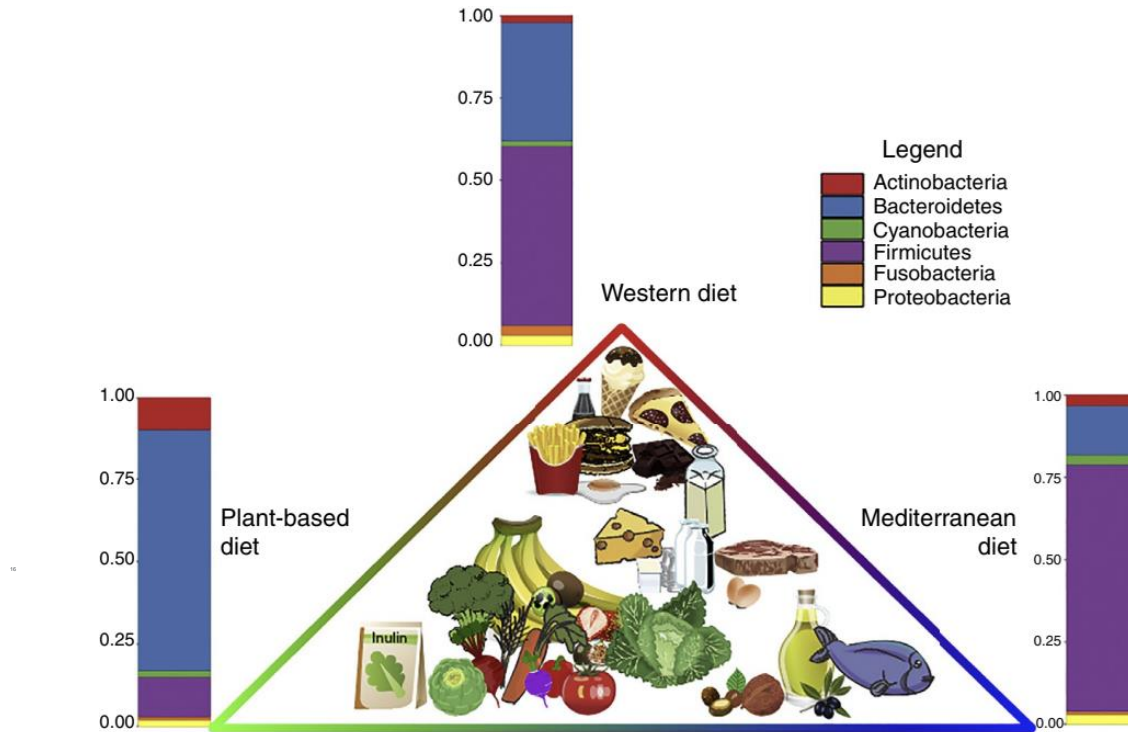
- We have  $\approx 1:1$  ratio of microbial cells and human cells in our body
  - 38 trillion bacteria and other microbes
- These microbial cells make up about 0.2 kg body mass of our bodies
- Humans have about 23,000 genes
- Microbes that are in our body have 3.3 million genes
- The human microbiome project of the NIH started in 2007
  - 60 million genes have been sequenced



# Factors Influencing the Composition of the Microbiota

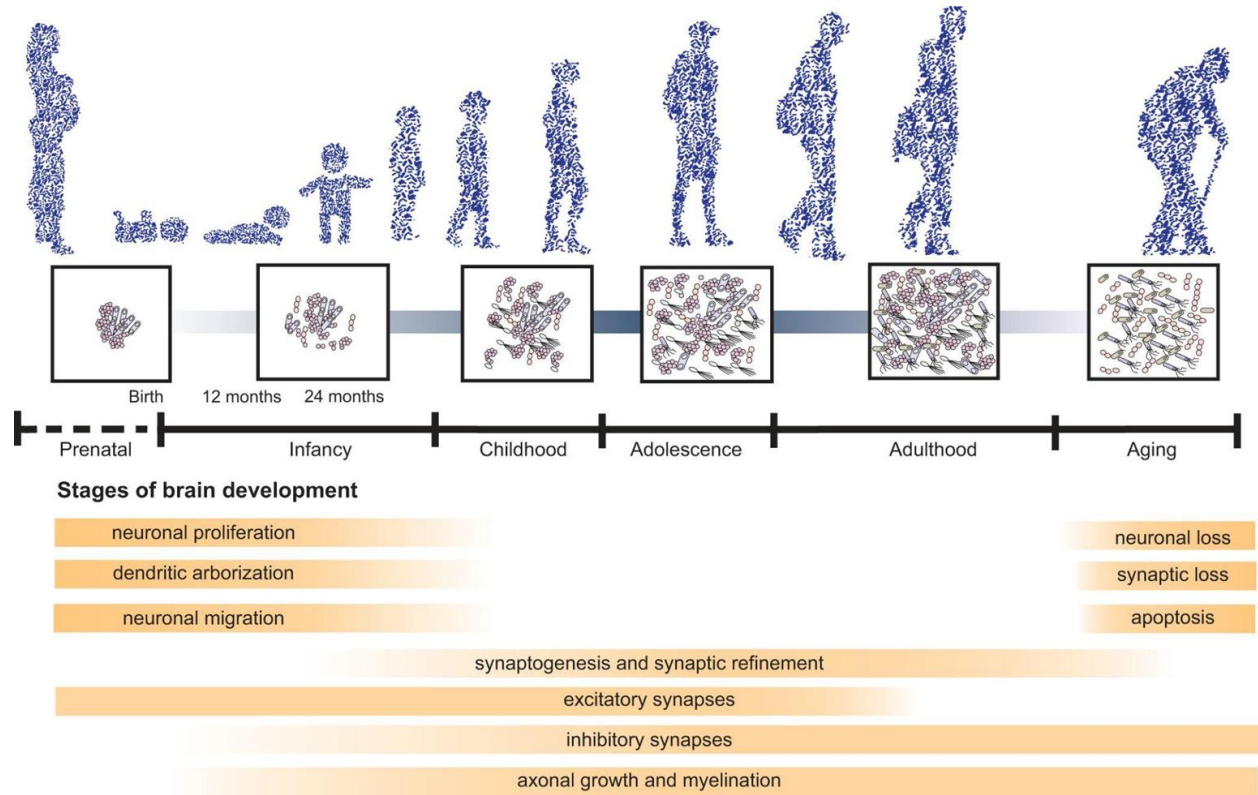


# The Effect of Different Diets on the Composition of the Gut Microbiota

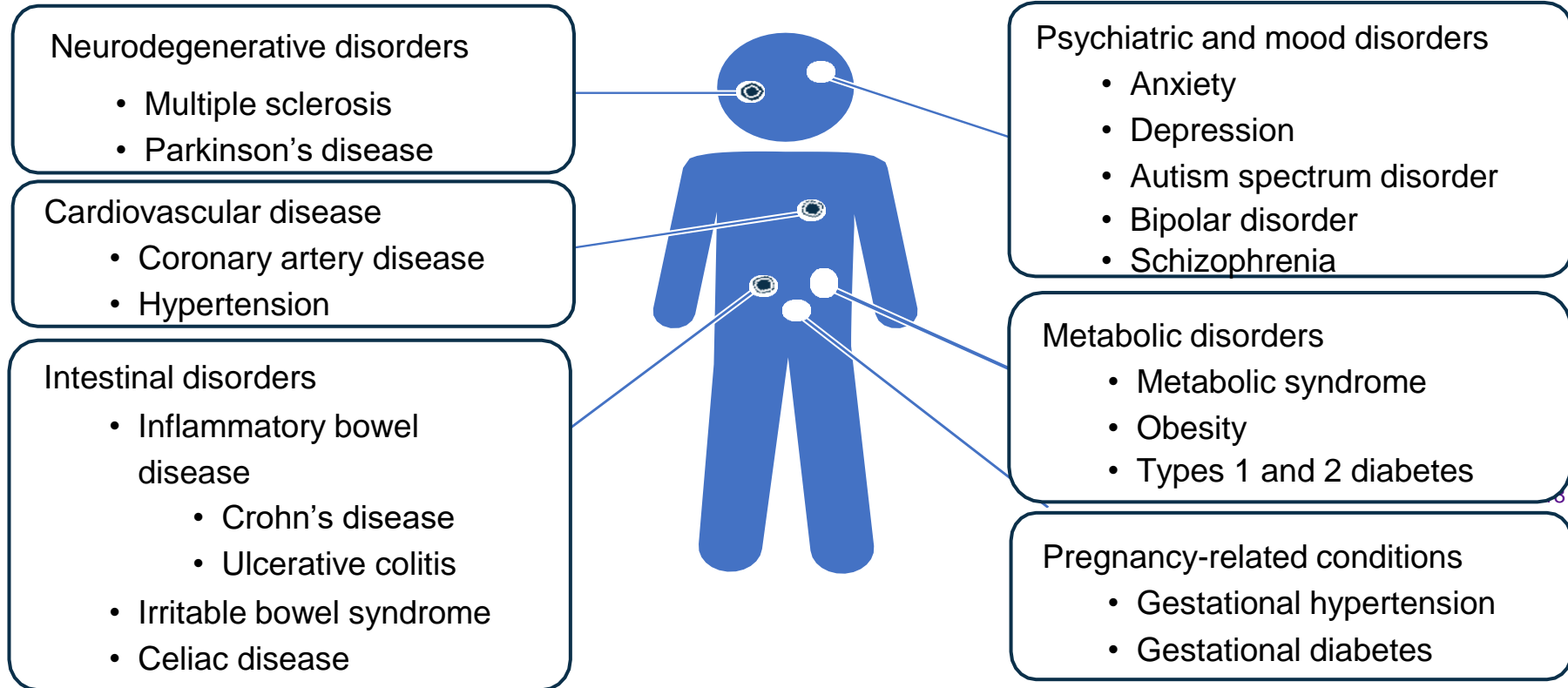




# Diversity of Microbiota Through the Lifespan



# Diseases Associated with Dysbiosis of Gut Microbiota





# Food Insecurity and Mental Health Disorders

## A Conceptual Framework: Cycle of Food Insecurity & Chronic Disease



Adapted: Seligman HK, Schillinger D. N Engl J Med. 2010;363:6-9.

# Increases Bad Bacteria

- The Standard American Diet= SAD



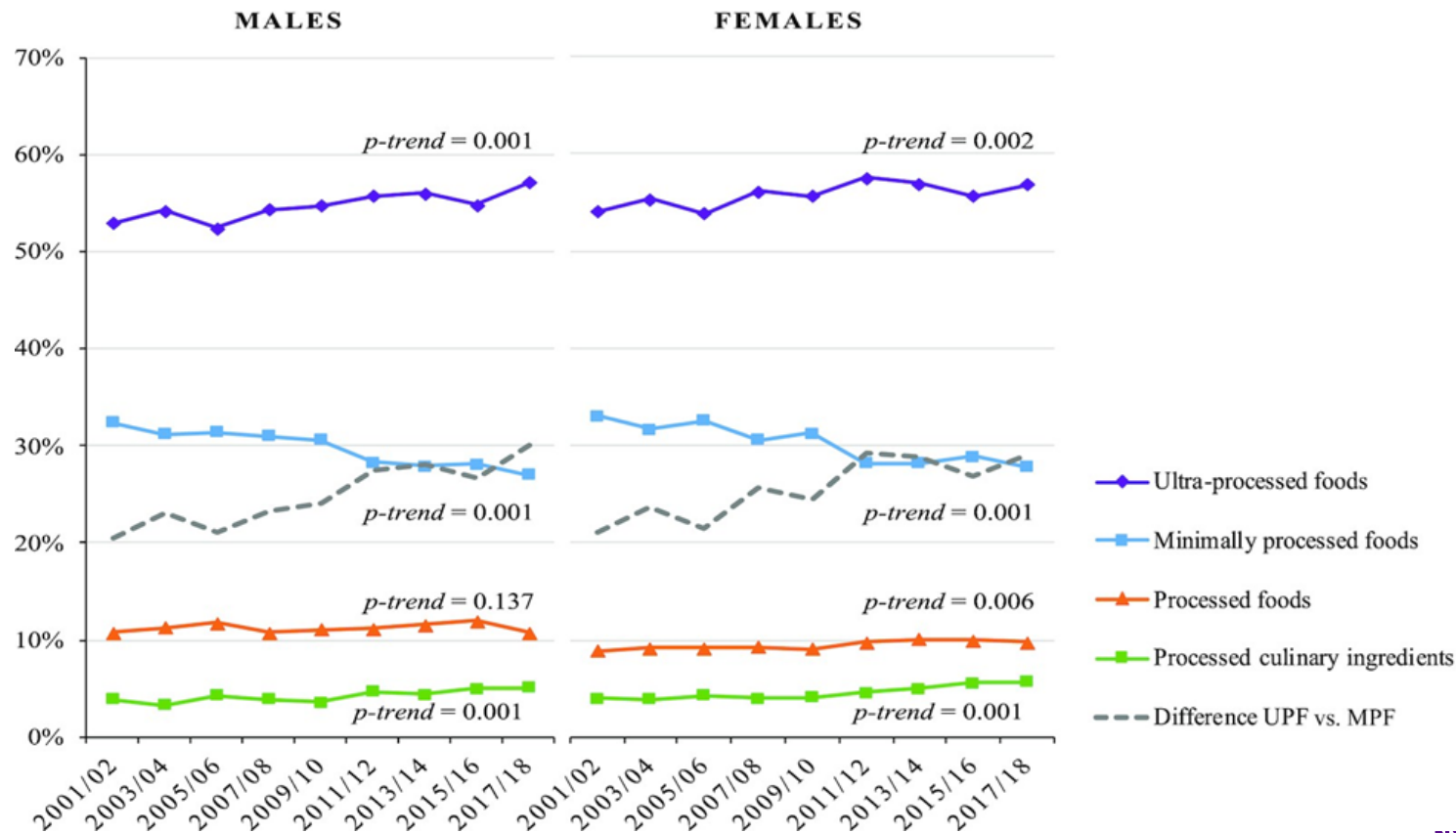
# Ultra-Processed Foods (UPF) and Mental Health

- UPF and depressive outcomes
- UPF results in limited energy intake that doesn't necessarily help intakes with bioactive micronutrients, which are beneficial to preventing depression

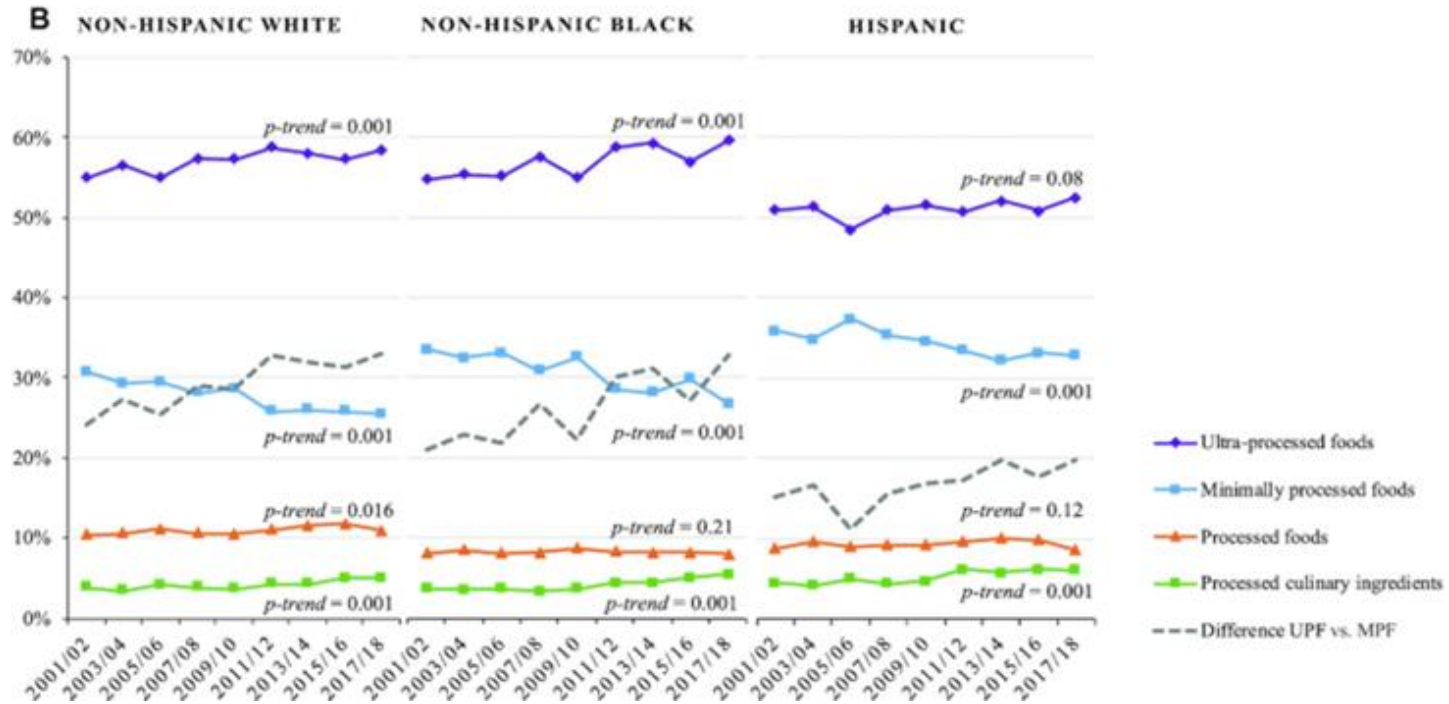


Healio.com

# Ultra-Processed Food Trends



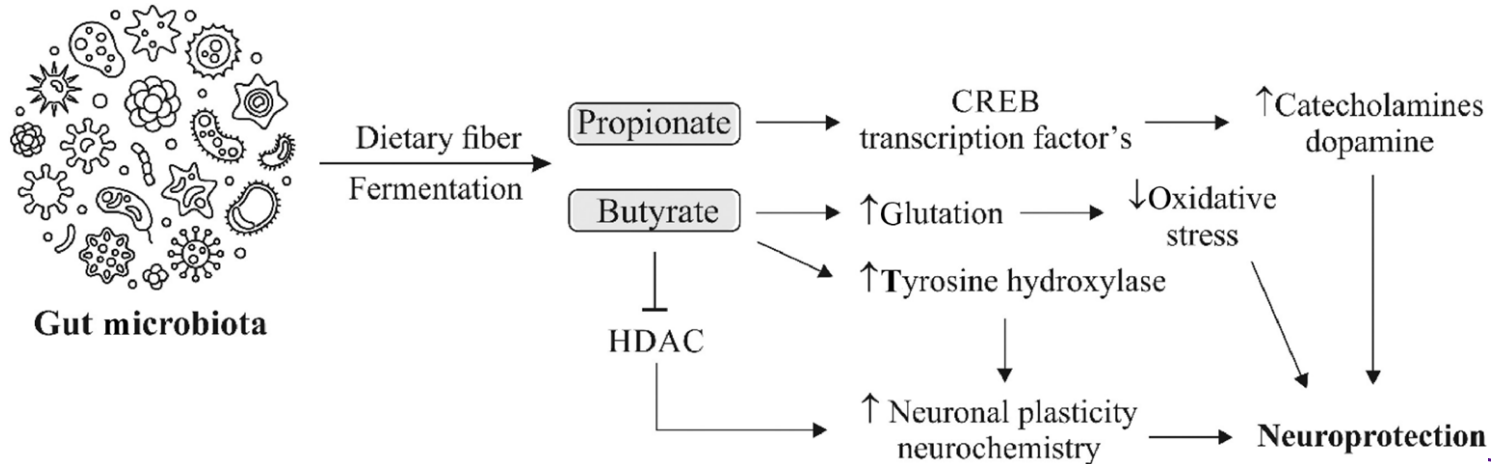
# Ultra-Processed Food Trends





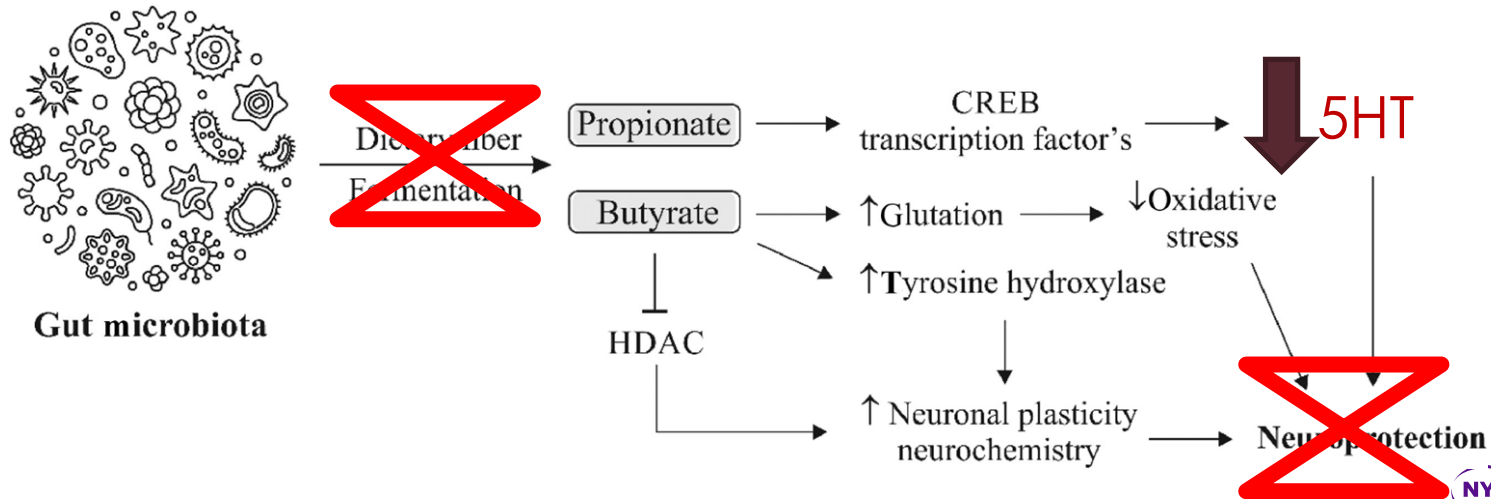
# Ultra-Processed Food and Gut Microbiota

- UPFs lack fiber
- Health gut microbiota need fiber (short-chain amino acids) to keep healthy



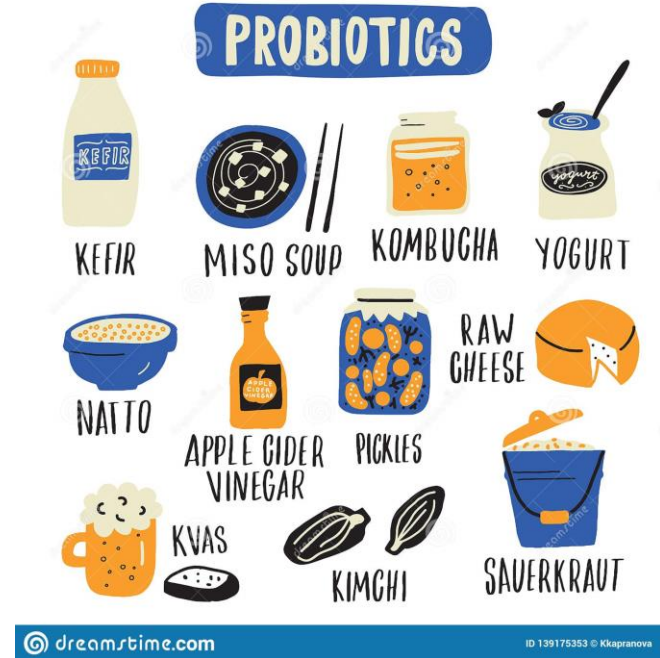
# Ultra-Processed Food and Gut Microbiota

- UPFs contain sugars, salts, oils
- With no fiber, dysbiosis occurs (change in gut bacteria)



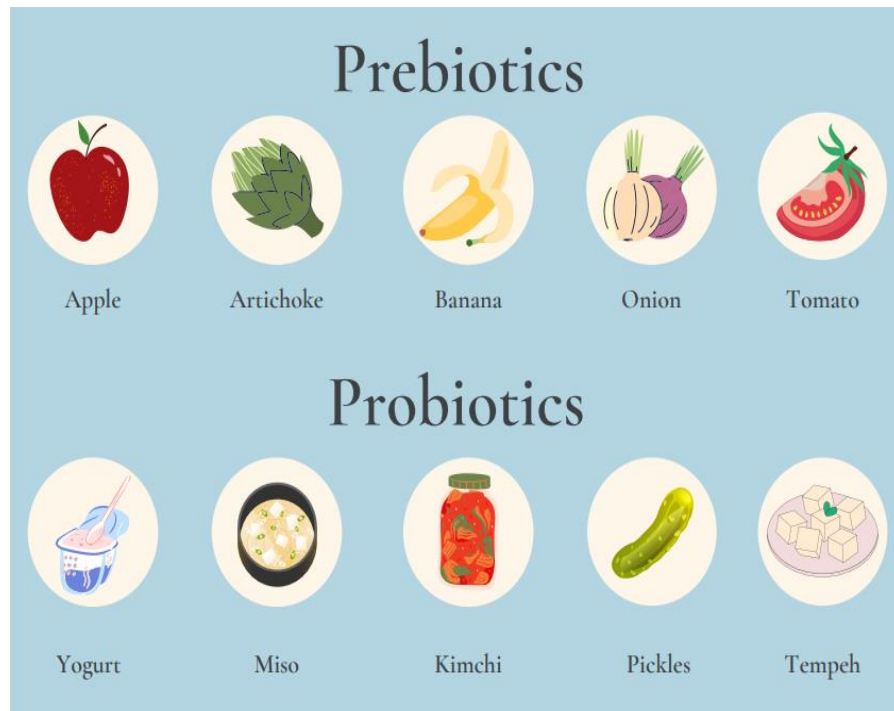
# A Healthy Microbiome and Good Bacteria

- 85% good bacteria + 15% bad bacteria
- Increasing good bacteria are the best way to maintain this balance
- Prebiotic vs. Probiotic Foods
- Dietary changes rapidly alters human gut microbiome



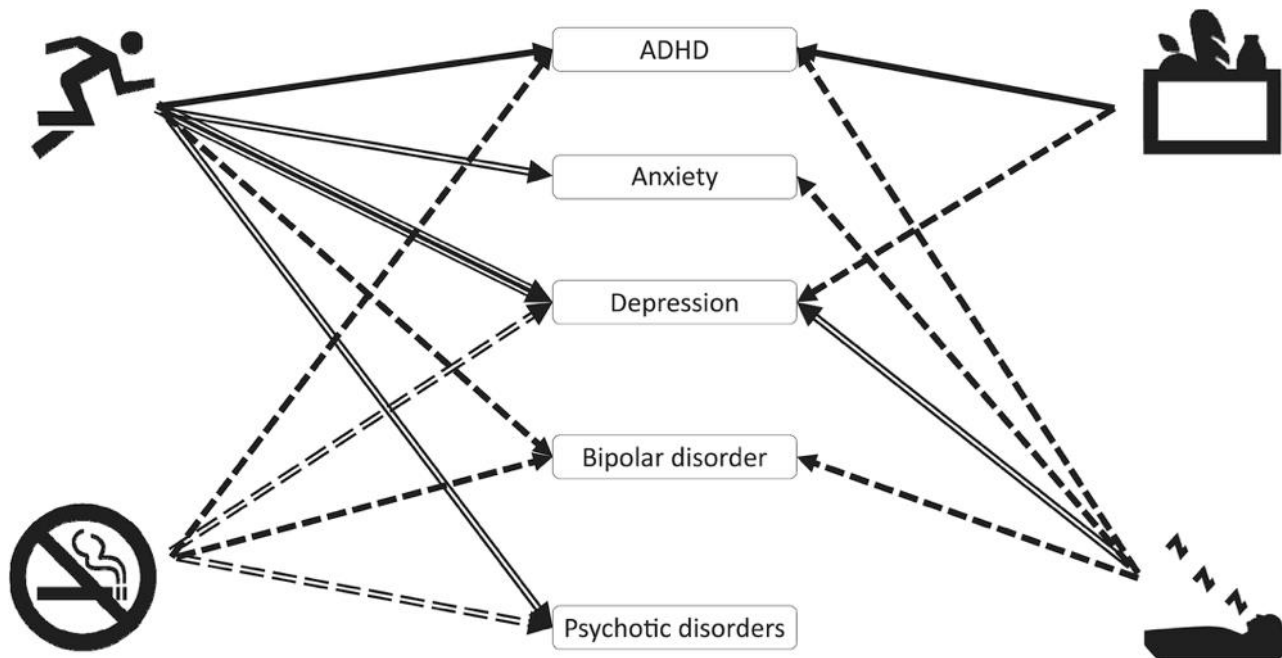
# Probiotics and Prebiotics

- **Probiotics:** “Live microorganisms which, when administered in adequate amounts, confer a health benefit on the host” (World Health Organization)
  - Found in fermented foods
  - Use can result in both beneficial and detrimental effects
- **Prebiotics:** “A nonviable food component that confers a health benefit on the host associated with modulation of the microbiota” (Food and Agriculture Organization of the United Nations)
  - Nutritional substances required by probiotics for survival
  - The modern Western diet often fails to provide prebiotics



HomeBase.org

# Lifestyle factors in the prevention and treatment of mental illness: What is the evidence?



# Mental Health Disorders

## Most Prevalent in the U.S.

Anxiety

Depression

ADHD

Bipolar disorder

Eating disorders

Substance Use Disorders

Dementia/Alzheimer's

## Most Impacted by Diet / Nutrition

Anxiety

Depression

ADHD

Bipolar disorder

Eating disorders

Substance Use Disorders

Dementia/Alzheimer's

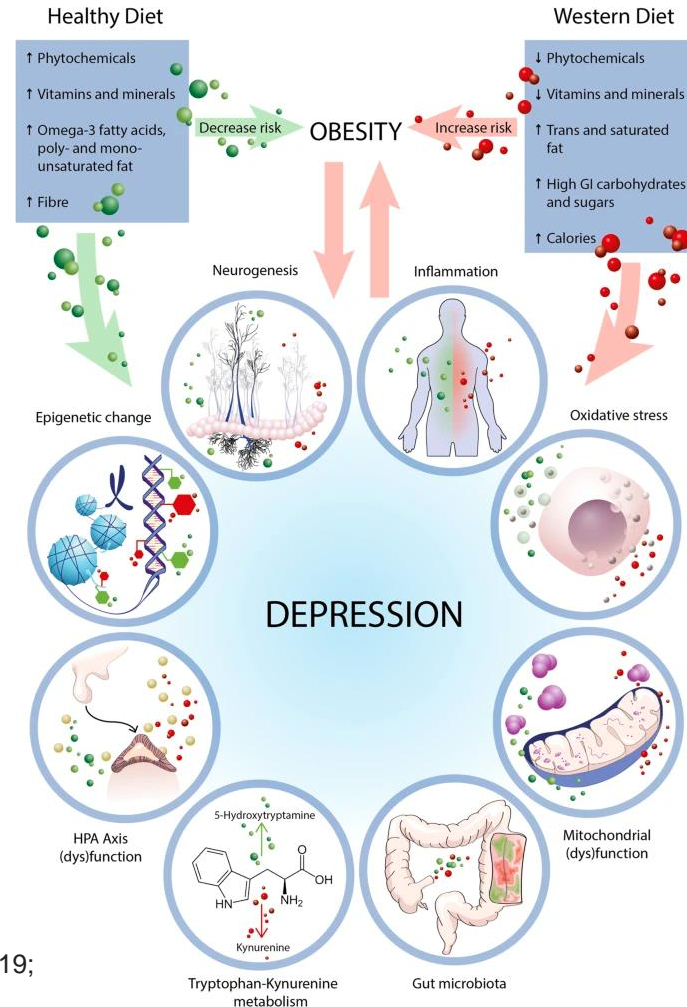
# The Food–Mood Connection

**Complex bidirectional relationship between food intake and mood**





# Overview of the Role of Diet Quality on Implicated Mechanisms of Depression



Horn Marx et al., 2021; Jacka et al., 2017; Opie et al., 2018; Parletta et al., 2019; Sanchez-Villegas et al., 2013; Valles-Colomer et al., 2019



# Depression: Fruits and Vegetables Impact on Mental Health and Mood



# Foods that may help depression



Beydoun et al., 2010;  
Mocking et al., 2016

# Foods that may worsen depression





# Foods that may help anxiety



# Foods that may worsen anxiety



# Foods that may help ADHD





# Foods that may worsen ADHD



# Foods that may help bipolar disorder





# Foods that may worsen bipolar disorder



# Foods that may improve memory



## Foods that may worsen memory







# Foods that may worsen schizophrenia





# Foods that may help PTSD



# Foods that may worsen PTSD



# Barriers to Change

People don't do things  
for very **REAL** reasons





# Potential Barriers: Psychosocial Factors

- Social Determinants of Health (SDOH)
- Adverse Childhood Events (ACEs)
- Trauma
- Unmet needs
- Access: Food Insecurity



# Trauma-Related Barriers

## Types of ACEs



### ABUSE

- Emotional
- Physical
- Sexual



### NEGLECT

- Emotional
- Physical



### HOUSEHOLD CHALLENGES\*

- Substance misuse
- Mental illness
- Suicidal thoughts and behavior
- Divorce or separation
- Incarceration
- Intimate partner violence or domestic violence

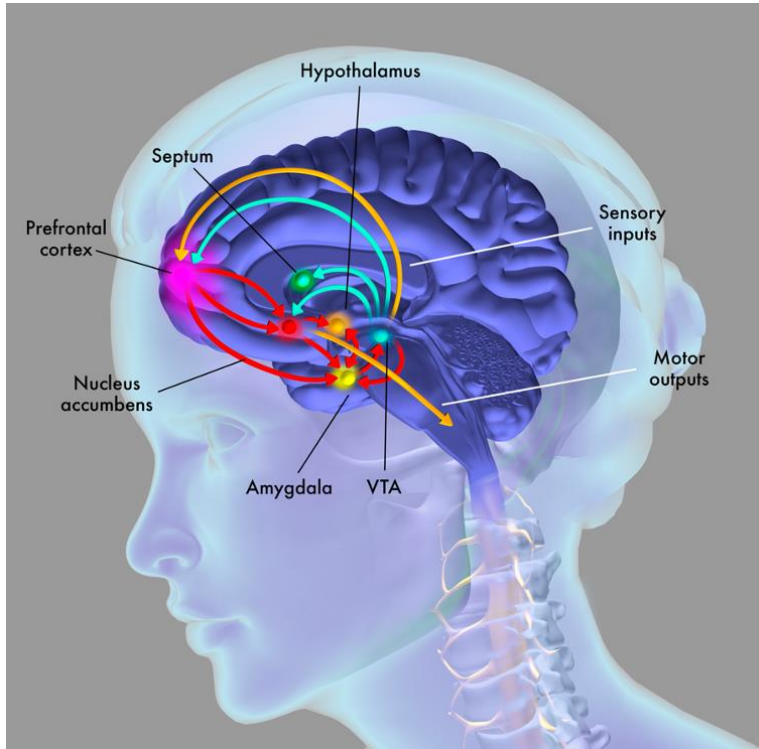
## Other Adversity



- Bullying
- Community violence
- Natural disasters
- Refugee or wartime experiences
- Witnessing or experiencing acts of terrorism

\* The child lives with a parent, caregiver, or other adult who experiences one or more of these challenges.

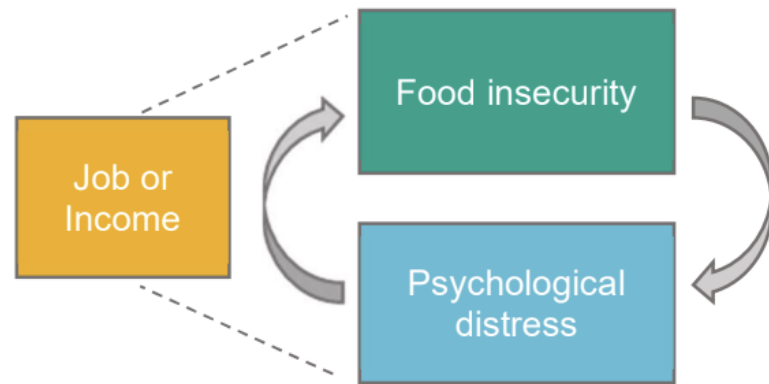
# Trauma/Stress Pathways



- Amygdala
- Hypothalamus-Pituitary Axis
  - Cortisol Releasing Factor
  - Cortisol
  - Epinephrine
- Sympathetic Nervous System

# Global Link Between Food Insecurity, Mental Health, and Poor Emotional Wellbeing

- **Food insecurity is associated with:**
  - **40% higher risk of depression**
  - **34% higher risk of stress**
- According to survey research during the COVID-19 pandemic, the likelihood of food insecurity was higher for individuals reporting symptoms of depression and anxiety
- Families in NYC with low socioeconomic status who experience food insecurity report 1.6x more psychological distress than those who do not experience food insecurity



*Figure 4. Modified graphic of the relationship between poor mental wellbeing and food insecurity.*

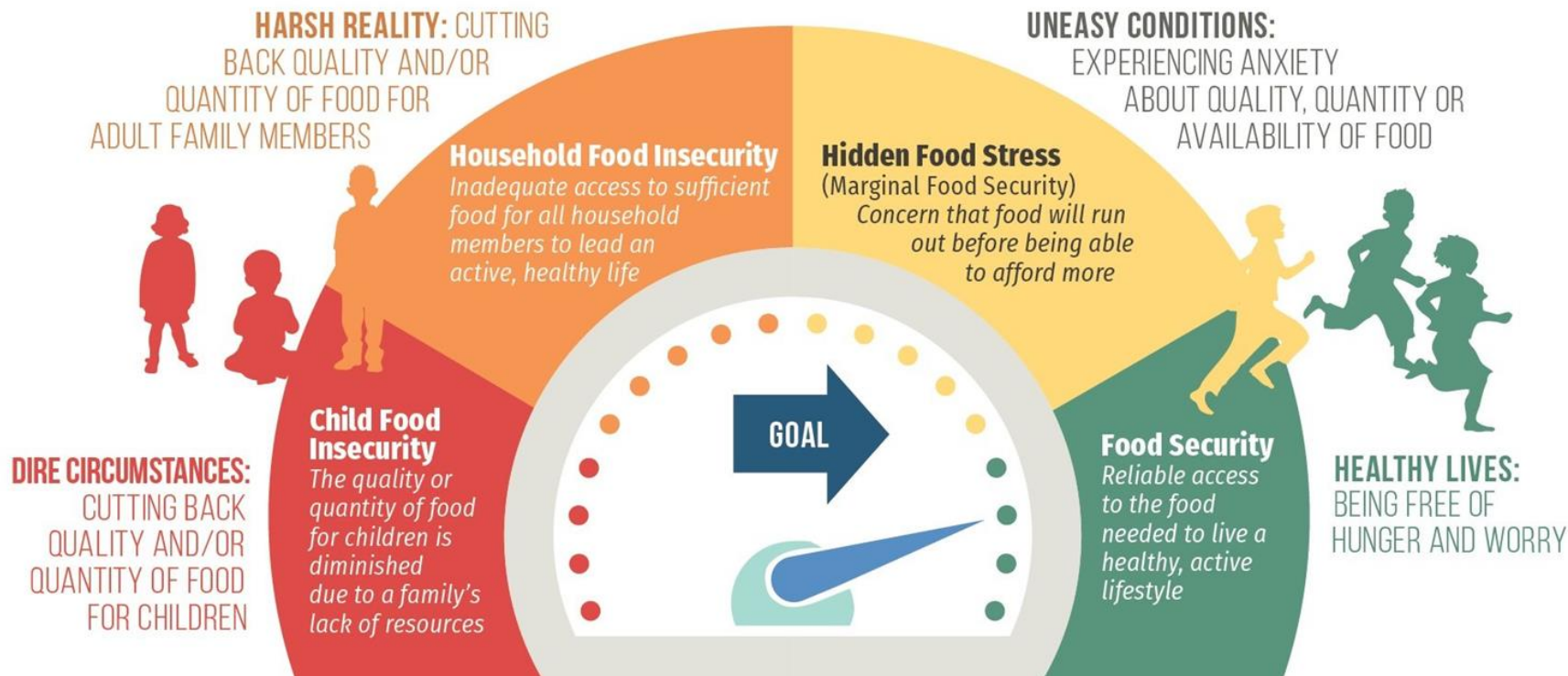
# Food Insecurity and Mental Health Outcomes

- Psychological distress
- Depression
- Anxiety
- Food insecurity between parents and children
  - parental depression, anxiety, and stress,
  - child depression, externalizing/internalizing behaviors, and hyperactivity.

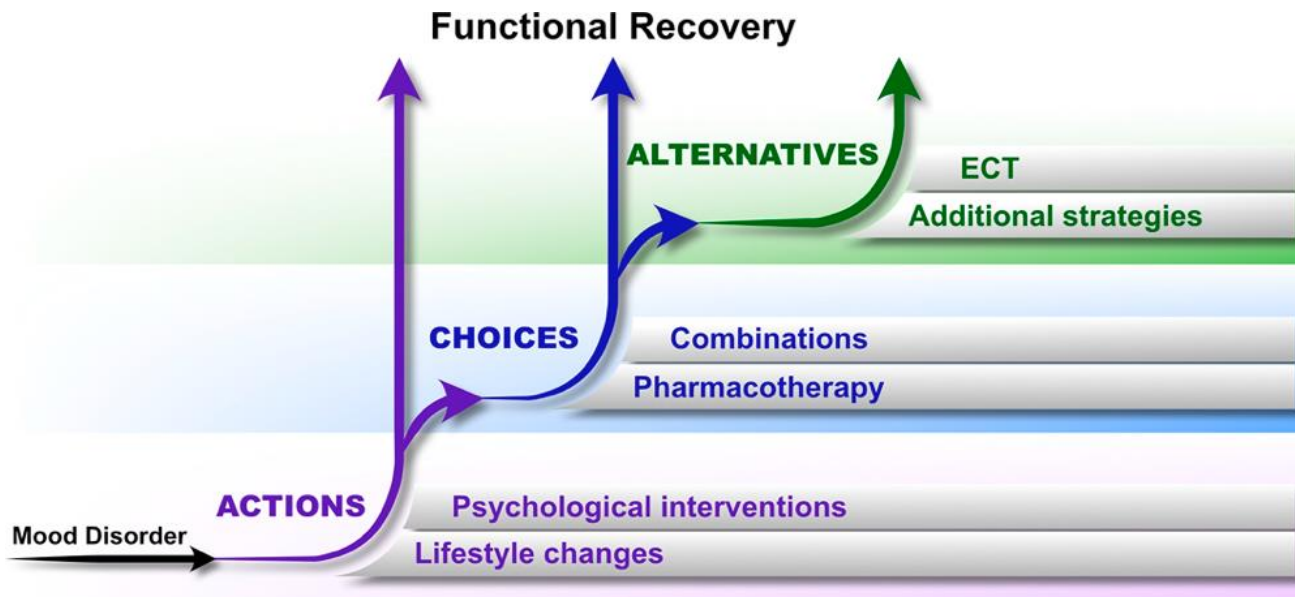


Each Green Corner

# Children's Experience with Food Insecurity & Mental Health



# The 2020 Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for mood disorders: Major depression summary



# Programs and Policies to support food security and public health goals

- Food insecurity linked to nutritional deficiencies and common metabolic diseases associated with poor dietary intake e.g., hypertension, diabetes mellitus 2, coronary heart disease, chronic kidney disease
- Thirteen federal nutrition programs represent around \$100 billion in annual nutritional assistance—strong evidence suggests that SNAP substantially reduces the rate of food insecurity
- Broadscale implementation of voucher and incentive programs for subsidizing the cost of healthier foods such as fruits and vegetables can support food security and healthier dietary intake





# Promoting quality of life in adults with mental health issues using exercise and nutrition intervention

- Participants reported sleeping and functioning “better”, being happier and experiencing improved confidence and self-esteem and increased ability to “cope” with life’s challenges, over the duration of the program.
- Most participants reported ongoing commitment to exercising
- Increased motivation for a range of other general activities, from volunteering to improving their relationships



# Traffic Light Eating



## **Low (Red light foods)**

- Avoid or only eat occasionally
- Artificial additives/preservatives
- High in sugar
- Highly processed

## **Medium (Yellow light foods)**

- Eat every day, but in moderation
- May contain more fat or sugar than green-light foods

## **High (Green light foods)**

- Nutrient dense
- Found close to the source
- Grown, not manufactured

# DIET & EATING

Individual



System, organizations,  
and community levels



# Thank you!



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Associate Editor, American Journal of Lifestyle Medicine

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