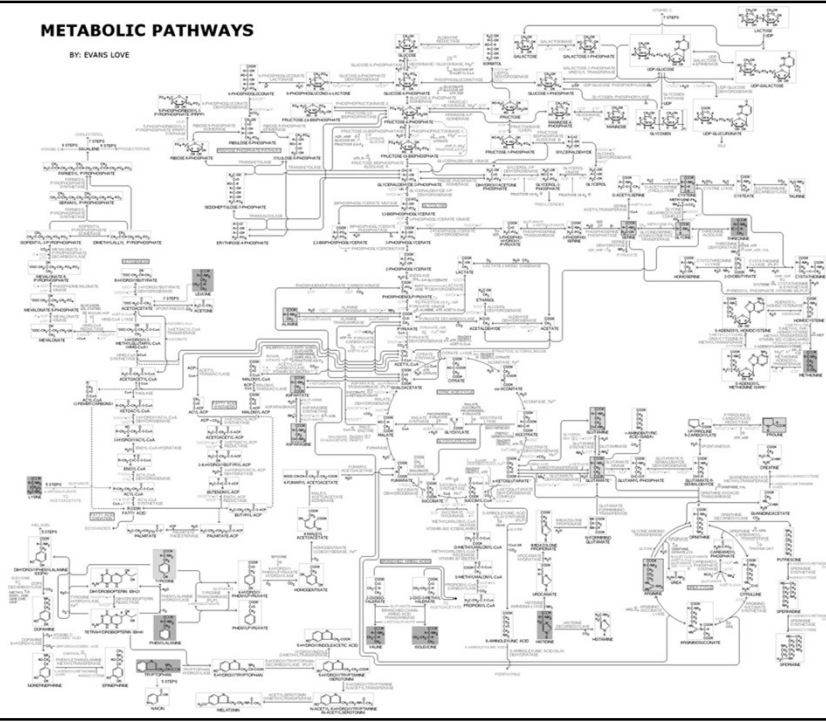


# THE ROLE OF NUTRITION THERAPY FOR DEPRESSION AND ANXIETY IN DIABETES MANAGEMENT

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# METABOLIC PATHWAYS

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# SYSTEM IMBALANCES THAT CAN DRIVE MENTAL HEALTH

- Cortisol and mineral corticoids
- Hormone production
- Neurotransmitter pathways
- Thyroid
- Immune and inflammatory pathways
- Nervous system: sympathetic dominance, and weak or dysfunctional parasympathetic nervous system

## Dietitian Assessment findings...

- Caffeine intake
- Iron status, related symptoms
- Magnesium: intake, signs/symptoms of low magnesium, RBC Magnesium if available
- B vitamins: intake, s/s, and related labs
- Protein: intake, physical assessment, related labs
- Antioxidant, phytonutrient intake (or food-based assessment)
- Sugar: intake, related labs even if not diagnosed with diabetes
- Fluid and electrolyte balance

## Link to these symptoms...

- Energy levels
- Sleep patterns and quality of sleep
- Anxiety
- Depression
- Motivation
- Anger bursts



These symptoms support a nutrition diagnosis.

# RELATE NUTRITION TO THE SYMPTOMS THAT PATIENTS WANT RELIEVED

- Energy levels (low sodium, hydration, B vitamins, balanced nutrition, protein, food sensitivities and allergy)
- Sleep (electrolyte balance, caffeine, magnesium, high inflammatory foods, B vitamins, protein intake, food sensitivities and allergy)
- Anxiety (high refined starch and sugar diet, B vitamins, magnesium, iron, protein, caffeine with COMT or MAO gene expression, food sensitivities and allergy)
- Depression (highly processed diet, high inflammatory foods, magnesium, B vitamins, low protein, food sensitivities and allergy)
- Motivation (highly processed diet, highly inflammatory foods, magnesium, B vitamins, low protein)
- Anger (sugar and refined carbs, highly inflammatory diet)

# INFLAMMATION IN DEPRESSION

AND THE ROLE OF NUTRITION

# INFLAMMATION

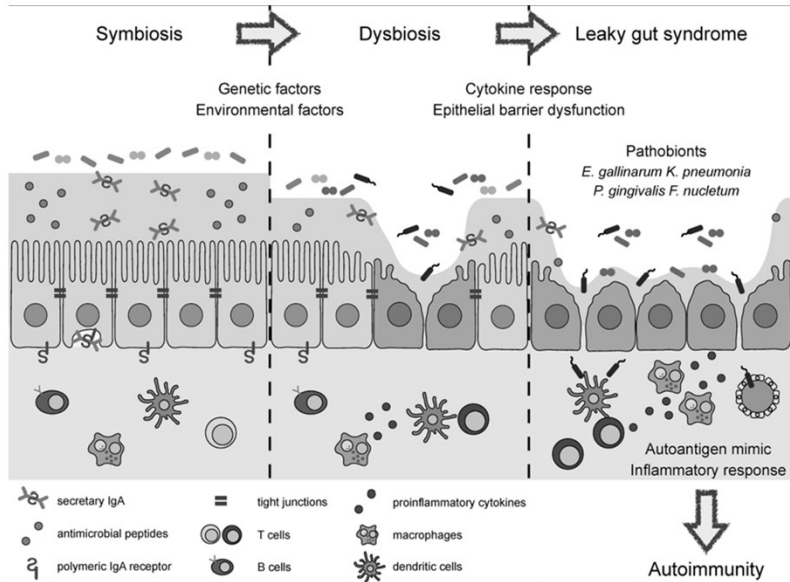
- Controlling inflammation has been found to provide an overall therapeutic benefit in depression.
- Depressed patients with increases in inflammatory markers may represent a population with poor treatment response to anti-depressants.
- Excess or prolonged inflammatory cytokine activity in the CNS and/or PNS begins to disturb many neuronal functions, including impairment of neurotransmitter signaling, synthesis, reuptake, and release.
- Connections have been drawn through the hypothalamic-pituitary-adrenal (HPA) axis and Gut-Brain axis to inflammation and mental health.

# INFLAMMATION

- Where does it come from?
  - Stress and trauma (ACEs, economic, situational, mild chronic stress)
  - Diet (Standard American Diet)
  - Exercise (Excess and lack of; the right amount has anti-depressant effect)
  - Obesity (IL-6 production in fat cells)
  - Smoking and other oxidative stress (pollution, chemical and fragrance exposures)
  - Allergies and sensitivities (food, environmental, chemical), autoimmunity, immune activation (MCAD and CIRS)
  - Gut permeability and the microbiome



# INFLAMMATION – GUT DYSBIOSIS AND GUT PERMEABILITY



# INFLAMMATION – A DIETITIAN'S ASSESSMENT

## Assessment

- Periodontitis
- Bone resorption (excess release of calcium)
- Fibromyalgia
- Arterial disease
- Food and chemical sensitivities
- Autoimmune disease
- Failure to repair degenerative processes

## Lab Indicators

- High glucose or Hgb A1c
- High C-reactive protein
- High A/G ratio
- Low total protein
- Low cortisol
- Low Alk Phos
- High SGOT/SGPT
- Pro-inflammatory cytokines: IL-1 $\beta$ , IL-6, and TNF- $\alpha$

# INFLAMMATION – NON-MEDICINAL INTERVENTIONS

## Anti-inflammatory Diet

- Avoid super processed foods
- Avoid overcooked and fried foods
- Avoid trans fats
- Avoid excess sugar
- Avoid excess alcohol consumption
- Increased amounts of vegetables, fruits, nuts and seeds, legumes, whole intact grains, fish, poultry, fermented foods

## Anti-inflammatory Lifestyle

- Exercise but not too much
- Balance between work and play
- Maintain normal weight
- Adequate rest and sleep
- Meditation
- Release anger and resentment
- Reduce trauma and drama (to reduce inflammatory response)

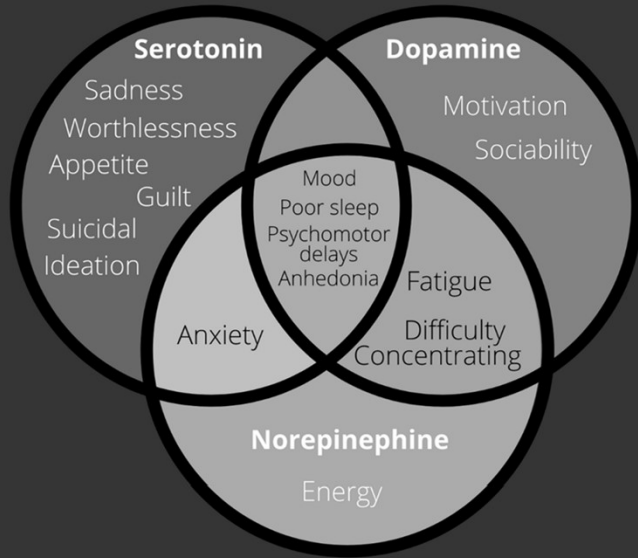
# DOPAMINE AND SEROTONIN

AND THE NUTRIENTS TO BUILD MORE

# NEUROTRANSMITTERS

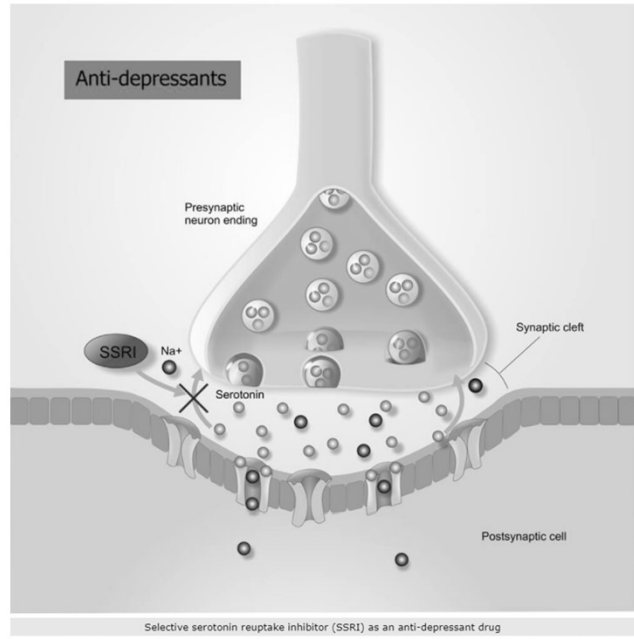
- Neurotransmitters regulate the nervous system.
- Controls joy, fear, depression, insomnia, appetite, substance cravings and addiction
- They are derived from amino acids, therefore someone could be at risk for neurotransmitter imbalance if a person has:
  - Inadequate high biological protein intake
  - Protein mal-digestion or malabsorption
  - A vegan diet, or anyone not consuming enough protein
- Co-factors are required to move the amino acids to the end-product neurotransmitter. A deficiency of co-factors can result in neurotransmitter imbalance.

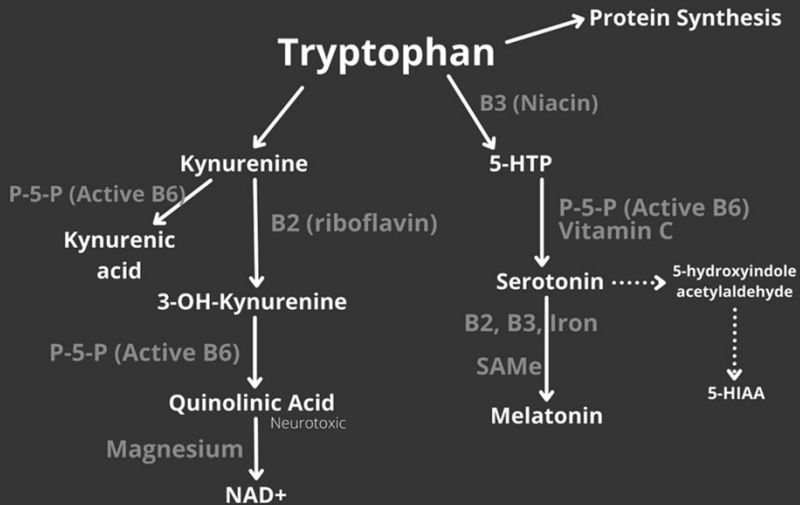
# SYMPTOMS OF LOW SEROTONIN, DOPAMINE, AND NOREPINEPHRINE



Adapted from *The Bidirectional Relationship of Depression and Inflammation: Double Trouble*,  
Neuron 107, July 22, 2020.

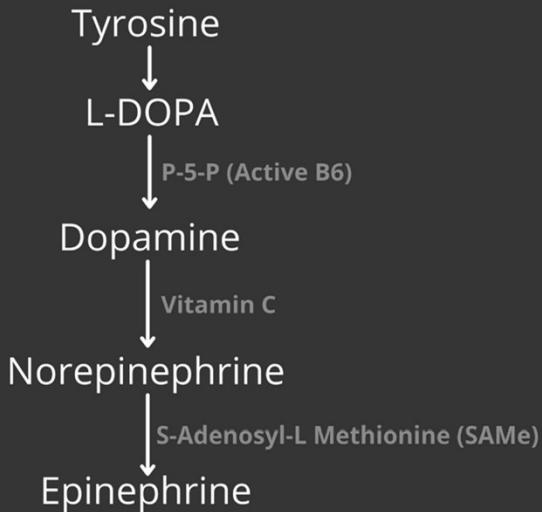
SELECTIVE SEROTONIN  
REUPTAKE INHIBITORS  
(SSRI) & SEROTONIN  
NOREPINEPHRINE  
REUPTAKE INHIBITOR  
(SNRI) MEDICATIONS







Breakdown of  
dopamine,  
norepinephrine,  
and epinephrine  
requires  
functional MAO  
and COMT  
enzymes. Co-  
factors B2, SAmE,  
and Iron



# BEST SOURCES OF KEY NUTRIENTS

FOR MENTAL HEALTH SUPPORT

# BEST SOURCES OF KEY PROTEINS

- Tyrosine
  - Non-essential, made from phenylalanine
  - Chicken, turkey, fish
  - Soy products: tofu, soy milk
  - Peanuts, almonds, pumpkin and sesame seeds
  - Avocados, bananas
  - Milk, cheese, yogurt, cottage cheese
- Tryptophan
  - Chicken, turkey, fish
  - Milk, cheese
  - Soy products: tofu, soymilk
  - Peanuts, pumpkin seeds, sunflower seeds
  - Egg whites
- Methionine
  - Brazil nuts, cashews, sunflower seeds
  - Beef, pork, chicken, turkey
  - Tuna, salmon, lobster, crab
  - Eggs
  - Legumes, soy products
  - Milk, cheese, yogurt
- Any amounts of other protein sources to help spare these for neurotransmitter function would also be helpful. Adequate amounts of total protein are key. Vegetarians and vegans may need more guidance.

# BEST SOURCES OF KEY NUTRIENTS

- Nuts/ Seeds- Omega-3 fatty acids, Magnesium, Zinc, Selenium (Brazil nuts), Iron, Folate, Vitamin B1, Vitamin B2, Vitamin B6
- Dark leafy greens- Magnesium, Iron, Folate, Vitamin B2
- Cruciferous vegetables- Iron, Folate, Vitamin B2, Vitamin C
- Citrus, melons, tomato, potato- Vitamin C
- Eggs- Vitamin B1, Vitamin B2, Vitamin B12
- Whole grains- Magnesium, Zinc, Vitamin B1, Niacin
- Beans/ peas/ soy- Omega-3 fatty acids, Magnesium, Zinc, Iron, Folate, Vitamin B1, Vitamin B2, Niacin, Vitamin B6
- Yogurts and cheeses- Zinc, Vitamin B1, Vitamin B12
- Quality meats, poultry, and sea foods- Omega-3 fatty acids, Zinc, Selenium, Iron, Folate, Vitamin B1, Vitamin B2, Vitamin B3, Vitamin B6, Vitamin B12

# LIMITATIONS TO OPTIMAL NUTRITION

FOR OPTIMAL MENTAL HEALTH

# EATING ENOUGH BUT NOT GETTING ENOUGH

- Chronic omeprazole use
- Hypochlorhydria
- Poor digestive enzyme production
- Not chewing food well
  - Fast eater
  - Poor dentition
- GI tract inflammation
- Catabolic state
- People with allergies tend to need more magnesium
- Genomic SNPs that prevent activation of B vitamins
- Under stress, the body may not be able to make enough tyrosine from phenylalanine

# CONDITIONS THAT INCREASE RISK OF DEFICIENCIES

- alcohol abuse – all B vitamins, magnesium, zinc
- people with diabetes – thiamine, zinc, magnesium
- older adults – thiamine, magnesium, zinc
- HIV/AIDS – thiamine, selenium
- bariatric surgery – thiamine, iron, zinc
- Malabsorption disorders – folate, iron, magnesium, vitamin C, Zinc
- MTHFR polymorphism – folate
- Women with heavy menses – iron
- Use of diuretics or laxatives – potassium
- Smoking – vitamin C
- Vegetarians – Zinc, B vitamins
- Any condition that causes you to use up certain nutrients faster, such as anxiety and depression

WHAT CAN ALL HEALTH  
PROFESSIONALS DO?



# ASSESSING THE BASICS

- Water intake vs. other beverages, especially caffeine for anxious people.
- Are meals balanced?
  - Work with your dietitian to get a balanced diet screening tool or assessment. A food frequency questionnaire is a common tool. I created my own tool for the diabetes program that can be used for assessing diet quality. Set parameters where a patient would benefit from a referral to RDN.
  - You can ask questions about eating meats fish poultry vs Spam, hot dogs, sausages, etc. Ask how many times per day/week?
  - You can ask how many vegetables do you put on your plate each day? Fruits?
  - Do you snack on snack cakes, chips, etc. vs. nuts, seeds, fruits, etc.?
- Review slide “Conditions that Increase Deficiencies”. Many of these are likely already in your assessment or patient profile.

# YOU CAN COACH ON A GENERAL HEALTHY DIET

- If it is within your scope of practice to coach on general health nutrition patterns, you cannot go wrong encouraging adequate water, decreased caffeine, increased quality protein, increased fruits and vegetables, decreased sugars/ junk foods.
- Avoid nutrition diagnosing or prescribing specialized diets for specific disease treatment unless it is within your licensed scope of practice.
- If you are not comfortable, refer to a dietitian. Its what we do and more!
  - A dietitian can further assess for specific nutrients and offer targeted recommendations.
  - Dietitians who are trained in supplement use can also recommend supplements where a patient needs more than what food can supply to the patient.
- Screen for adequate food resources, time availability to prepare meals, or meal preparation knowledge and equipment.

# QUESTIONS?

