



Obsessive Compulsive Disorder Redefined

*A Functional & Integrative
Medicine Approach*

Dr. James Greenblatt



“I ...took sleeping pills to fall asleep, as this was the only way to *not* perform the rituals.”

- *Chandler*



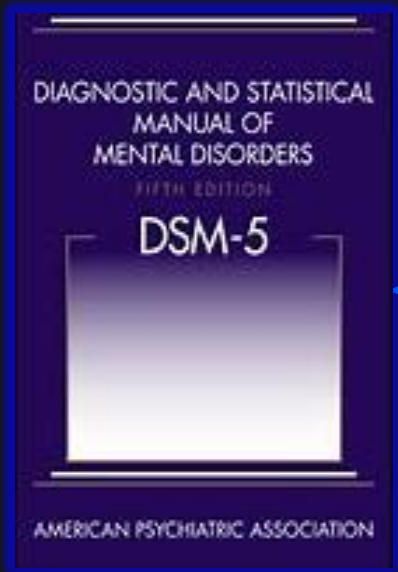
**ANXIETY
DISORDERS**

GAD

ETC...

PTSD

OCD



**ANXIETY
DISORDERS**

**Trauma & stressor-
related disorders**

PTSD

OCRDs

OCD

**PSYCHIATRY
REDEFINED**

OCD

Body Dysmorphic
Disorder

OCRD due to another
medical condition

OCRDs

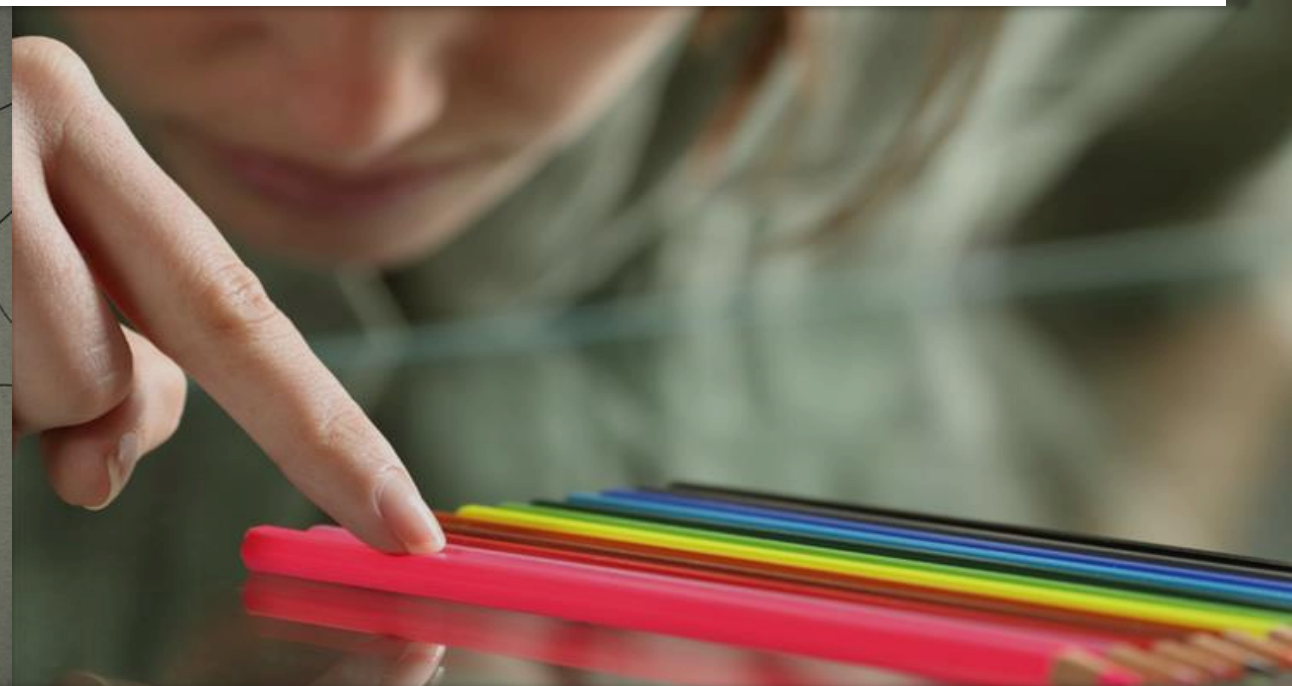
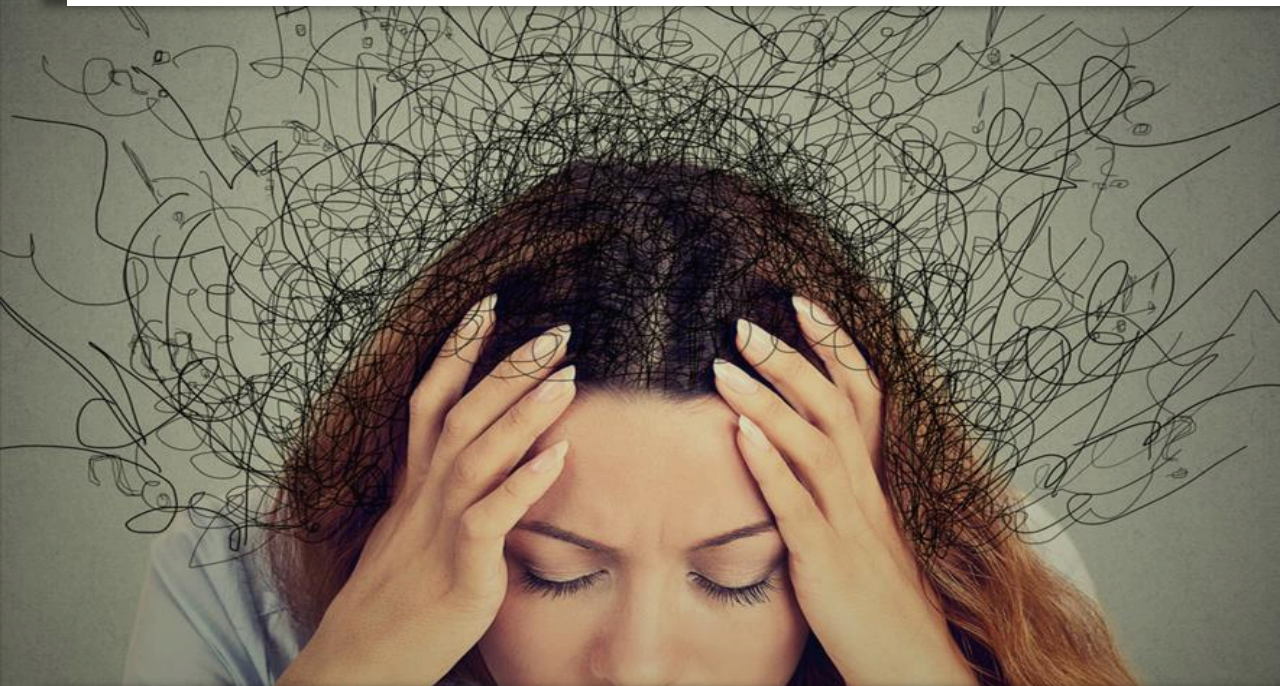
Hoarding Disorder

Substance/Medication
Induced OCRD

Trichotillomania

Excoriation
Disorder

OCD is characterized by intrusive & unwanted thoughts that elicit anxiety – also known as obsessions.



To alleviate anxiety from the obsessions, sufferers often engage in specific and repetitive behaviors –known as compulsions.

Common OCD Obsessions



- An intense need for symmetry
- Fear of dirt or germs
- Pathological doubt
- Intense religious / spiritual convictions
- Aggressive impulses
- Sexual impulses
- Concerns about feelings in or appearances of the body

Common OCD Compulsions

**Excessive
washing &
cleaning**

**Repetitive
checking
(locks, etc.)**

**Pathologic
doubt**

**Intense religious,
spiritual
convictions**

**Aggressive
impulses**

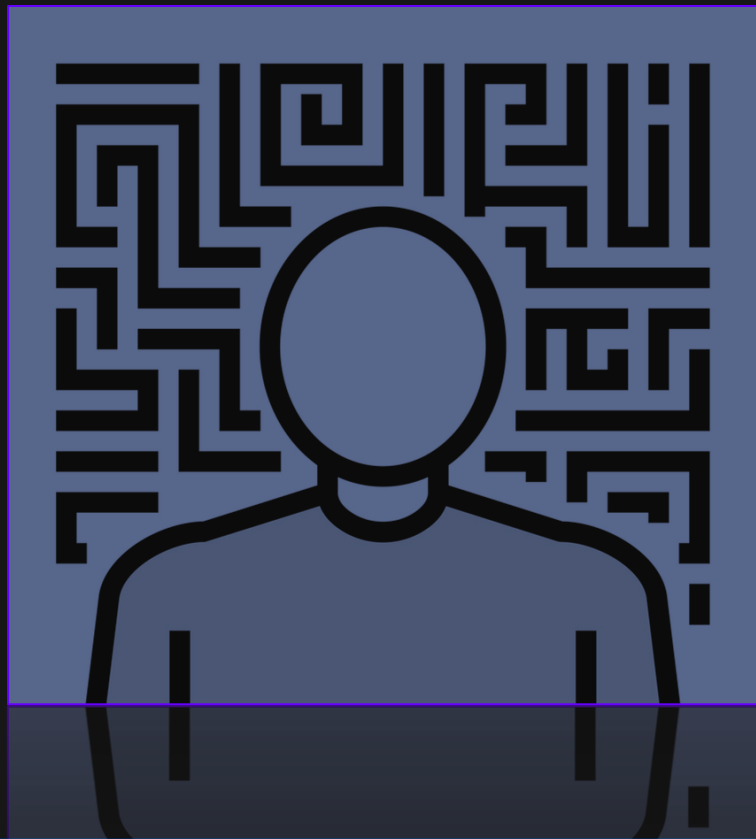
**Sexual
impulses**

**Concerns about feelings in /
appearances of the body**

At its most extreme, **OCD** can make it difficult to navigate school, hold down a job, or even leave the house



While OCD can occur at any age, there are generally two age ranges within which symptoms first manifest:



Between the ages of 8-12 years

Between late teens – early adulthood

“Angel”: 12 year-old female

Symptom onset:

- age 4

Obsessions:

- not throwing away garbage

Compulsions:

- hoarding garbage



Family History:

- Mother
- 2 maternal aunts
- Mother's cousin
- Maternal great-grandmother

...ALL had OCD!

OCD Prevalence*



1 in 40 adults

1 in 100 children

**Lifetime: 1.6 - 2.3%
in the community**

Factors Contributing to Misdiagnosis / Non-diagnosis



Outward symptoms are often indistinguishable from those of other disorders



Many OCD sufferers feel compelled to hide their disorder

MISSING THE MARK

The average OCD sufferer will go an average of **11 years** before being treated



It's estimated that less than 10% of all sufferers receive ANY treatment at all

Etiologic Theories

PSYCHODYNAMIC

Arises as a consequence of repressed sexual

GEN

**NO THEORY IS
SUFFICIENT TO STAND
ALONE**

h suggests

NEUROBIOLOGICAL

pathways – currently serves as etiologic basis for
most current treatment

ONERGIC

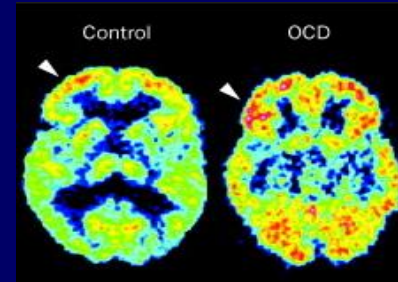
There is compelling evidence for a biological basis of OCD



**Common in
several
medical
conditions**



**40-60% of
patients
respond to
SSRIs**

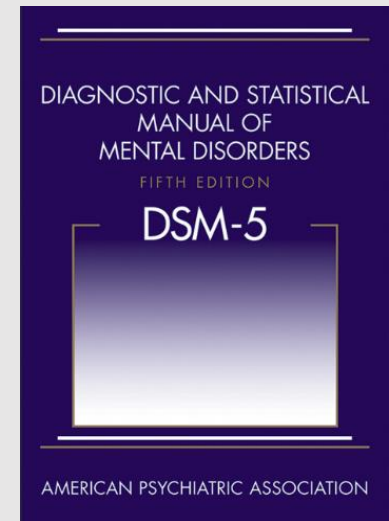


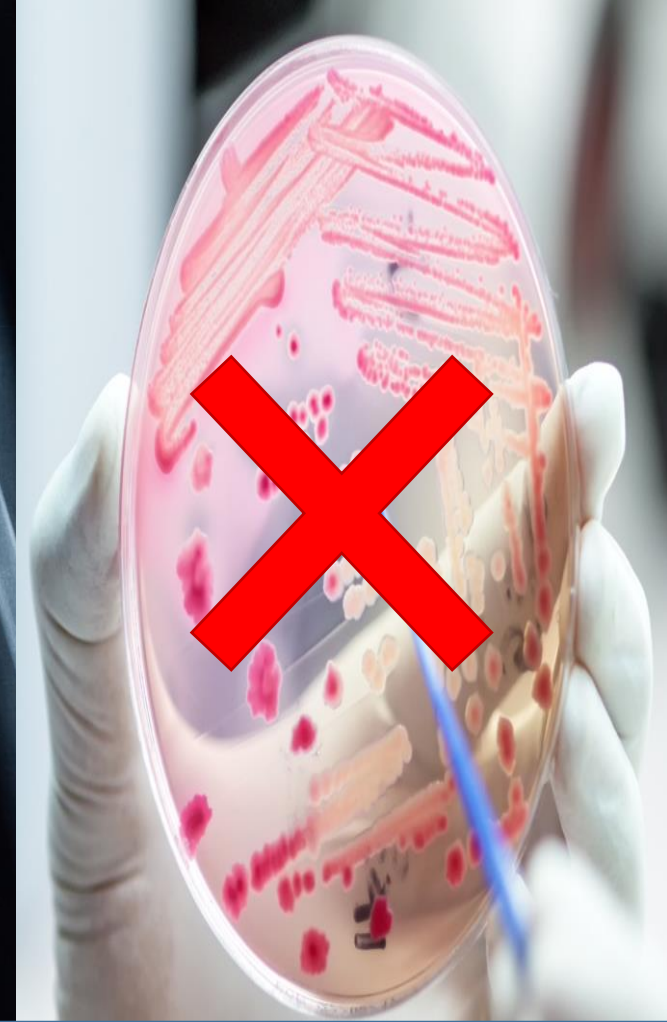
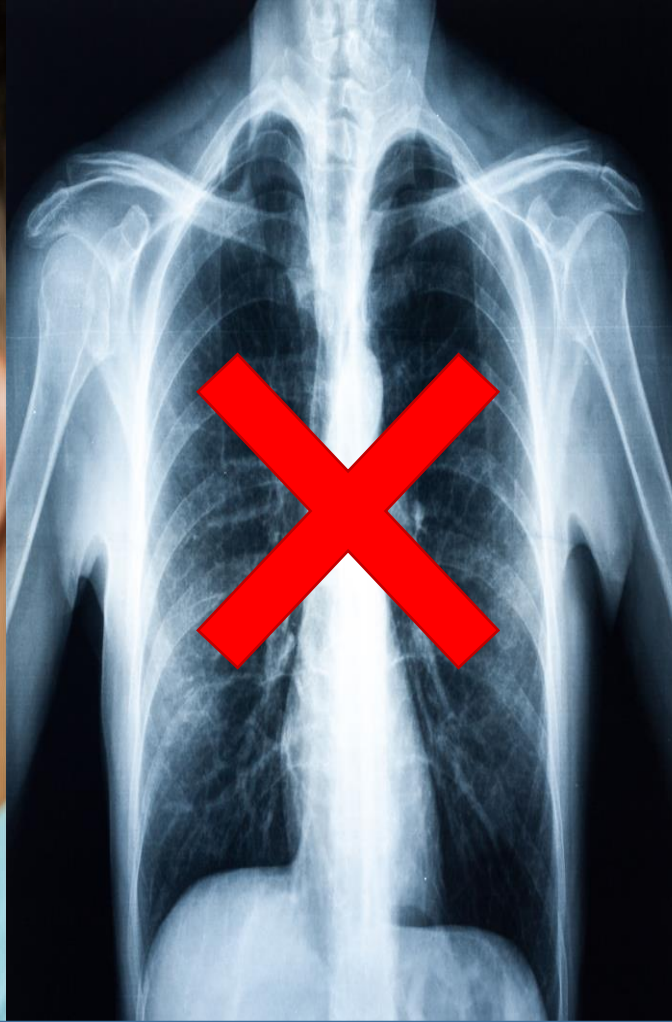
**Distinct
brain
abnormalities**



**Heritability
estimate of
45% - 65%!**

A Typical Evaluation for OCD





DIAGNOSIS OFTEN INVOLVES ZERO BIOLOGIC TESTING OF ANY KIND

**PSYCHIATRY
REDEFINED**



**PSYCHIATRY
REDEFINED**

Pillars of Mainstream OCD Treatment



MEDICATION



PSYCHOTHERAPY

P.A.N.S. / P.A.N.D.A.S.



A clinical condition defined by acute onset of OCD and/or severe eating restrictions AND at least two concurrent cognitive, behavioral, or neurologic symptoms



Is this the best
we can do for
our patients?

....really?



THERE IS A BETTER WAY

**PSYCHIATRY
REDEFINED**

FUNCTIONAL BIOMEDICAL ANALYSIS

Urine Test



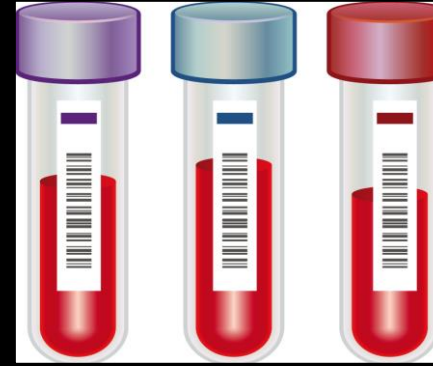
- Opiate peptides
- HPHPA
- Yeast
- Organic Acids
- Amino Acids

Hair Test



- Copper
- Zinc
- Lead
- Magnesium
- Lithium

Blood Test



- Amino Acids
- Food Allergies
- Hormones
- Fatty Acids
- Vitamins
- Trace Minerals

Saliva Test



- Genetics
- Hormones



**If you don't
test...**

**...how do you
know?**

**SSRIs &
SRIs can
reduce
OCD
symptoms**

```
graph LR; A[SSRIs & SRIs can reduce OCD symptoms] --> B[Both influence SEROTONIN]; B --> C[Nutritional interventions influencing SER activity]
```

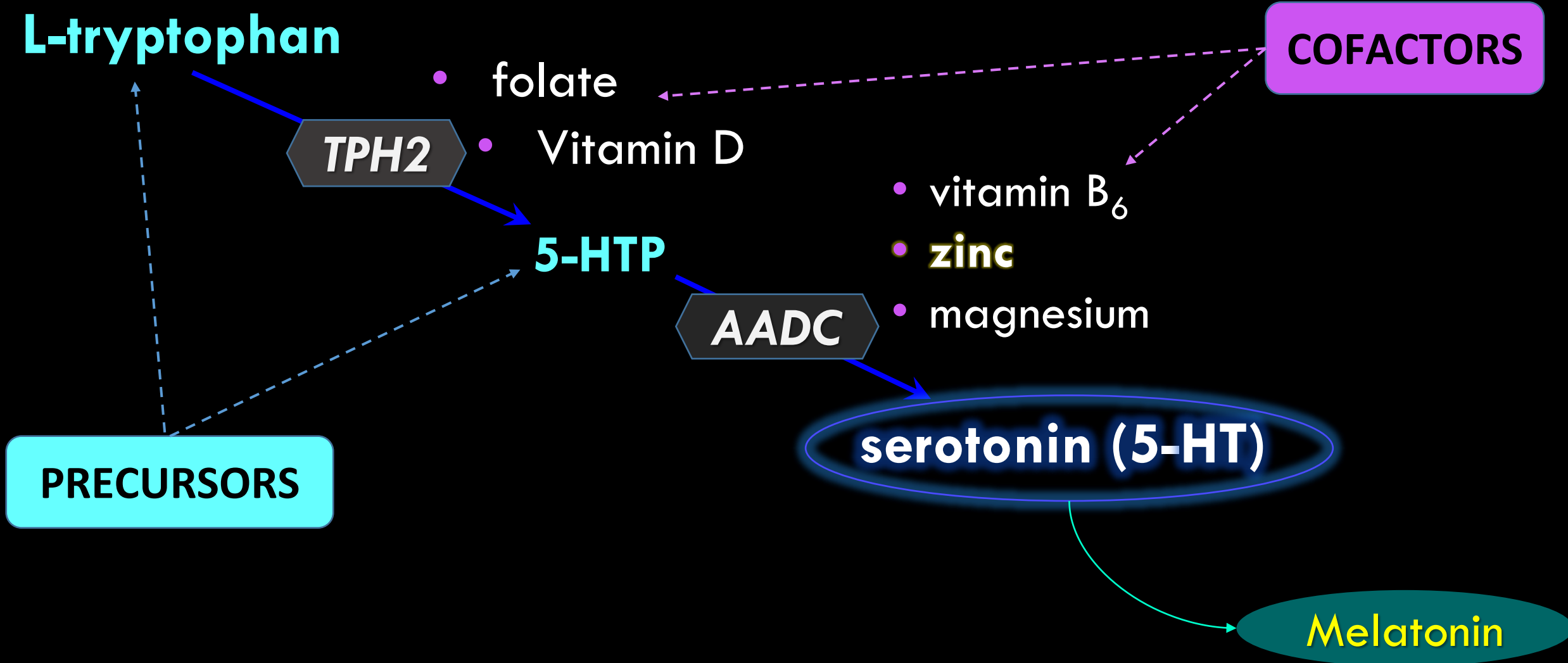


**Both
influence
SEROTONIN**



**Nutritional
interventions
influencing
SER activity**

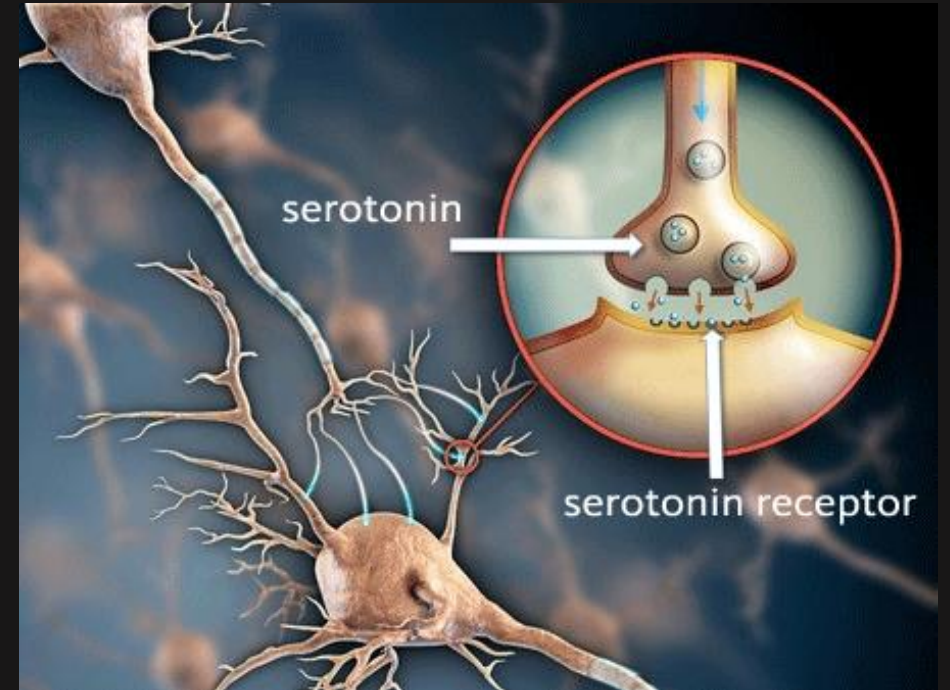
Serotonin Synthesis



OCD Redefined

Serotonin Synthesis

- Genetics
- Dietary intake
- Digestion/Absorption of Amino Acids (Amino Replete)
- Target Amino Acids 5-HTP, Tryptophan
- Zinc
- Folate
- Vitamins B6, B12, C, D
- Magnesium

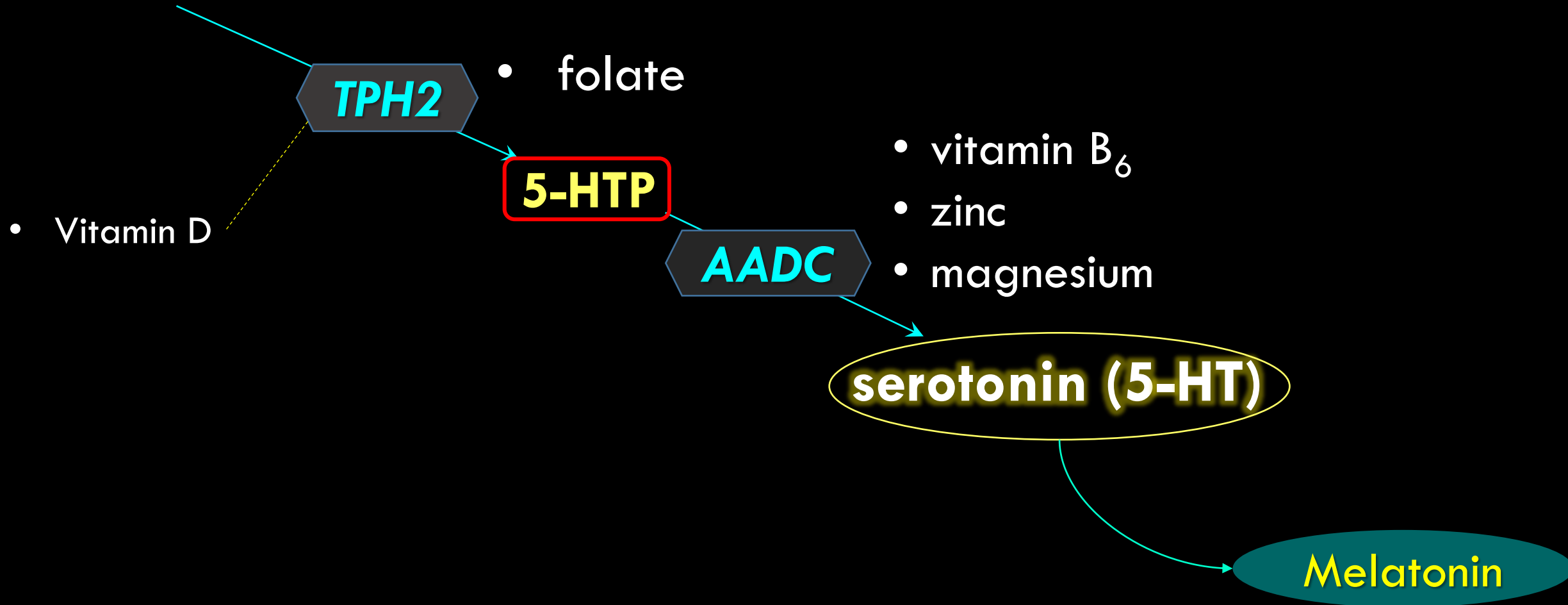


Neurotransmitters from Amino Acids

Amino Acid	Neurotransmitter	Roles in Mental Health
Phenylalanine/ Tyrosine	Dopamine Norepinephrine	Alertness, cognitive performance, positive mood
Tryptophan	Serotonin	<p>IN ANY NORMAL OR VEGETARIAN DIET, TRYPTOPHAN IS THE *LEAST* PLENTIFUL OF THE AMINO ACIDS!</p> <p>sleep, relaxation</p>
Glycine	Glycine	
Glutamic acid	Glutamate	Learning, memory
Arginine	Nitric Oxide	Modulation of other neurotransmitters

Serotonin Synthesis

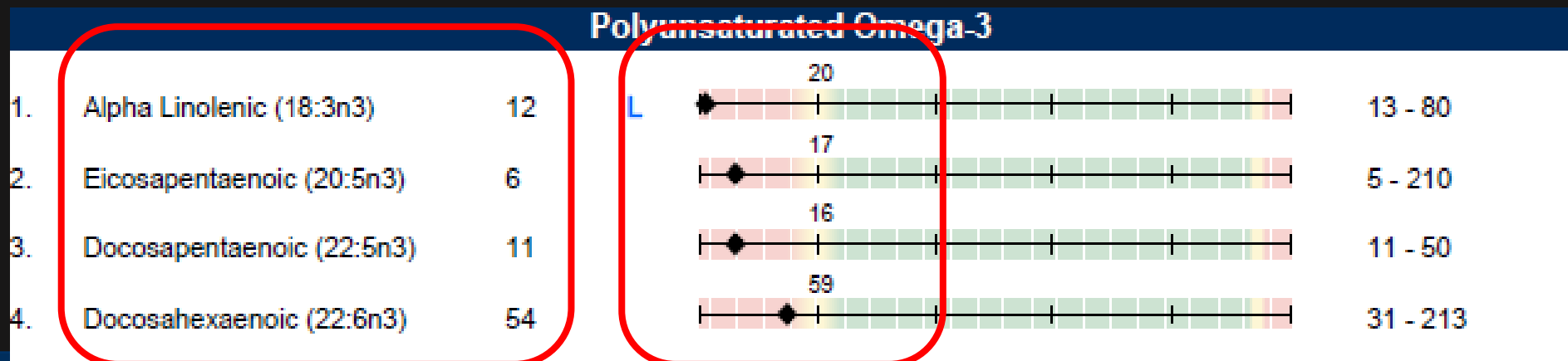
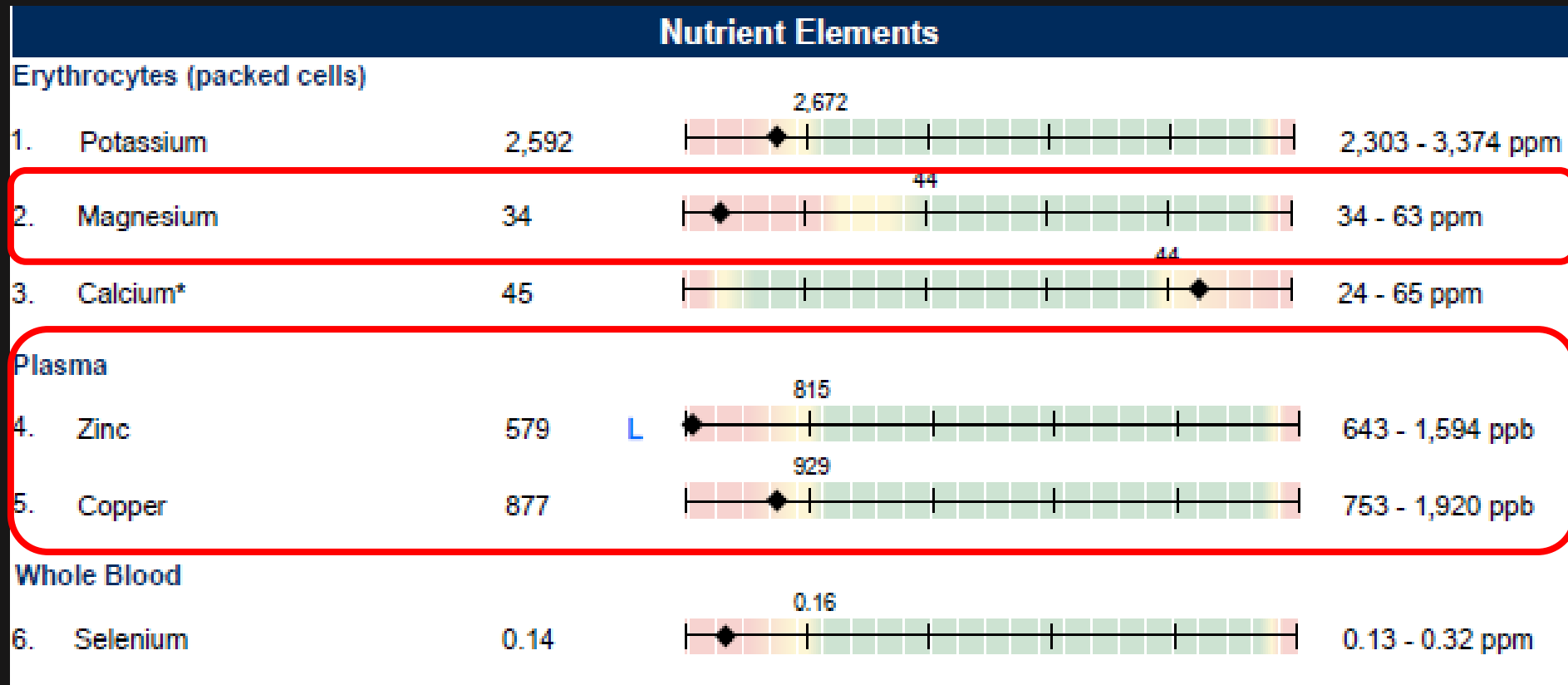
L-tryptophan



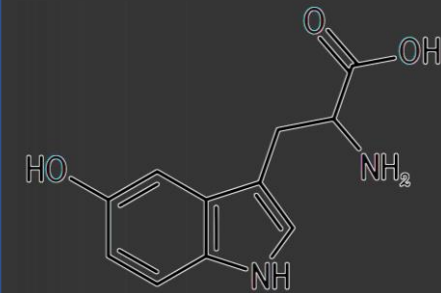
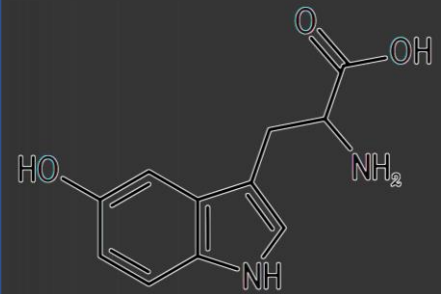
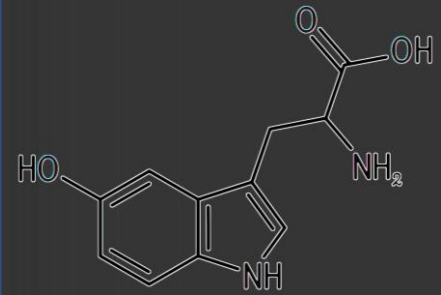
Case SE

ION Testing

- Low Mg
- Low Zinc
- Low Copper
- Low EPA, DHA, GLA



5-Hydroxytryptophan (5-HTP)



- A metabolite of tryptophan & a precursor for serotonin
- Effectively crosses the blood-brain barrier
- Is *not* incorporated into other proteins; is **utilized exclusively for serotonin synthesis**
- Can reliably increase brain / CSF serotonin

SeroPlus

Supplement Facts

Serving size 2 capsules
Servings per container 60

	Amount Per Serving	%DV
Vitamin C (as ascorbic acid)	100 mg	111%
Niacin (as niacinamide)	20 mg	125%
Vitamin B ₆ (as pyridoxal 5' phosphate) (activated B ₆)	6.7 mg	394%
Folate (as Metafolin®, L5-MTHF) (500 mcg L5-MTHF)	833 mcg DFE	208%
Magnesium (as di-magnesium malate)	100 mg	24%
Zinc (as zinc picolinate)	10 mg	91%
5-Hydroxytryptophan	100 mg	*
Inositol (as myo-inositol)	500 mg	*
Taurine (free-form)	200 mg	*

*Daily value (DV) not established

Other ingredients: vegetarian capsule (cellulose, water)

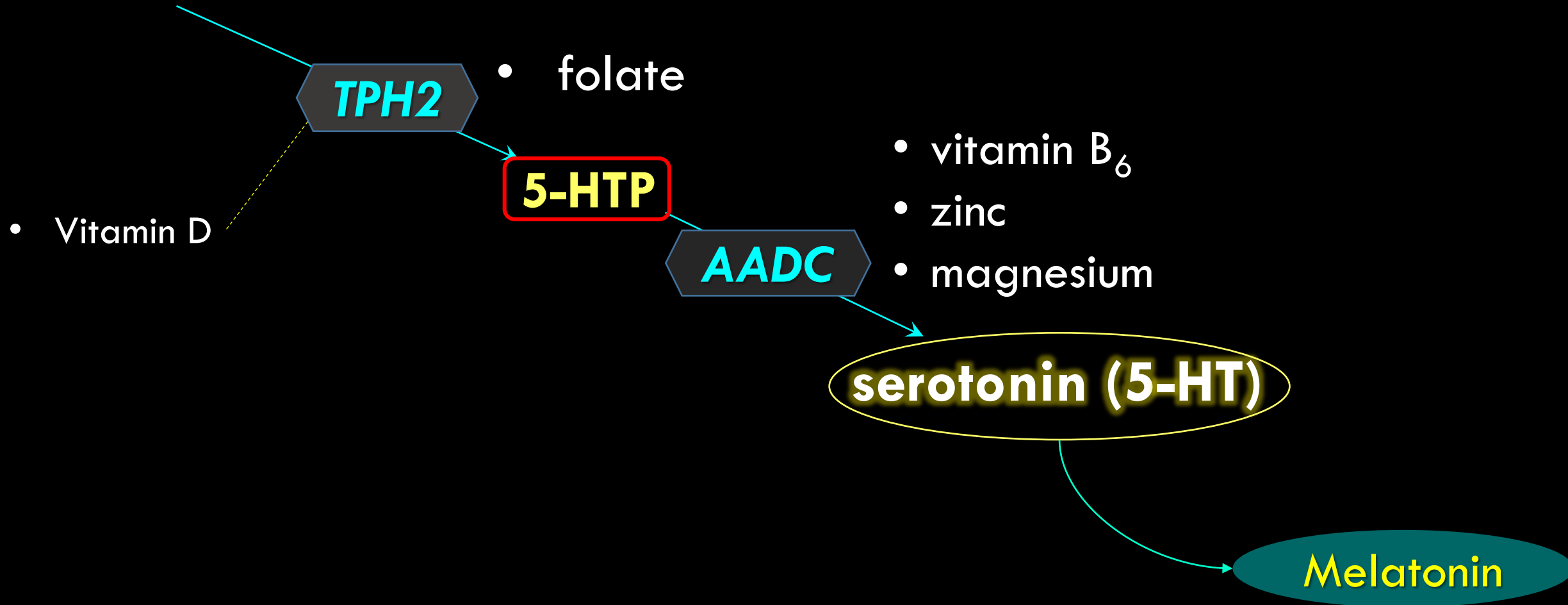


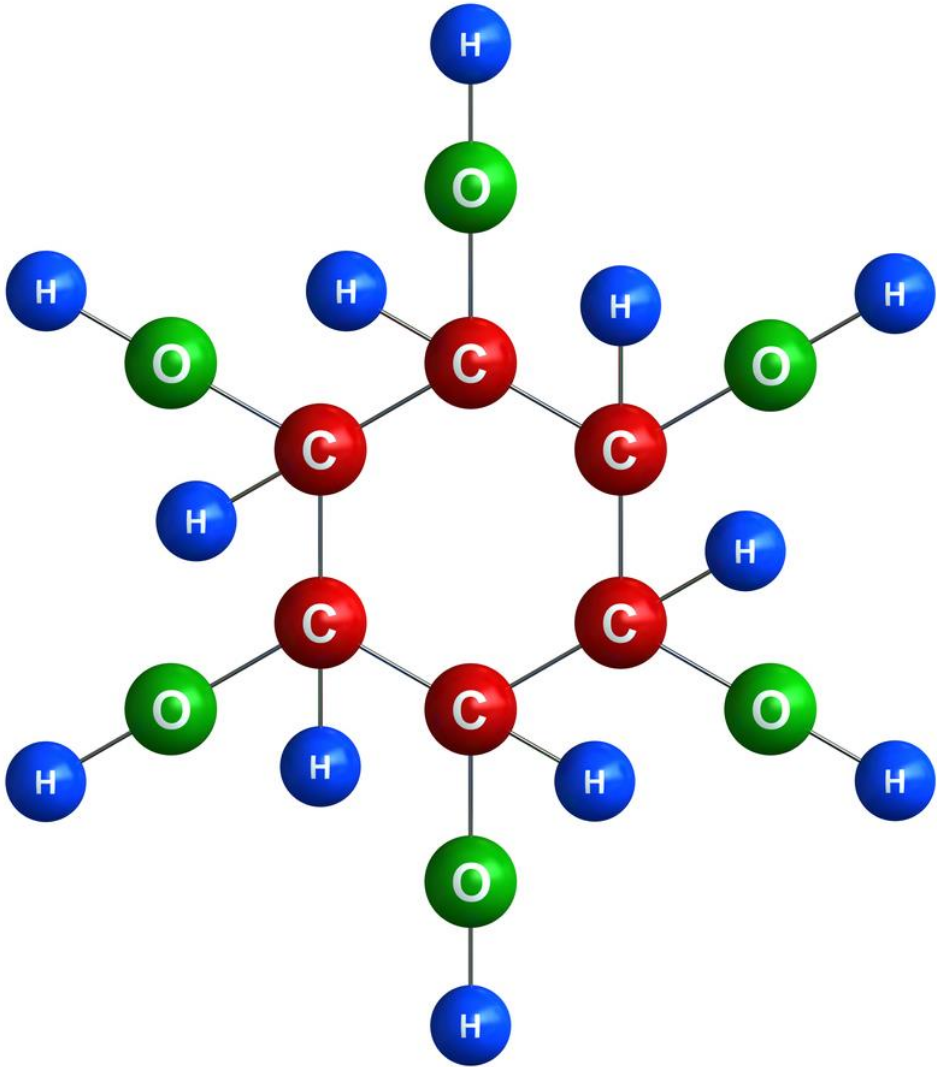
Supports serotonin production

- Folate (5-MTHF)
- P5P (Vitamin B₆)
- 5-HTP
- Zinc
- Inositol

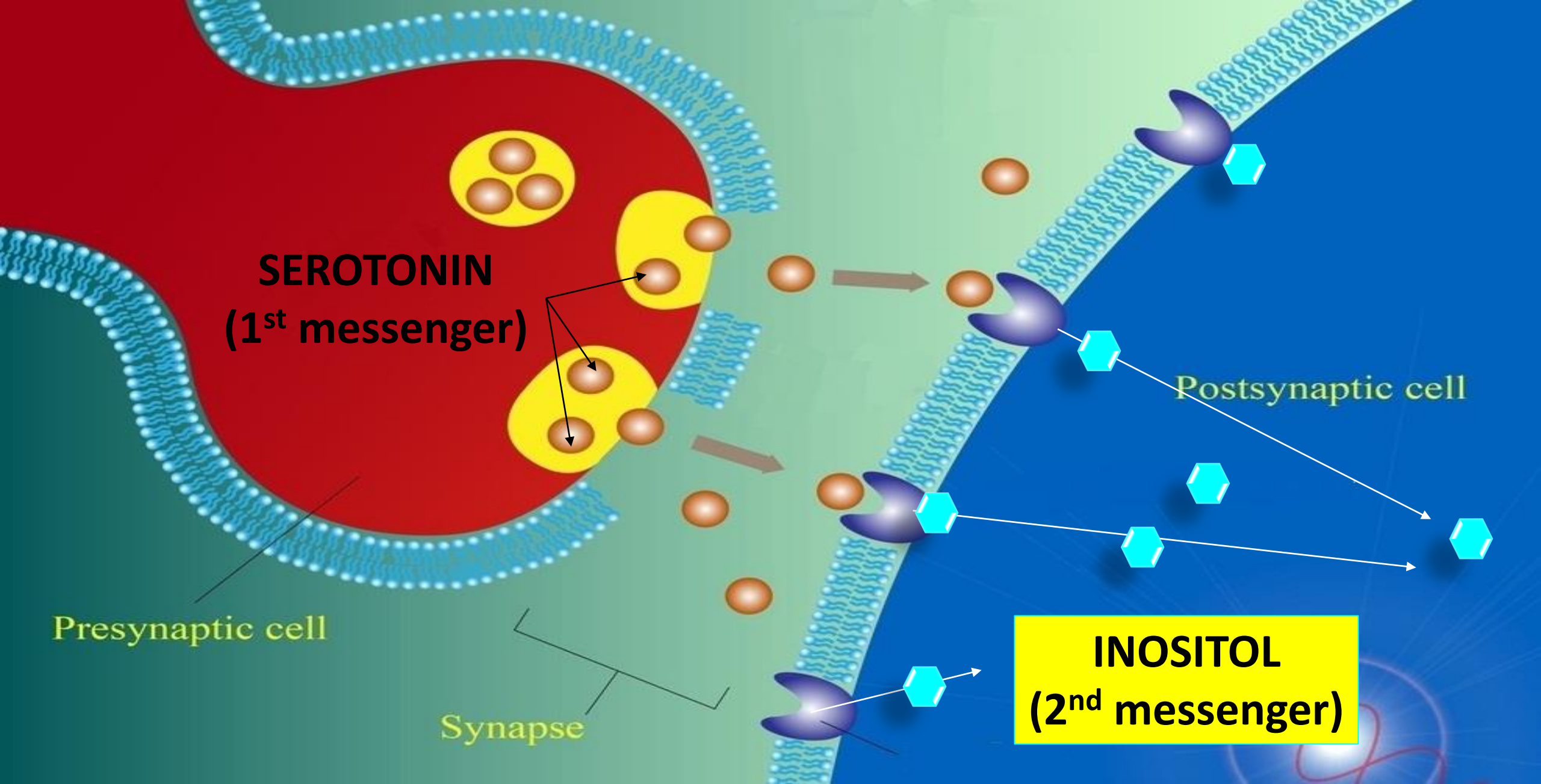
Serotonin Synthesis

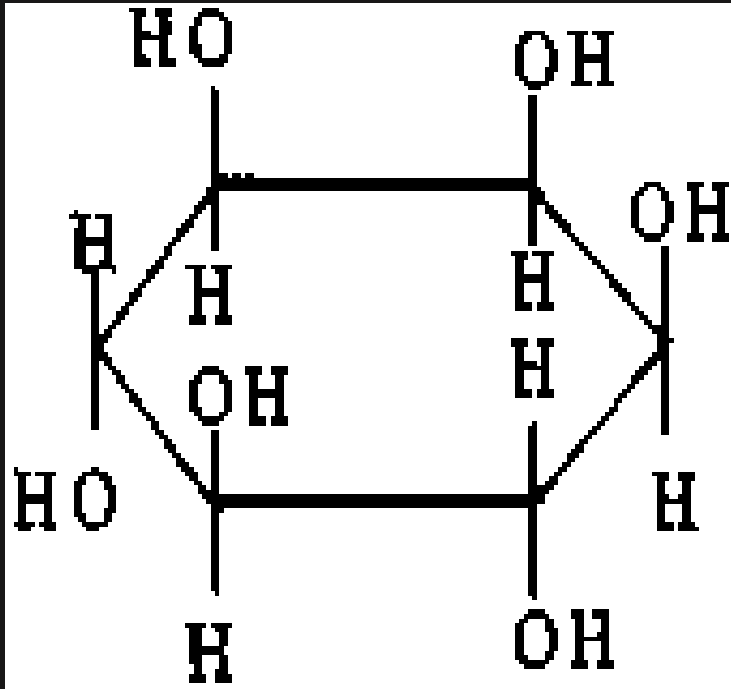
L-tryptophan



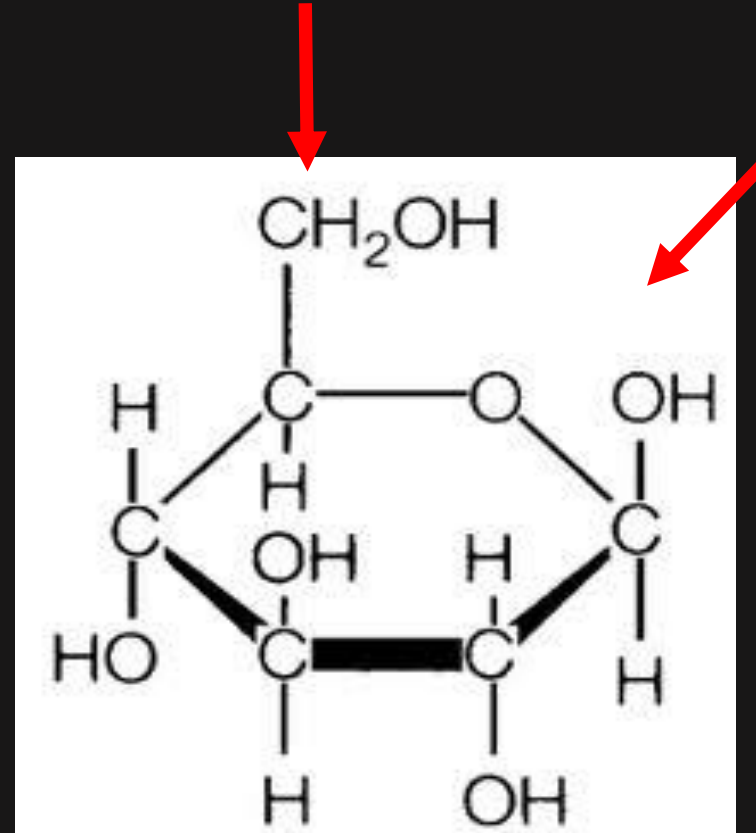


INOSITOL



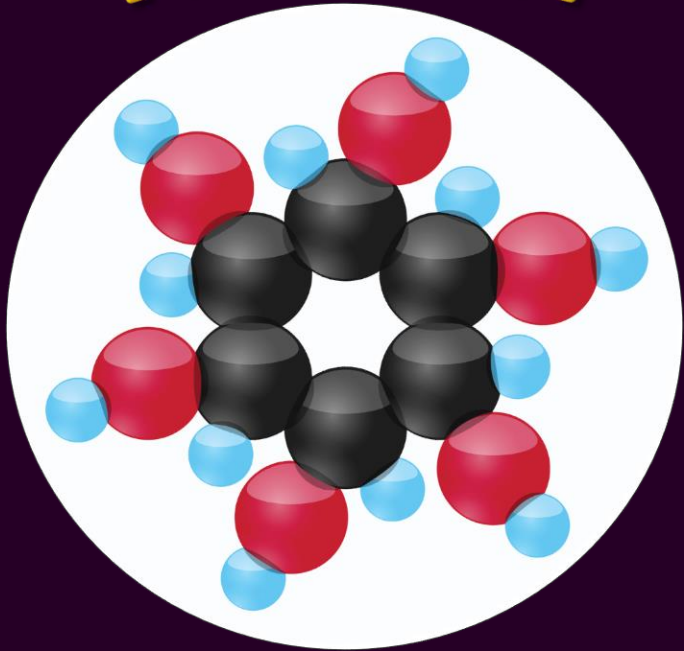


Inositol



Glucose

VITAMIN



B8

Helps to form healthy cell membranes

Maintains proper electrical energy and nutrient transfer between cells

Part of the second messenger system for the 5HT₂ serotonin receptor

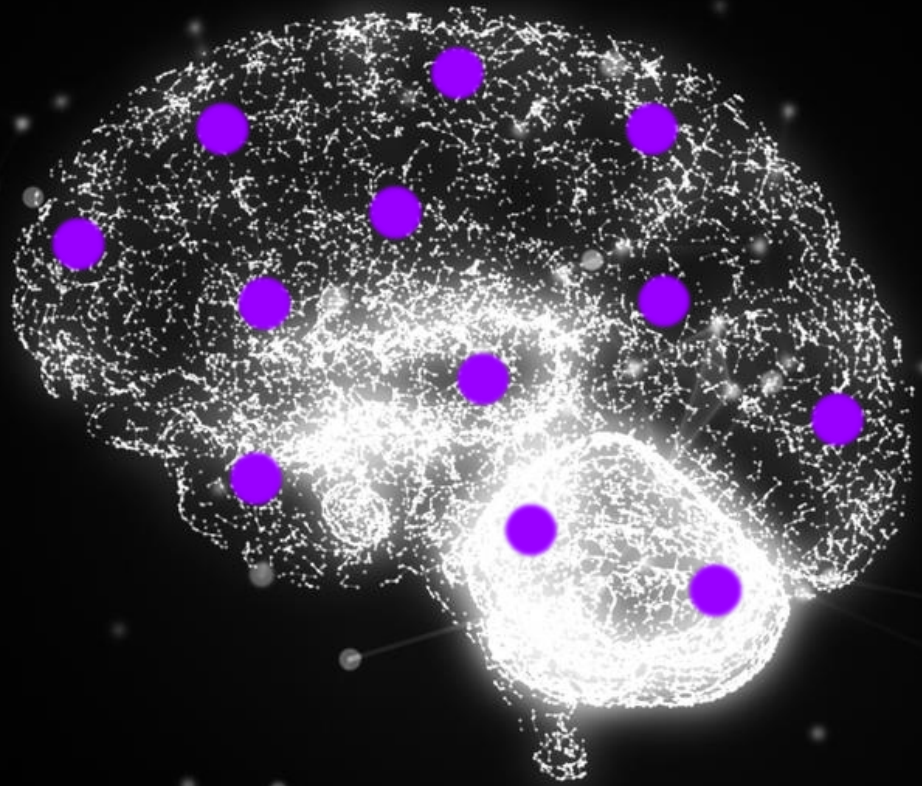
Inositol in Psychiatry

1978 Reports of reduced CSF inositol levels in depressed patients

1993 12g/day of Inositol raised CSF inositol levels by 70%

1993 11 treatment resistant patients responded to inositol

1995 Double-blind, placebo-controlled trial of inositol

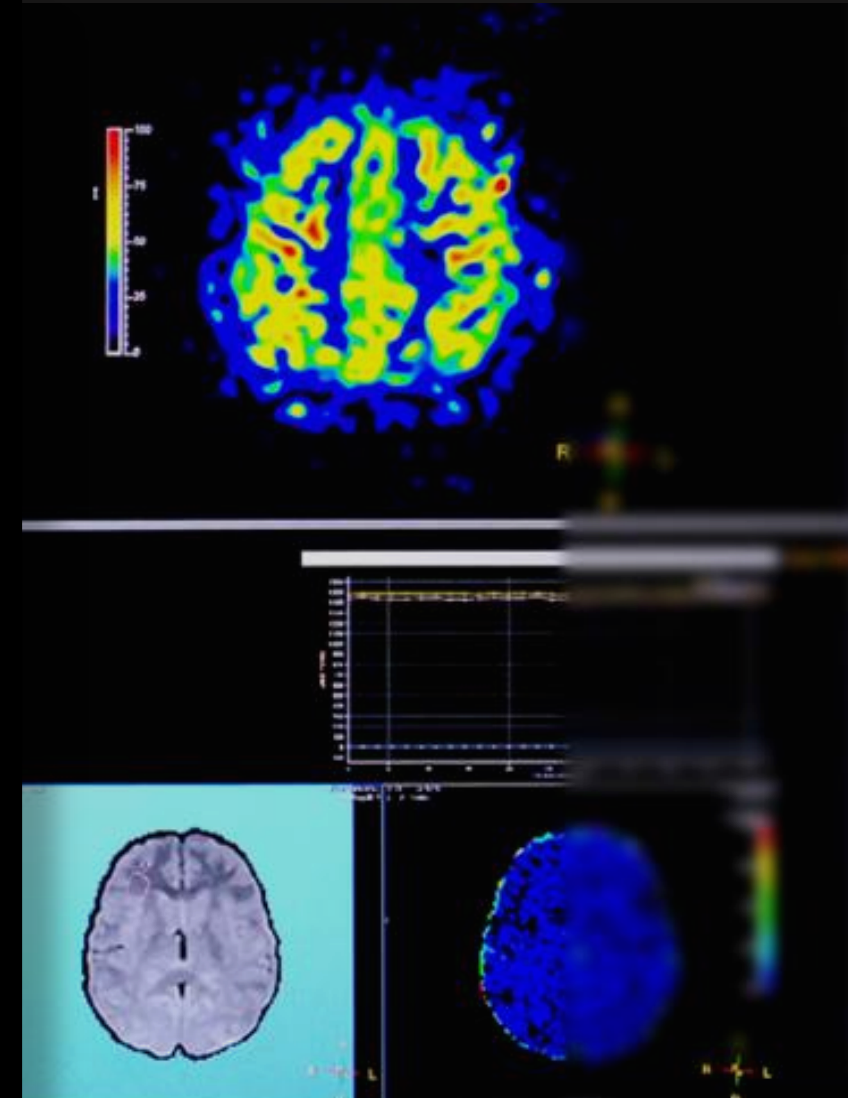


Inositol levels are
**7-fold higher in
cerebrospinal fluid**
relative to plasma...

...and ~**50- to 200-fold
higher in the brain**

Neuroimaging Studies Have Documented. . .

- **Reduced myo-inositol (MI) levels in the frontal cortex of patients with depressive and sleep disorders**
- **Negative correlations between MI levels and depression severity**



Inositol may have therapeutic effects in the spectrum of psychiatric illnesses responsive to SSRI medications, including:

DEPRESSION

OCD

PANIC
DISORDER

BULIMIA
NERVOSA

Adjunctive treatment for OCD; frequently the sole treatment for children

Double-Blind, Controlled Trial of Inositol Treatment of Depression

Levine, Joseph et al. Am J Psychiatry, Vol 152(5) May 1995. 792-794

28 unmedicated subjects with MDD or Bipolar Disorder
experiencing depressive symptoms



Significant benefit for Inositol group at 4 wks

Side effects:

- *Placebo – insomnia, agitation, tension headache*
- *Inositol – nausea, GI upset*

Inositol Treatment of Obsessive-Compulsive Disorder

Fux, Mendel, et al.; Am J Psychiatry, Vol 153(9) Sept. 1996. 1219-1221

**Significant treatment effect
of Inositol treatment vs.
placebo at 6 weeks**

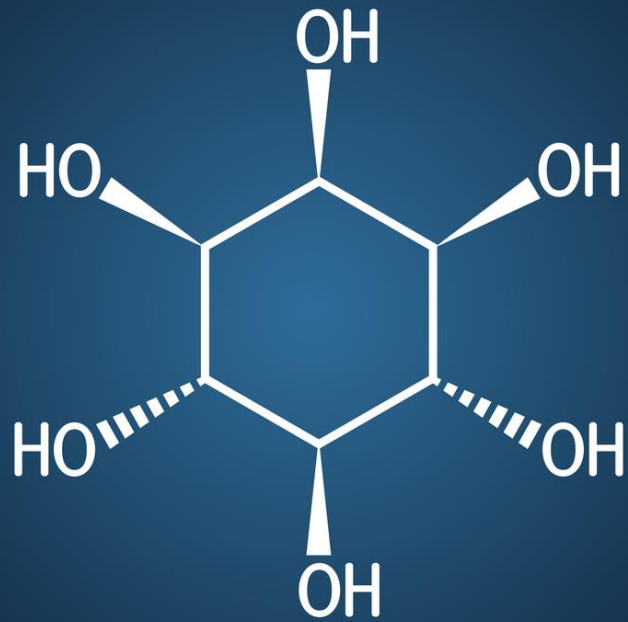
No reported side effects



Inositol augmentation of serotonin reuptake inhibitors in treatment-refractory obsessive-compulsive disorder: an open trial

S. Seedat and D.J. Stein

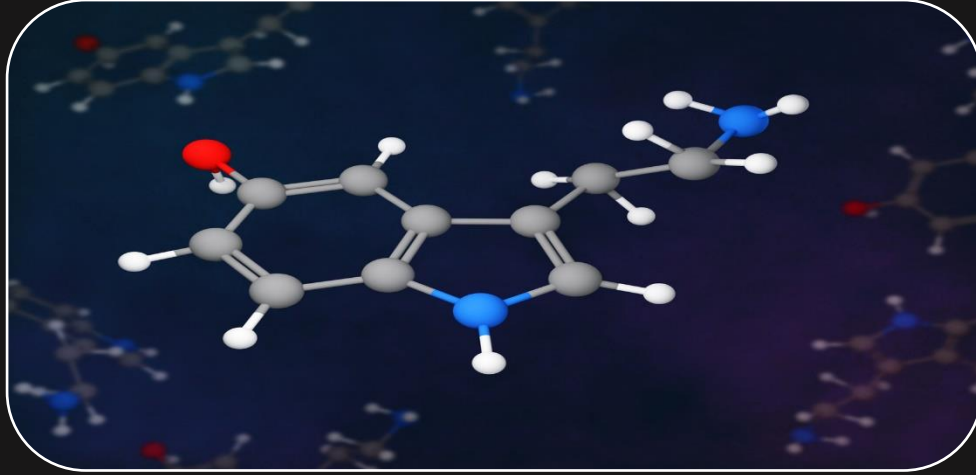
International Clinical Psychopharmacology 1999, 14: 353-356



Inositol augmentation 18 g/day did not lead to significant improvement in a majority of patients

3 patients did report a clinically significant response on the CGI improvement

Inositol

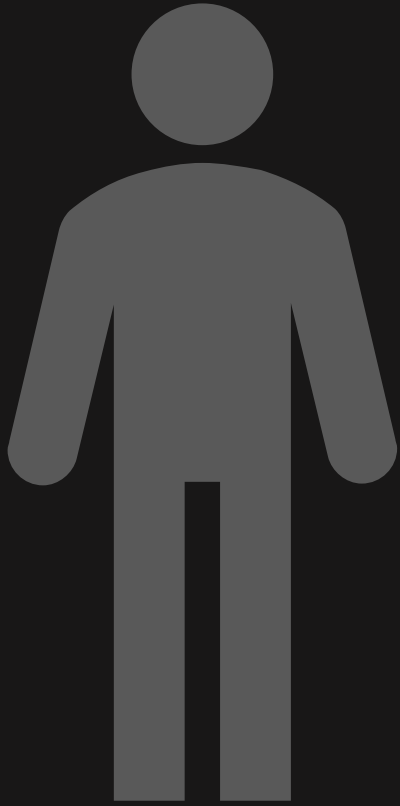


• May have therapeutic effects for SSRI-responsive disorders

◆ *Depression* ◆ *OCD* ◆ *Panic Disorder* ◆ *Bulimia*



• Adjunctive inositol frequently the sole treatment for pediatric OCD

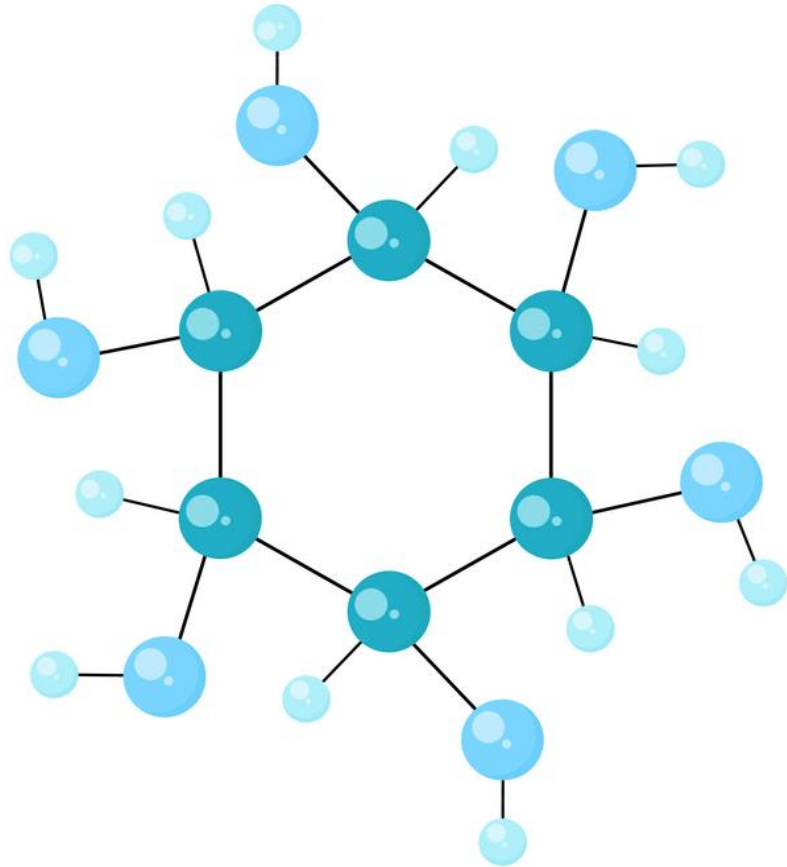


11 y/o male with increasing anxiety, worries that began at age 4

- Fears of fire
- Contamination
- “Bad” things will happen to family
- Complete social withdrawal

Treatment: Inositol ½ tsp 3x/day (4.2 g)

“AMAZING. . . A DIFFERENT CHILD.”



1-12 grams daily

Start with 1,000 mg/day; titrate
as needed



Inositol can cause GI upset or nausea in some individuals.



To minimize the risk of GI side effects, start at 1,000mg/day and titrate gradually.

Supplements can also be taken with food to further reduce stomach upset.



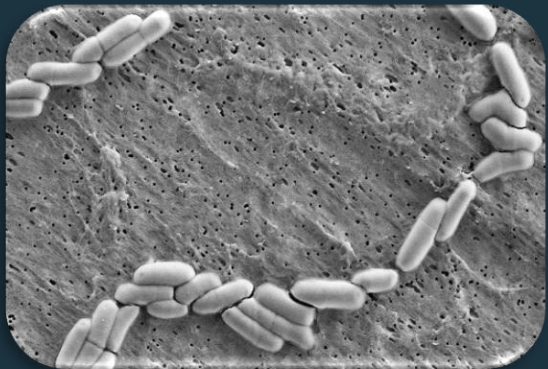
**YOU ARE
NOT ALONE**

**10¹⁴
friends
you didn't
know you
had**

Probiotics and Bipolar?



L. rhamnosus strain GG



B. animalis subsp. lactis

66 patients recently hospitalized for mania

After discharge:

- *L. rhamnosus GG*
- *B. lactis*

24 weeks

73%

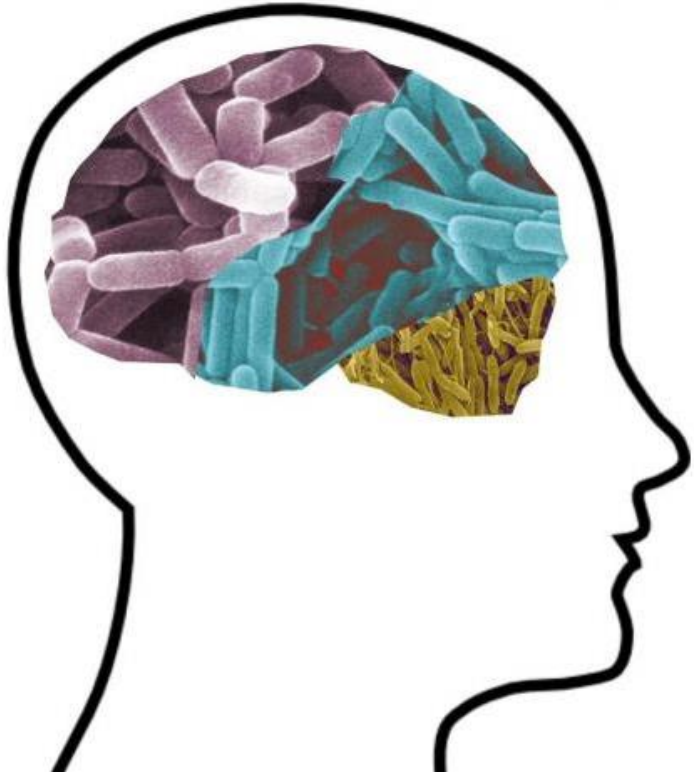
VS

24%

Probiotics Affect Neurotransmitters

Oral administration of probiotics:

- Increased plasma **tryptophan** levels
- Decreased **serotonin** metabolites concentrations in the frontal cortex
- Increased **dopamine** metabolite concentrations in the amygdaloid cortex
- Increased **acetylcholine** levels
- Increased **GABA** levels

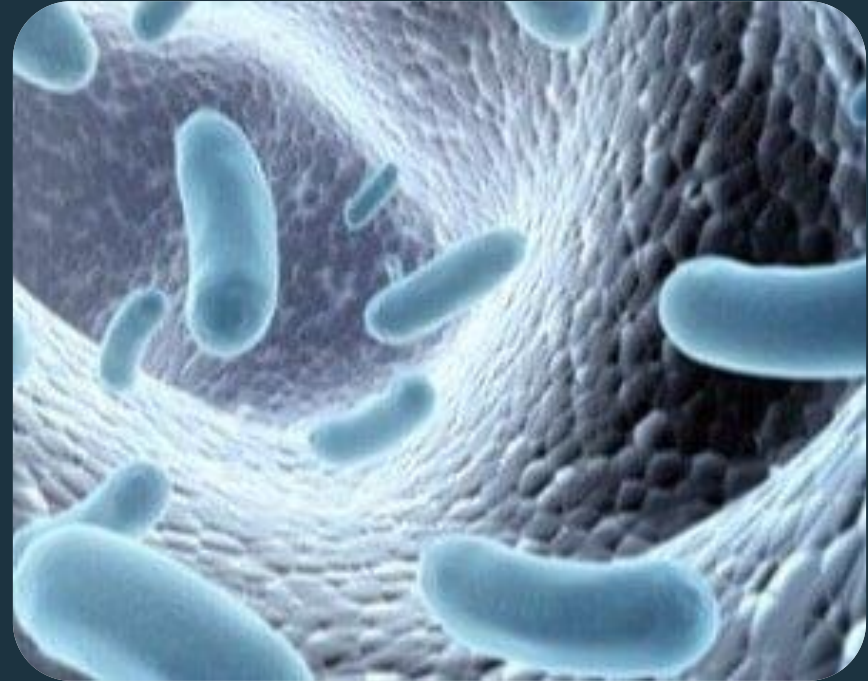


“I went to a psychiatrist,
one of the most
talented psychiatrists in
the field, and he told
me that there was
nothing that psychiatry
could do for me.”



“I continued taking the ‘Brand X’ 30 Billion probiotics every day... I have not pulled even one hair since mid-January. Not only have I been symptom free, but I never had to apply any will power or focus on stopping the hair pulling...

...the urges did not need to be fought off, they simply dissipated by themselves...”





16 HPHA
(*C. sporogenes*, *C. caloritolerans*, *C. botulinum* & others)

≤ 220

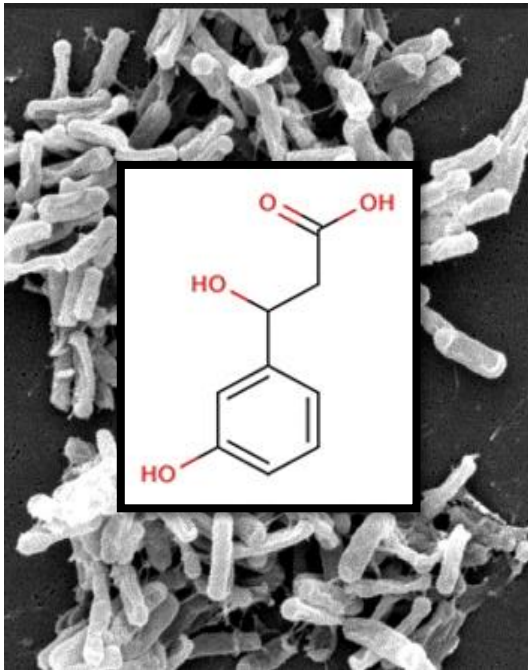
173



**PSYCHIATRY
REDEFINED**

3-(3-hydroxyphenyl)-3-hydroxypropionic acid

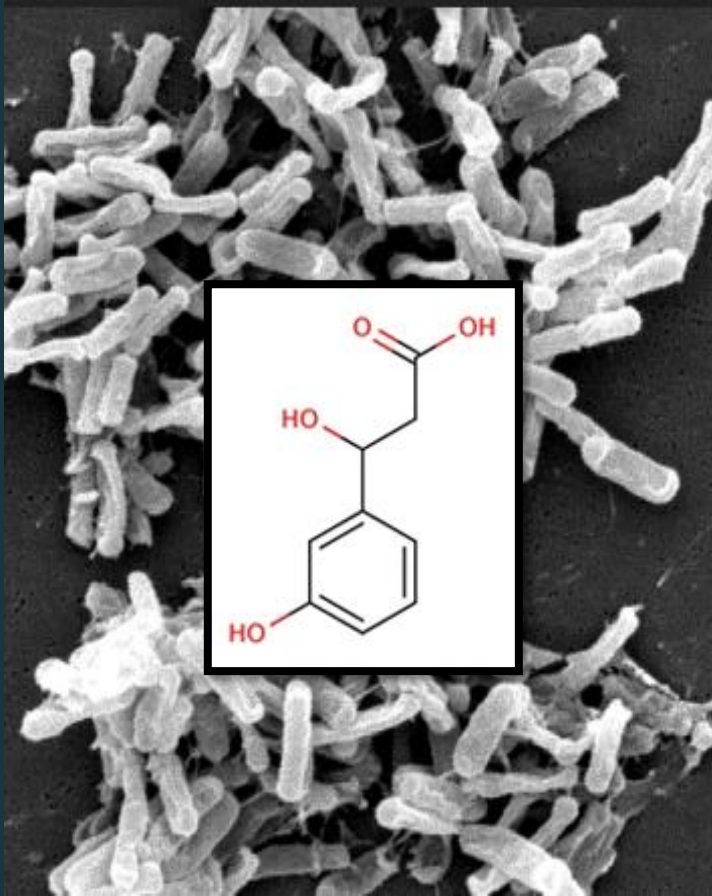
Otherwise known as: **HPHPA**



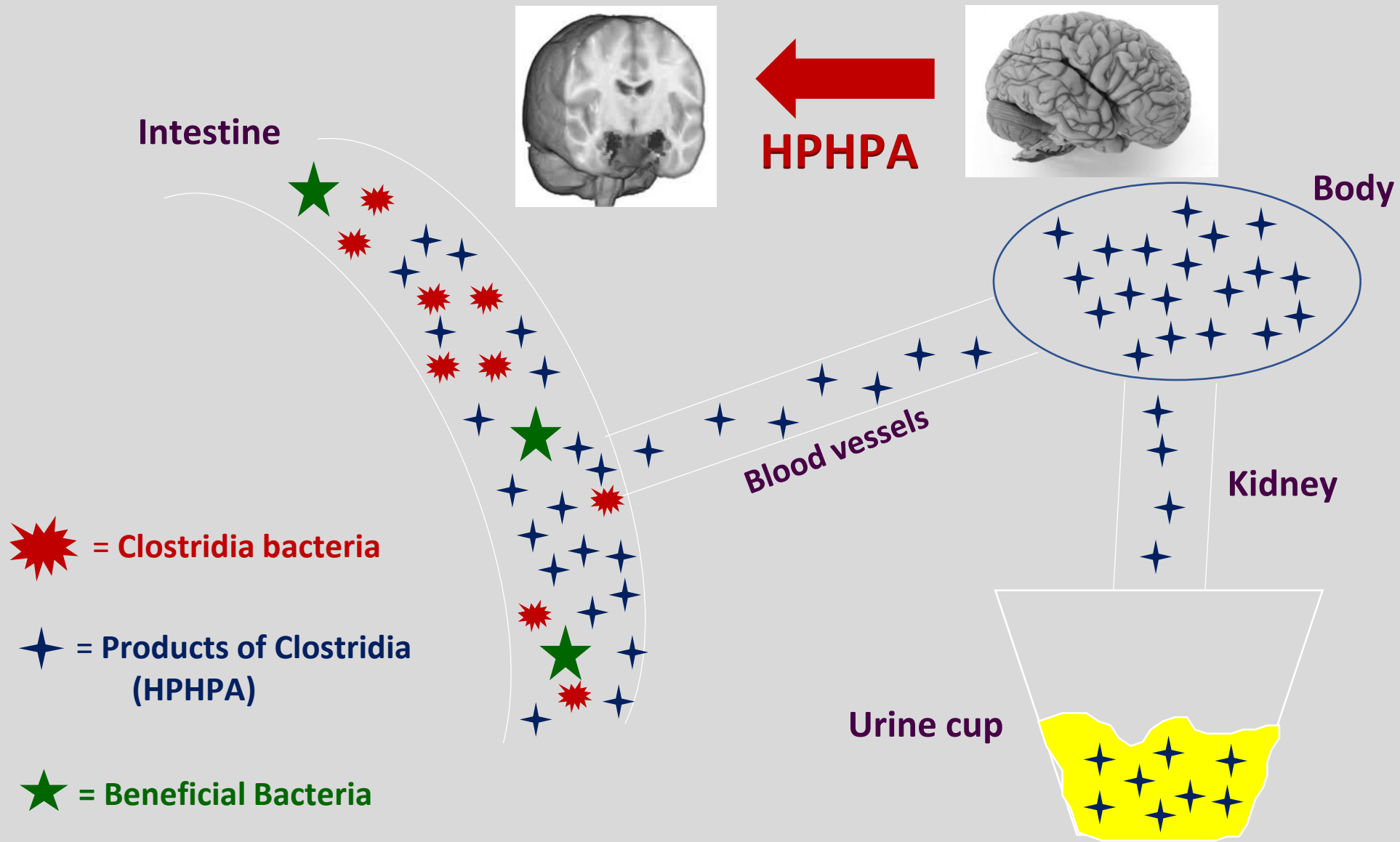
**Neurotoxic byproduct
of some* species of
CLOSTRIDIA bacteria**

** not all*

3-(3-hydroxyphenyl)-3-hydroxypropionic acid (HPHPA)



- Made by anaerobic bacteria of the *Clostridium* genus
- High HPPA associated with behavioral, gastrointestinal, and/or neuropsychiatric effects
- GI symptoms may include diarrhea *or* constipation



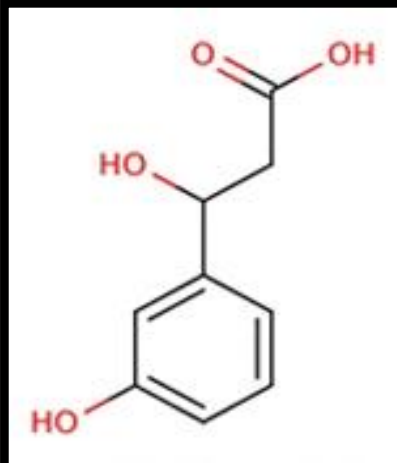
How HPHPA Disrupts the Dopamine Pathway

DOPAMINE

~~enzyme~~

NOREPINEPHRINE

EPINEPHRINE



DOPA

3,4 dihydro
phenylalanine



↑ HPHPA

Benzodiazepine
Use

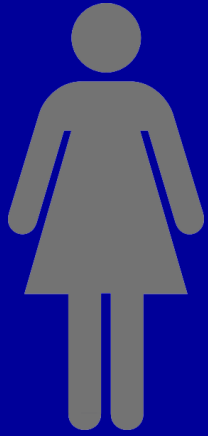
Benzodiazepine
Dependence





**PSYCHIATRY
REDEFINED**

Subject Characteristics



10



11

Age range

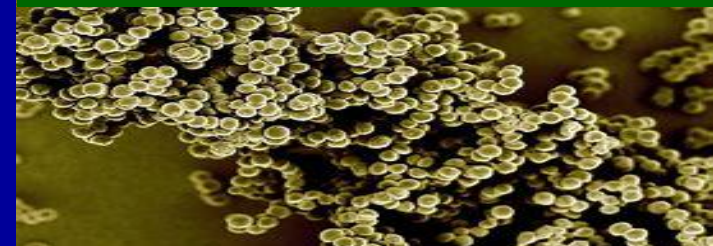
4 – 70 years

C-Section Birth



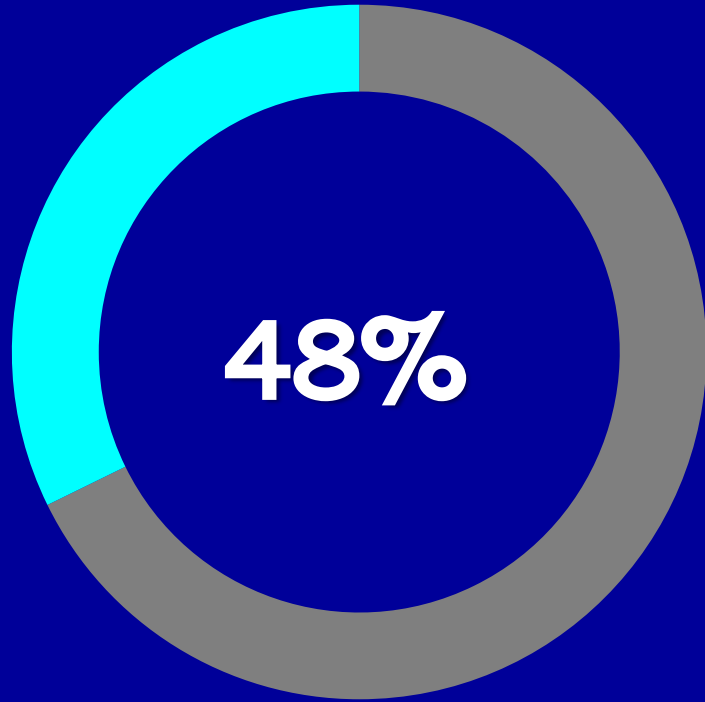
5 subjects

Hx Abx use

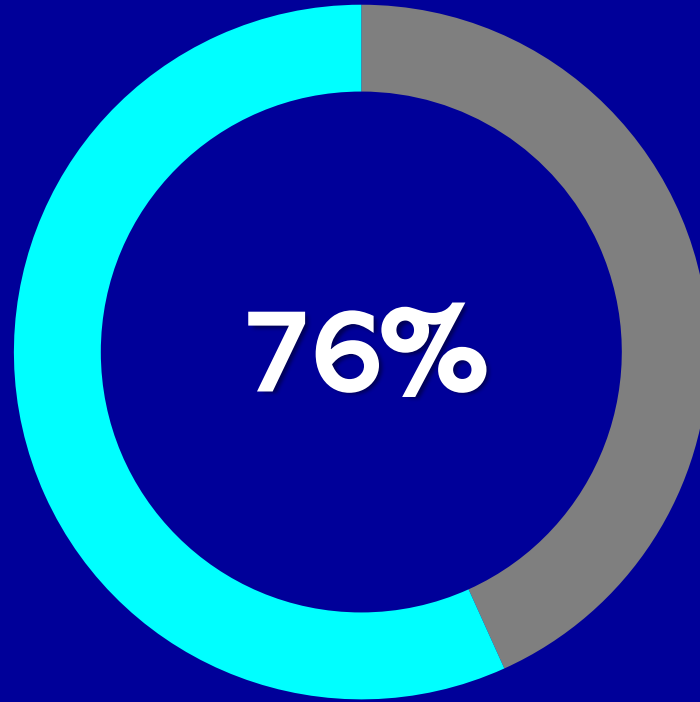


6 subjects

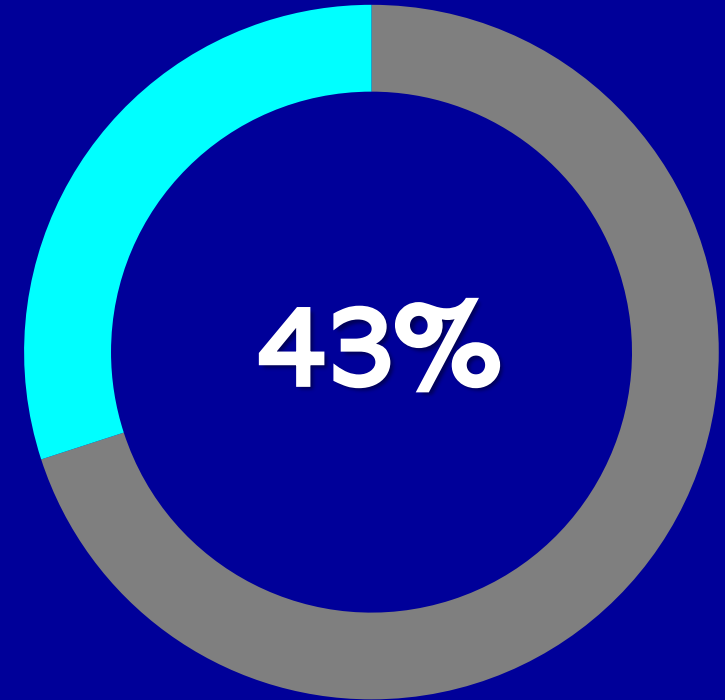
Dx Prevalance



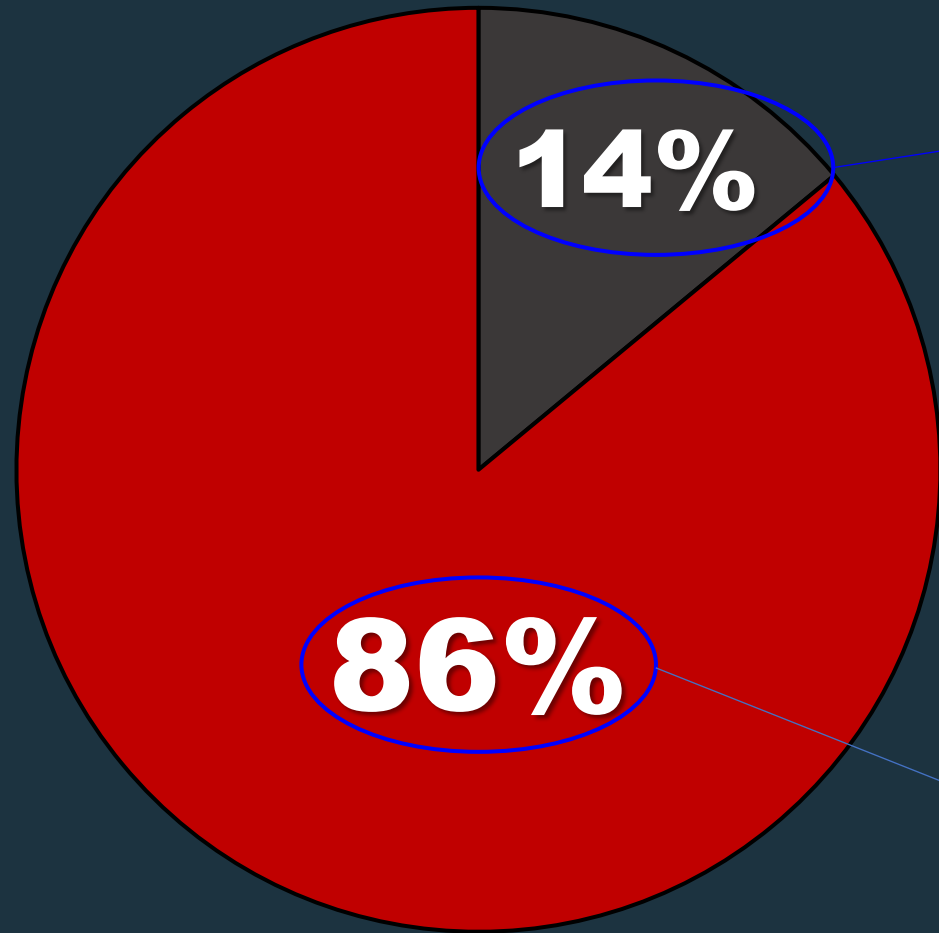
DEPRESSION



ANXIETY



ADHD



Subjects with 1 clinical psychiatric diagnosis

Subjects with ≥ 2 clinical psychiatric diagnoses

OCD

**BULIMIA
NERVOSA**

**BIPOLAR
DISORDER**

ASD

**MAJOR DEPRESSIVE
DISORDER**

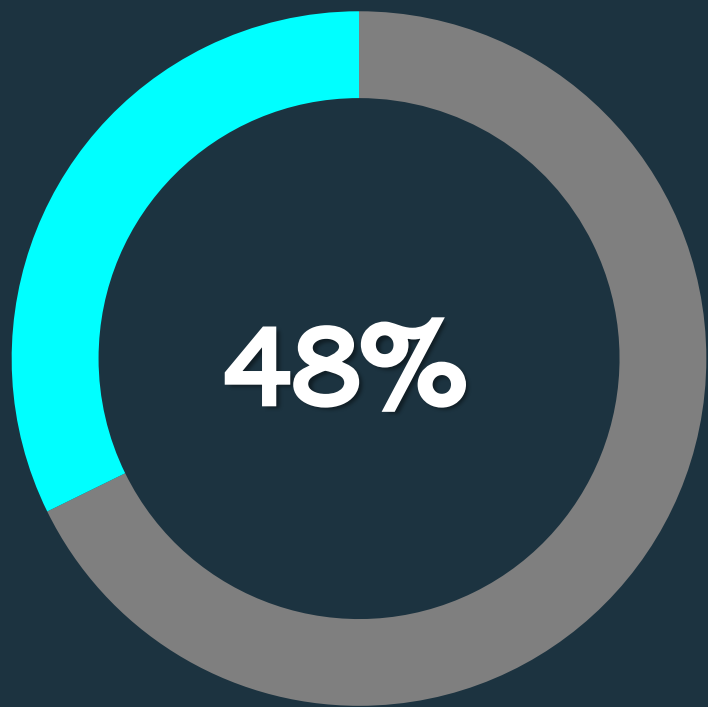
ADHD

**GENERALIZED
ANXIETY
DISORDER**

**ANXIETY
UNSPECIFIED**

**IMPULSE
CONTROL
DISORDER**

PTSD

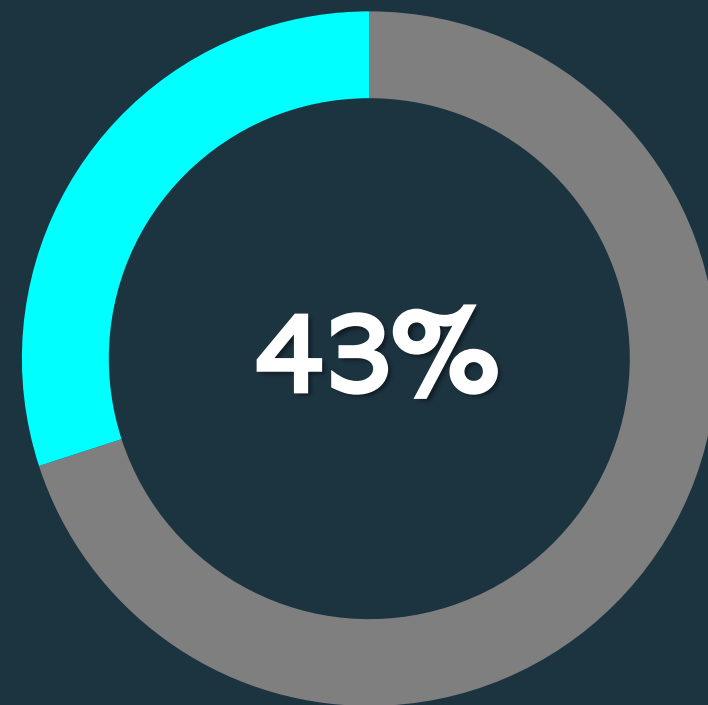


DEPRESSION



ANXIETY

76%



ADHD

Aggression and impulsivity

Daily worry, panic attacks

Fatigue, low energy

Low frustration tolerance

Anxiety with panic attacks

Inattention with impulsivity

Severe OCD, anxiety

Obsessive worries

OCD, rumination

Disruptive bx, aggression



Anxiety, rumination, worry

Struggles with listening

Skin picking, restlessness

Mood dysregulation, rage

Difficulty focusing

Binge eating, compulsive exercise

Racing thoughts

OCD, rumination

Outbursts, impulsivity

Folate/B12

Food Allergies

Thyroid

Vitamin Deficiencies

Vitamin D

Mineral Deficiencies

Zinc/Magnesium

LITHIUM

Copper

HPHPA

Acids

Celiac Disease

Heavy Metals

Homocysteine

Fatty Acids

Infections

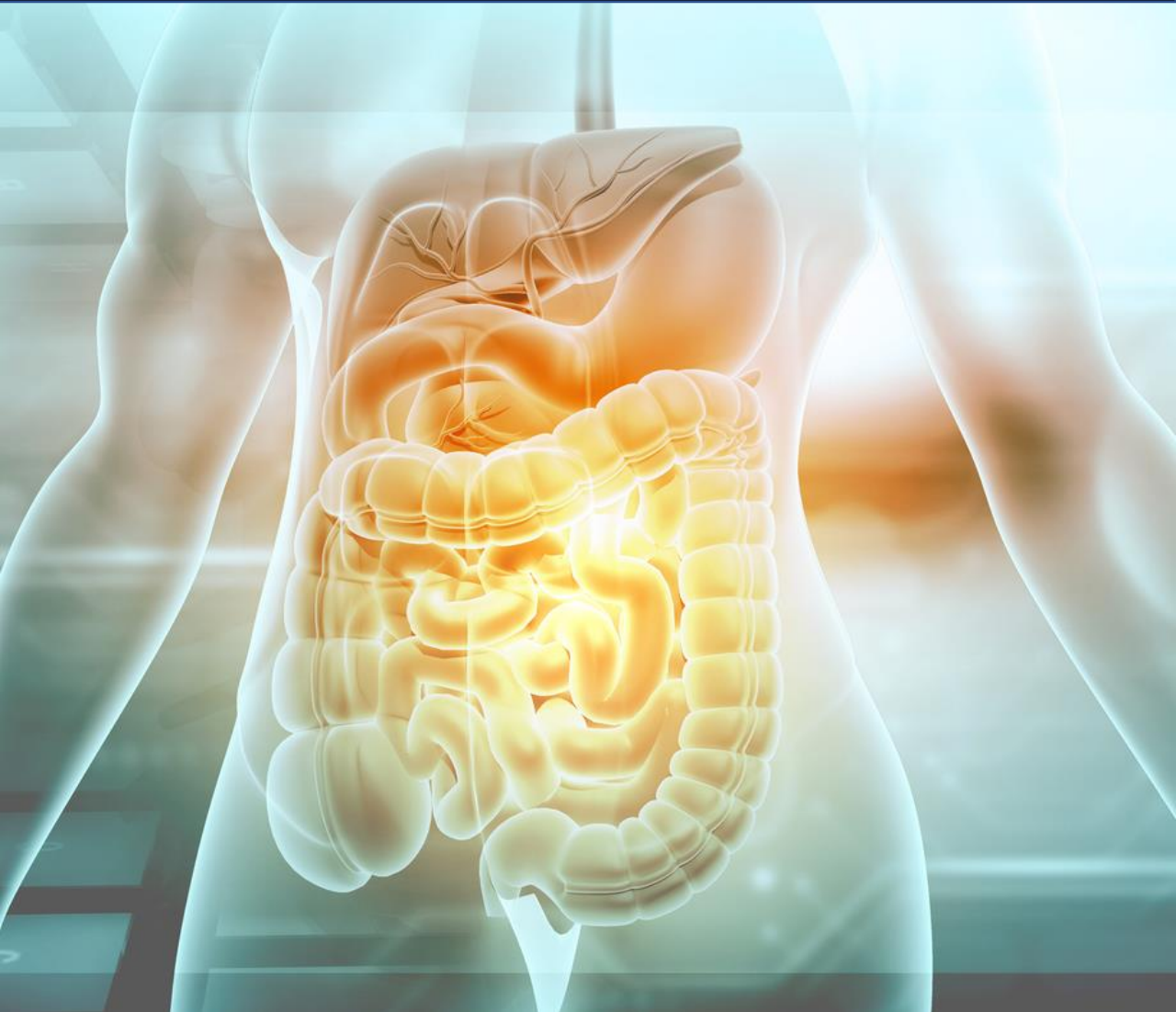
Dysbiosis

Cholesterol

13%

DHEA

ONE SOLUTION. . .



**PSYCHIATRY
REDEFINED**

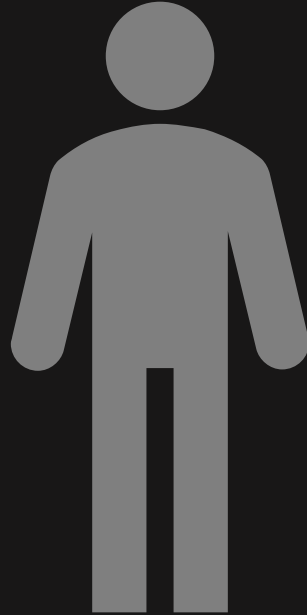
“JP”: 21 year-old male

Presentations:

- Anxiety
- Inattention, auditory learning issues
- Trauma

Diagnoses:

- ADHD; Anxiety (unspecified); Depressive Disorder



Symptom Duration:

- 5-7 years

History of Abx Use:

- none reported

Birth: vaginal

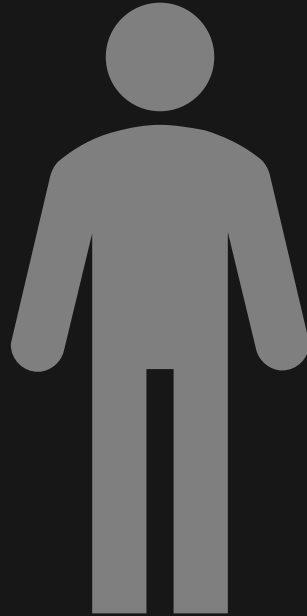
3/9/18 OAT

HPHPA level “193”

“JP”: 21 year-old male

Recommendations:

- Multi-strain probiotics, 50 Billion CFU
- 1 cap twice daily w/meals
- Increase to 2 caps daily after two weeks



7/1/18 OAT

Patient states his mood is better overall... “less stressed, and less anxious”

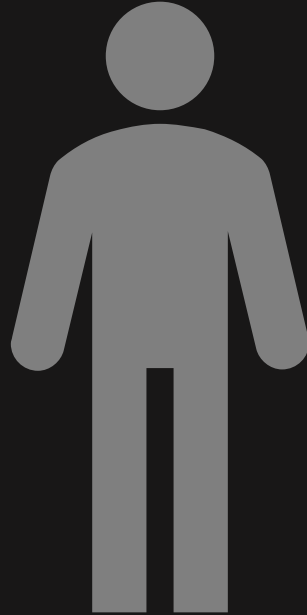
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3/9/18 OAT

HPHPA level “193”

“CF”: 26 year-old male

Presentations:

- Significant history of anxiety, irritability, OCD traits
- Multiple somatic complaints
- GI symptoms: steatorrhea, diarrhea



Diagnoses:

- GAD, MDD, ADHD, OCD

Symptom duration: 14 yrs

History Abx use?: YES

3/18/18 OAT

HPHPA level “167”

“CF”: 26 year-old male

Recommendations:

- **Multi-strain probiotics, 50 Billion CFU**
- **2 caps / day**
- **If tolerated, add 1 cap/day in PM after meal**



8/30/18 Follow Up:

Patient: “*anxiety is low, I haven’t had this level of anxiety in a long time.*”

- **states GI symptoms nonexistent; NO physical anxiety symptoms**

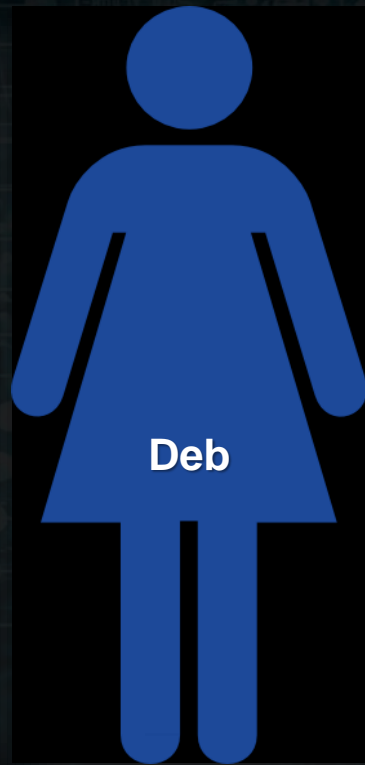
8/3/18 MOAT

HPHPA level “61”

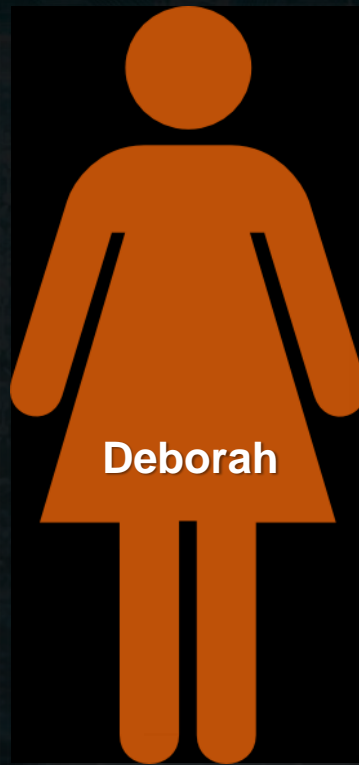
Biochemical Individuality



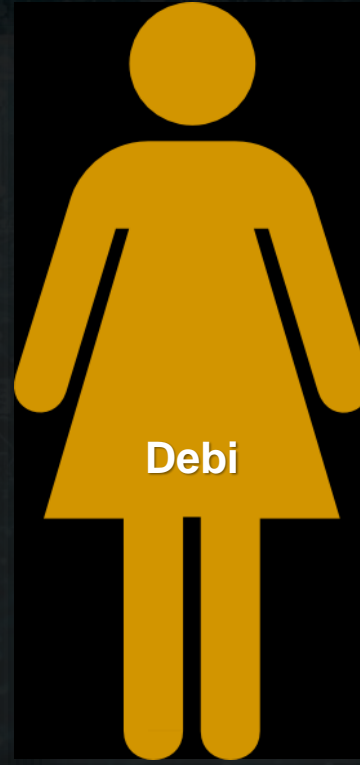
Debbie



Deb



Deborah



Debi



Debs



**NO TWO PEOPLE
SHARE THE
SAME MICROBIAL
MAKEUP!**

Depression

*“Even **after a few days’ treatment**, one is able to notice a difference in the appearance of the patient. The complexion is clearer and he wears a **happier expression**. The dry, furred tongue becomes moist and clean, and an increasing desire for food gradually appears. The feces increase in quantity, become softer, and of regular consistency, and the offensive smell diminishes.”*

The Treatment of Melancholia by the Lactic Acid Bacillus. (1) By J. GEORGE PORTER PHILLIPS, M.B., B.S. (Lond.), M.R.C.S., L.R.C.P., Assistant Physician, Bethlem Royal Hospital.

[July, 1910.]

Probiotics and Psychological Symptoms

2017 meta-analysis of
7 human RCTs

Measured depression, anxiety,
and stress in healthy samples
pre- and post-supplementation

2016 meta-analysis of
10 human RCTs

Measured depression & anxiety
in healthy + **clinical samples** pre-
and post-supplementation

**Significant improvement in depression,
anxiety, and perceived stress**

Over 50% of studies concluded that interventions regulating intestinal flora helped reduce anxiety.



- 2019 meta-analysis comparing interventions designed to alter gut microbiota + their effects on anxiety
- 21 studies, $n = 1,503$

Many Diagnoses...



Depression

OCD



Self Injury
Anxiety



Borderline

Trichotillomania

Bulimia

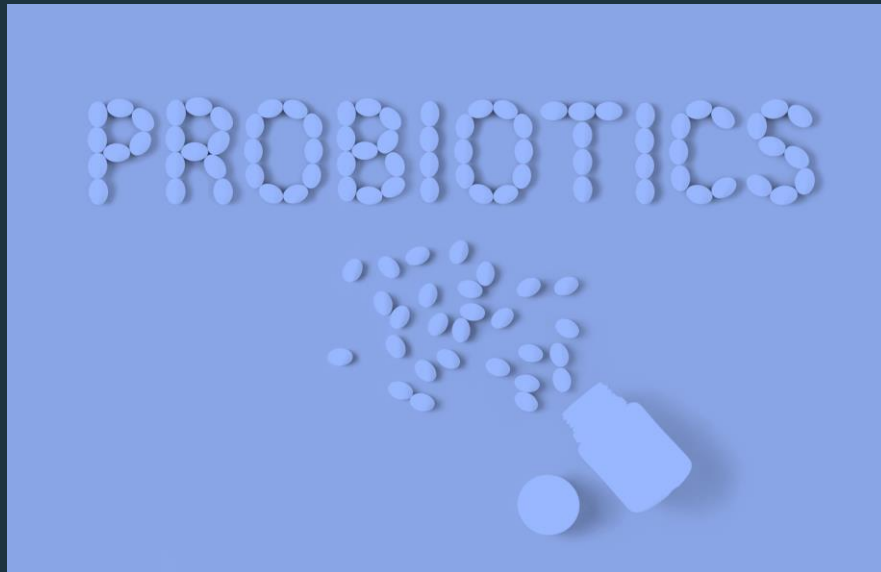
HPHPA Treatment: Probiotics



High-dose
probiotic (50
billion CFUs) for
2-3 months; 2-4
capsules daily

HPHPA Treatment: Vancomycin

30 days, in three 10-day
courses: [1 day on, 2 days off]

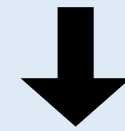


- Day 1: Antibiotic/Probiotic
- Day 2: Probiotic
- Day 3: Probiotic
- Day 4: Antibiotic/Probiotic
- Day 5: Probiotic
- Day 6: Probiotic
- Day 7: Antibiotic/Probiotic
- Day 8: Probiotic
- Day 9: Probiotic
- Day 10: Antibiotic/Probiotic

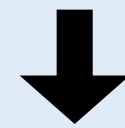
Measureless Medicine?



Symptoms



"i"-Symptom
tment given



asure symptoms

“The patient began eating flour when she was 16 years old. She recalls being depressed at that time but could not pinpoint specific thoughts that led her to eat flour, except that she enjoyed the taste of it. Currently, the patient associates eating flour with feeling relaxed and soothed.



...She currently eats from 1 to 2 lbs of flour daily, with a maximum of 4 lbs in one day.”

2022

2021-22: U.S. wheat consumption
≈ **31 million** metric tons

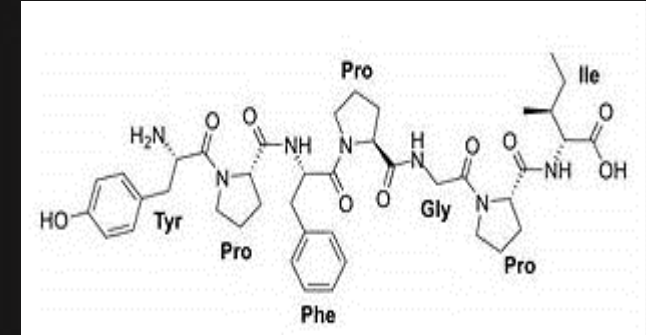
The average American consumes
180 lb of wheat *every year*

2020: the U.S. produced **223 billion**
lbs of milk for human consumption

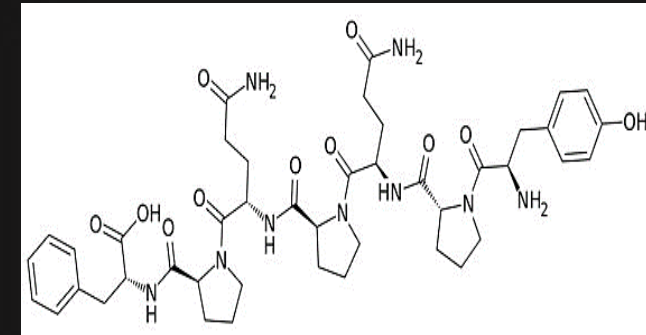
The average American drinks
18 gallons of milk *every year*

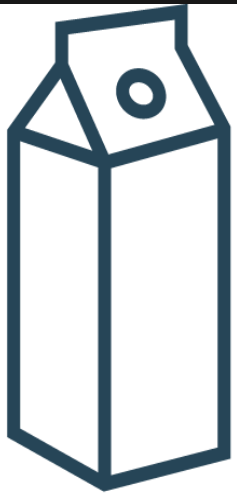


→ Casein → Casomorphin



→ Gluten → Gliadorphin





Dairy
Containing
Foods

Casein

Endogenous
Protease
Enzymes

Caso

MORPHIN

Digestion by
DPPIV enzymes

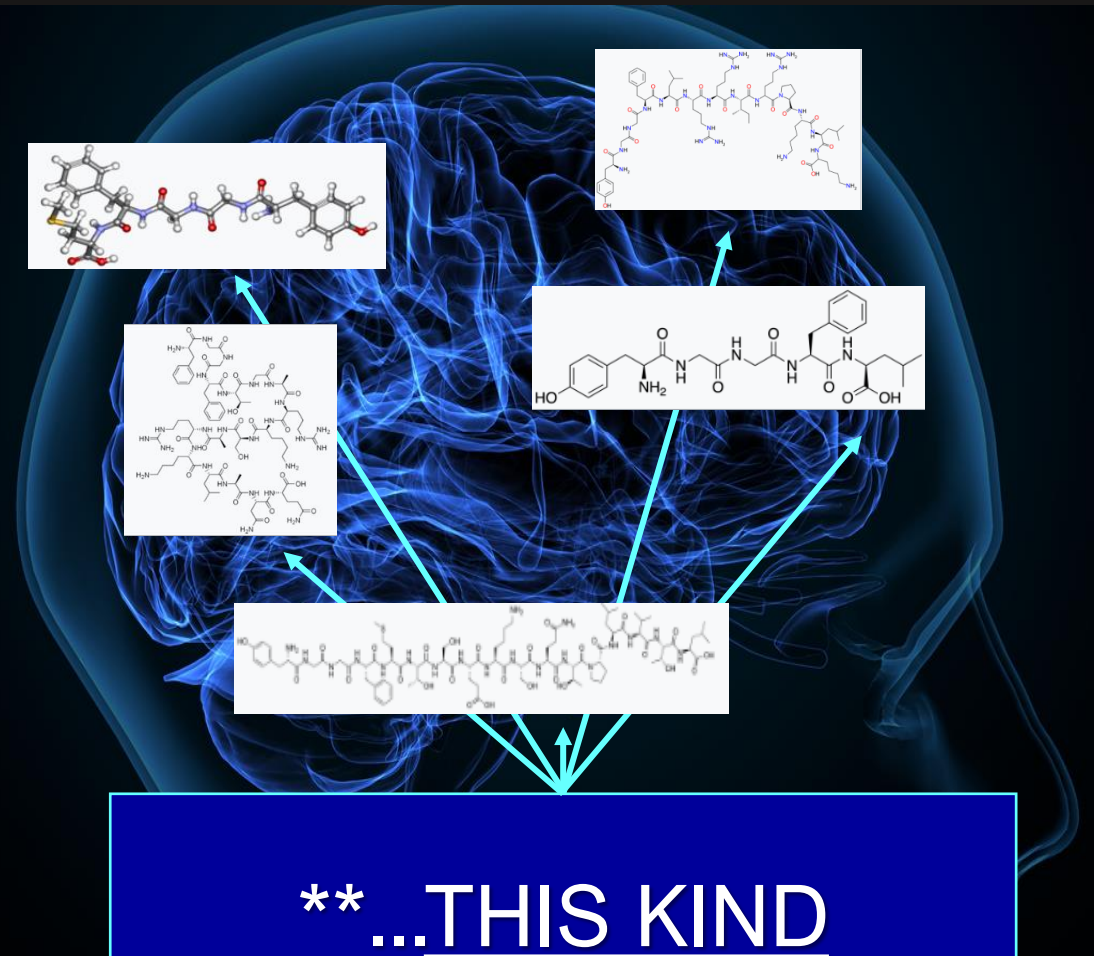
**Harmless
Amino Acids**

Passes through
blood brain barrier
Enters into Brain

Understanding OPIOIDS**



****NOT this kind**



****...THIS KIND**

Fun Fact: **Your body makes its own opioids!**

Like other signaling molecules, these endogenous (internally-produced) opioids play critical roles in many biological processes



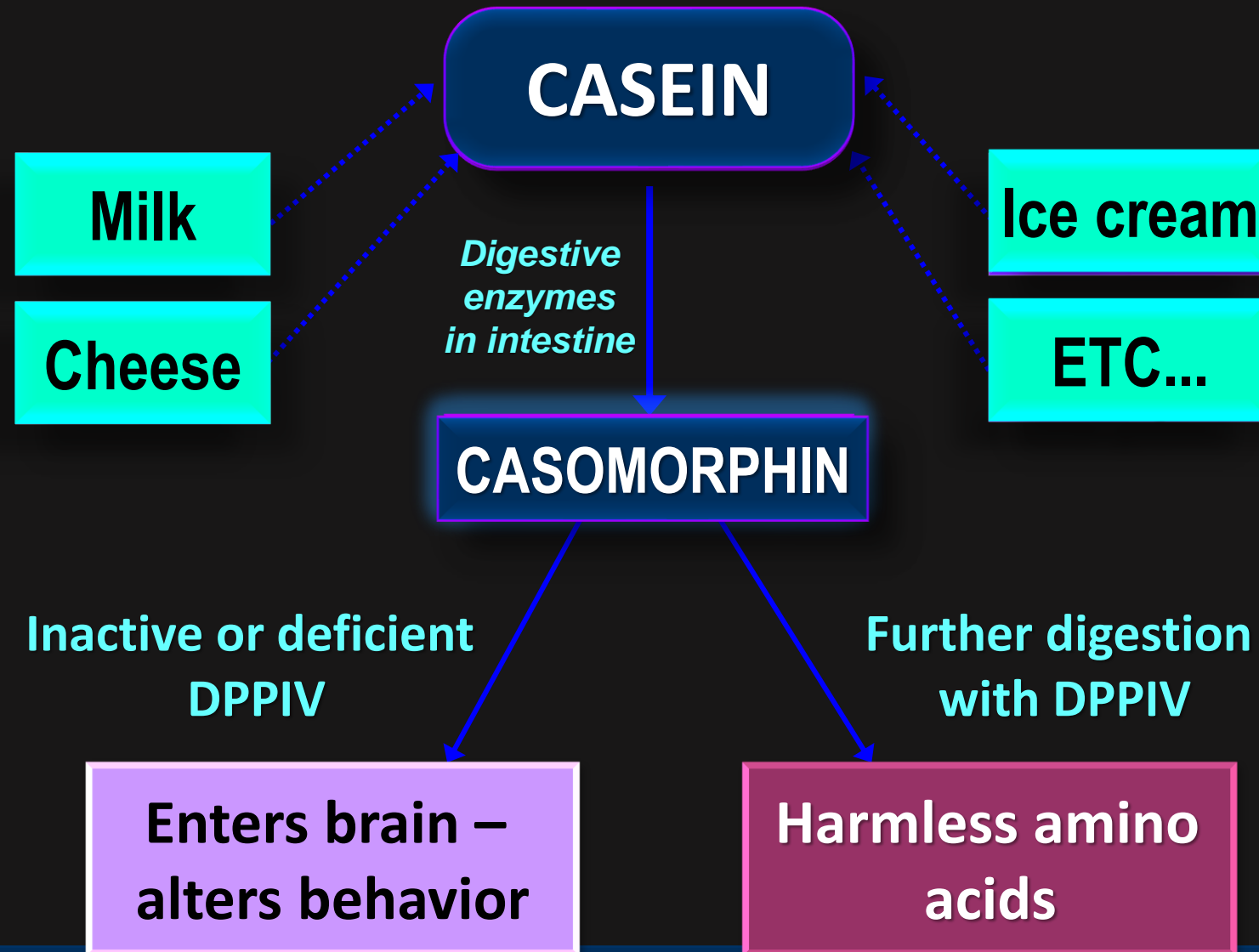
OPIOIDS & HUMAN BIOLOGY

ENDORPHINS:

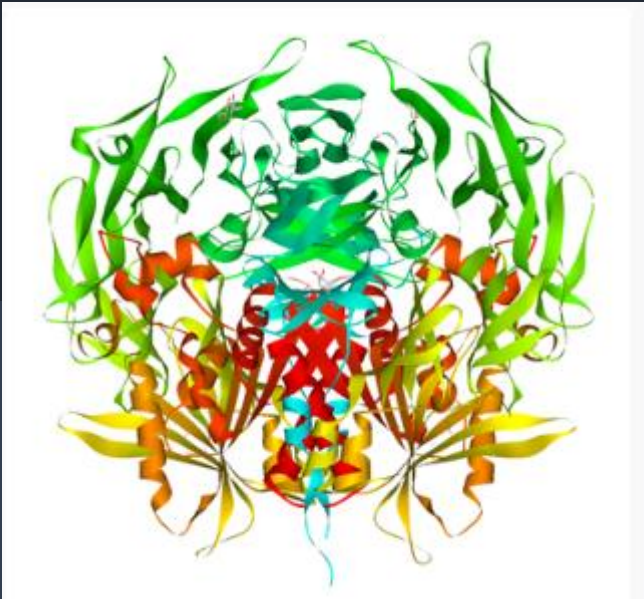
opioid peptides
produced internally by
the body

EXORPHINS: opioid
peptides produced from
the incomplete digestion
of foods originating
outside the body

Formation of Opiates from Food



Dipeptidylpeptidase-4 (DPP-IV):



An enzyme responsible for **breaking down complex proteins** into smaller peptides that can be used by the body or further broken down into amino acids

DPP IV Activity

Gliadorphin: tyr-pro-gln-pro-gln-pro-phe

1 2 3 4 5 6 7

Casomorphin: tyr-pro-phe-pro-gly-pro-ile

N-terminal



Removes a dipeptide-two amino acids from the N-terminal end of peptides which have the amino acid proline or hydroxyproline in second position

DPP-IV

Gluten, casein

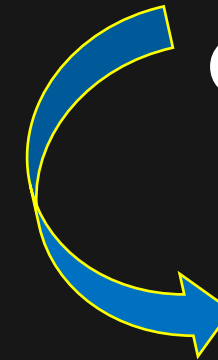
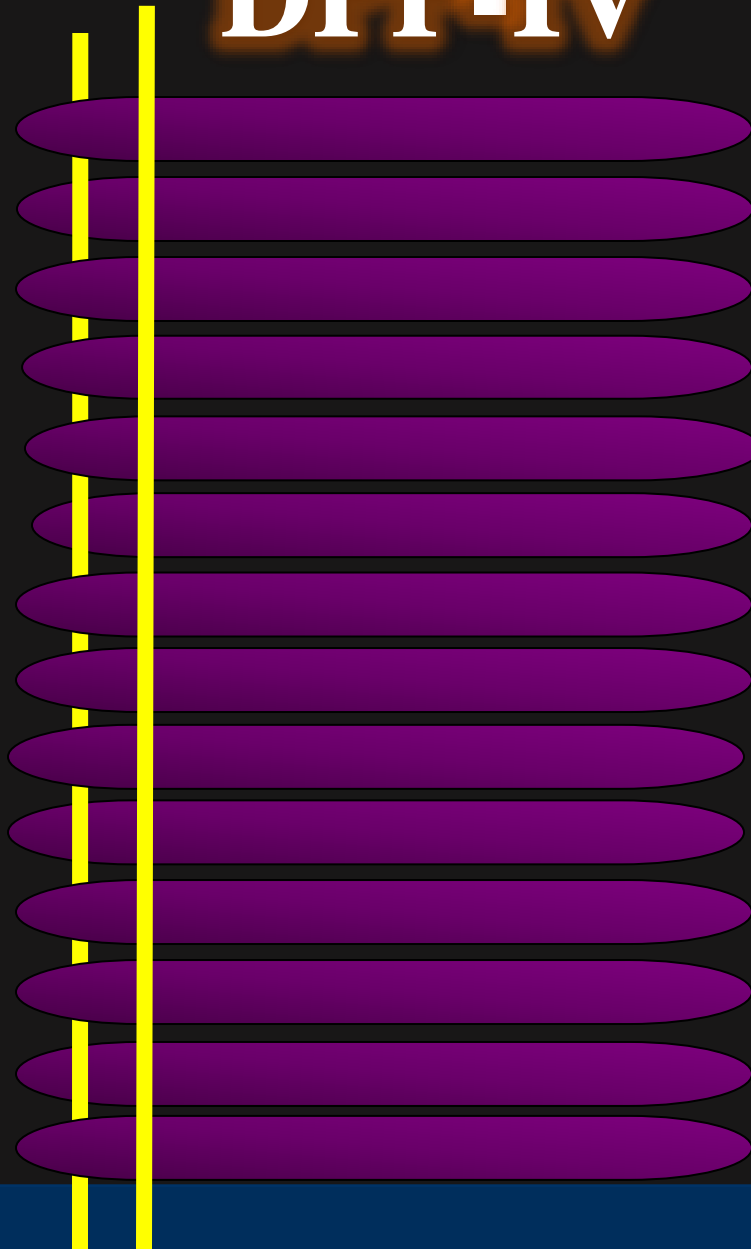
Pancreatic enzymes

**Gliadorphin
Casomorphin**

Dipeptide

**Inside
Cell**

Lumen of intestine



Morphine Variable Response



Symptoms of Elevated Casomorphin or Gliadorphin



Intense obsessions or
intensive thoughts that



Excessive consumption
of dairy / wheat to the



Intense feeling of
sedation of calm

WITHDRAWAL IS COMMON

interventions



**PSYCHIATRY
REDEFINED**

Clinical Indicators of High Dietary Exorphins



**Strong sense of relief
or calm after eating**
[bread / cheese / cookies
ice cream / etc.]



**Urge to eat dairy
and/or wheat when
stressed or irritable**



**Symptoms of
withdrawal if haven't
eaten dairy and/or
wheat**



**Can't sleep without
pre-bedtime ice
cream / crackers /
etc.**



**Take digestive enzymes
containing dipeptidyl
peptidase-IV (DPP-IV)**

**1-2 capsules at the start
of a meal**

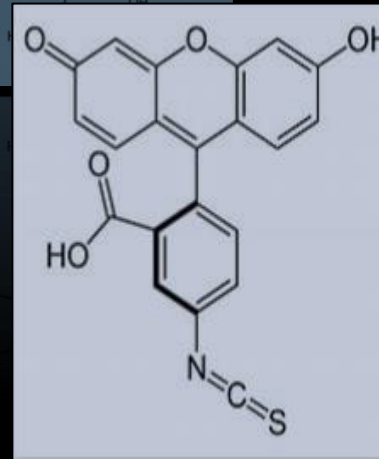
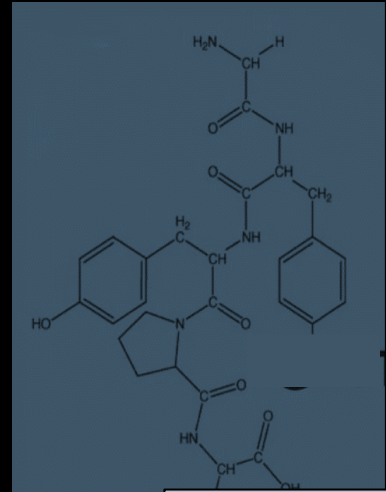
Incomplete gluten / casein digestion creates morphine-like molecules called **exorphins**

Casomorphin (from casein) and **gliadorphin** (from gluten) have proven opiate effects

Excess casomorphin and/or gliadorphin have been documented in patients with schizophrenia, autism, OCD, dyslexia, and other disorders

Urinalysis can detect these peptides; removal of gluten and/or dairy from the diet can improve psychiatric symptoms

DIETARY EXORPHINS

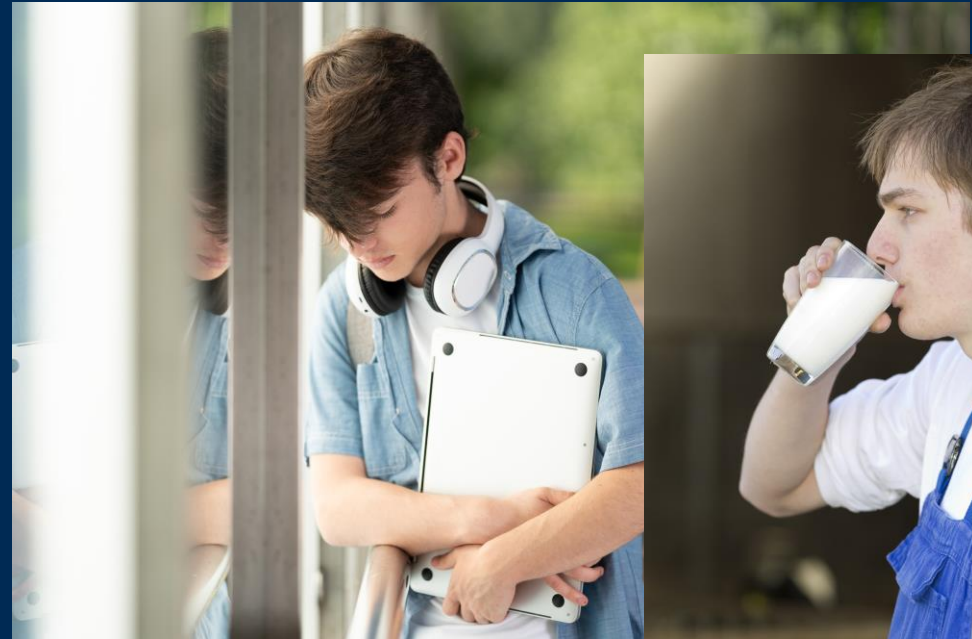


16-year-old

Drinks 1/2-1 gallon
of milk per day

Diagnoses:

- ADHD
- Anxiety/Panic Disorder
- Depersonalization –
feeling out of his body





SCREEN TIME



Screen Time & OCD Risk

- 9,208 children between the ages of 9 - 10 years
- Screen use, health outcomes tracked for 2 years



...and by **11%** for *every hour*
per day spent playing
watching videos

Screen Time & Disruptive Behavior Disorders

Data from Adolescent Brain Cognitive Development (ABCD) Study ($n = 11,875$)

Analysis: baseline screen time \leftrightarrow CD or ODD diagnosis at 1 year



>4 hrs/day *total* screen time was associated with a higher prevalence of Conduct Disorder (69%) & Oppositional Defiant Disorder (46%)

CUTTING DOWN ON SCREEN TIME

**The average U.S.
child aged 8-12
years spends up to
6 HOURS PER DAY
watching or using
screens**



**PSYCHIATRY
REDEFINED**

Save the Date!

**FUNCTIONAL MEDICINE
FOR MENTAL HEALTH
2023 CONFERENCE**

OCTOBER 7-8, 2023



Day 1: The Impact of Ketogenic and Low Carb Diets on Mental Health

Day 2: Infections and Mental Health: Mold, Lyme, PANDAS, COVID, and Beyond

Featured speakers: Eric Westman, Terry Wahls, Georgia Ede, Iain Campbell, Robert Lustig, Bret Scher, James Greenblatt, Nancy O'Hara, Dan Kinderlehrer, Jaquel Patterson, Neil Nathan, and Mary Ackerley

All Details and Registration Coming Soon!

Other adds?

One diagnosis. . . Multiple Potential Causes / Etiologic Contributors

Neurotransmitter Cofactors

- Vitamin D
- Vitamin B12
 - Folate
- Vitamin B6

Infections / Immunologic

- HPHPA
- PANS / PANDAS
- Lyme

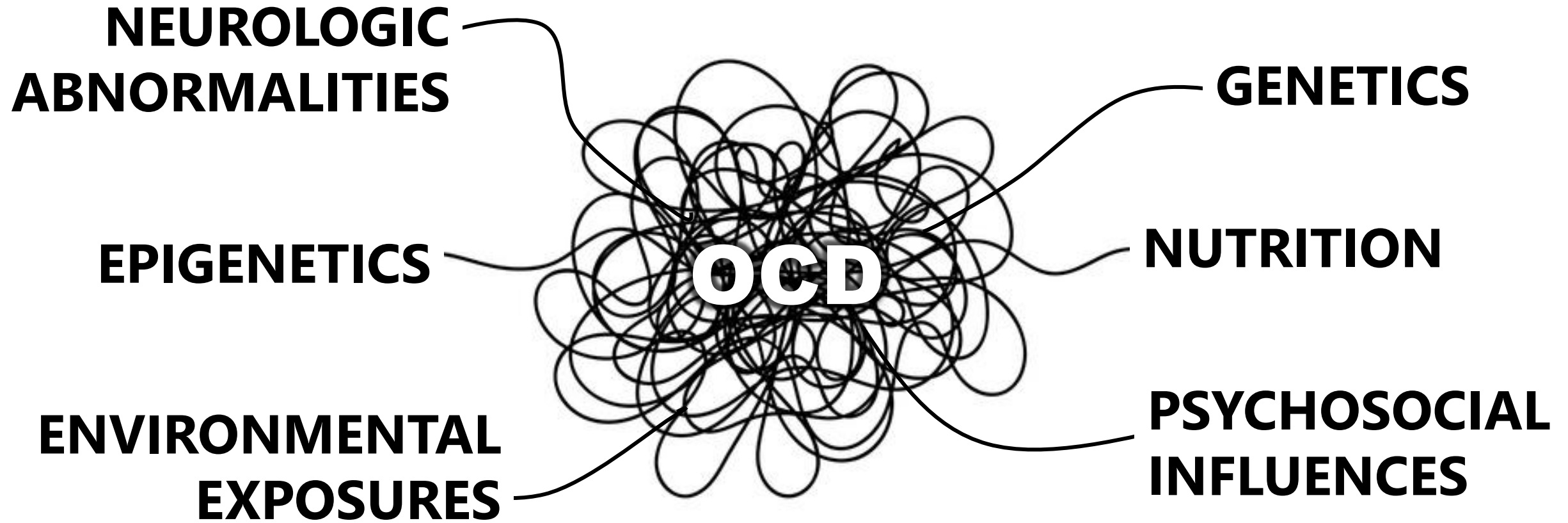
Nutritional / Dietary

- Omega-3 deficiencies
- Neuropeptides (casomorphin, gliadorphin)

Misc.

- Trauma
- Pyroluria (B6, Zn deficiency)
- Starvation

One diagnosis. . . Multiple Potential Causes / Etiologic Contributors



FOCUS ON ONE THREAD AT A TIME



Why I Should Have Been A Hand Surgeon

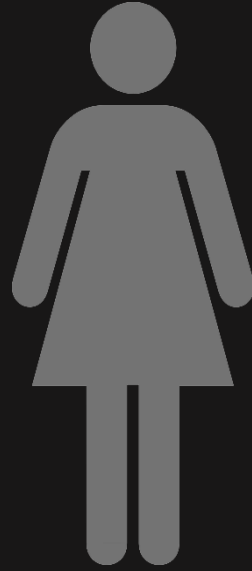


Previous Medication

Trials:

- *Celexa 10mg* – agitation
- *Prozac 10mg* – aggressive thoughts of self-harm, attempted suffocation

! 40-lb weight gain on SSRI



Minimal
improvement noted



Treatment:

- inositol 1/2 tsp TID (4.2g/day)

One diagnosis. . . Multiple Potential Causes / Etiologic Contributors

Neurotransmitter Cofactors

- Vitamin D
- Vitamin B12
 - Folate
- Vitamin B6

Infections / Immunologic

- HPHPA
- PANS / PANDAS
- Lyme

Nutritional / Dietary

- Omega-3 deficiencies
- Neuropeptides (casomorphin, gliadorphin)

Misc.

- Trauma
- Pyroluria (B6, Zn deficiency)
- Starvation

PSYCHIATRY REDEFINED

OCD may be seen as a reflection of
multiple errors in physiology

If we understand the causes,
we will understand the
cures.



**We can do
better.**