The Science of Addiction Recovery

Dr. Evelyn Higgins
Wired For Addiction™, CEO and Inventor

WIRED FOR ADDICTION™
MEASURABLE. TREATABLE. LIFE CHANGING.

DR. EVELYN HIGGINS

- Physical and Functional Medicine doctor for 34 years in private clinical practice
- Diplomate status within the American College of Addictionology and Compulsive Disorders
- Diplomate status within the American Board of Disability Analysts
- Member of the Pharmacogene Variation Consortium
- Inventor of patent utilized by Wired For Addiction™ and Neurotransmitter Reset Program™
- 2021 Nominee for Modern Healthcare's Top 25 Innovators in Healthcare
- Speaker at the International Society of Substance Use Professionals Annual Conference 2022, Abu Dhabi, AUE
- Advised the U.S. Surgeon General on Physical Activity & Women's Health
- 1996 Somali Olympic Team Physician and Delegate
- 1996 Olympic Torchbearer
- Regional Advisor on economic, social, and political issues to the government of South Africa for the 2004 Olympic Bid
- Medical Director of USA Women's Professional Football League

TODAY'S PRESENTATION

Methodology: Addiction & Biomarkers

Application: How the Science is Used

Case Study: Success Through Evidence Based Testing & Treatment

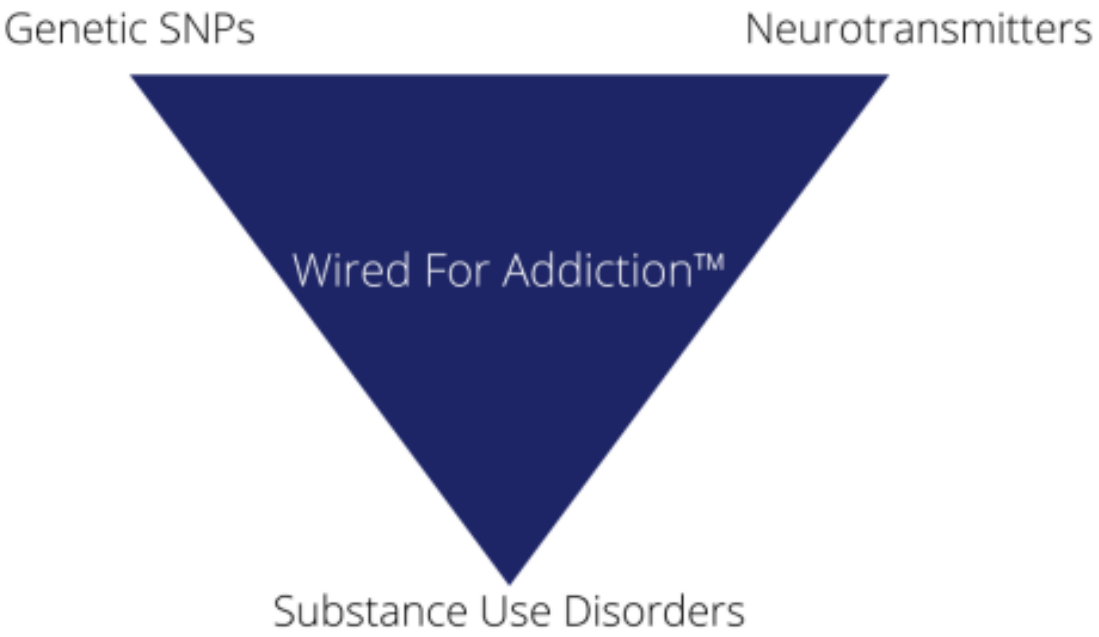
Questions

A REVIEW: THE NATURE OF ADDICTION

- Addiction is a complex disease with a triad of Bio-Psycho-Social components.

- Over 34 years in the clinical field and 16 years of Research & Development has led to the creation of an algorithm utilized to quantify & treat addiction.

SNP – NT – SUD RELATIONSHIP



- In this algorithm, we identify, isolate, and measure the physiological component of addiction using a triangular relationship model.
- 85 biomarkers: 69 genes, 11 neurotransmitters, and 5 hormones.

MENTAL HEALTH AND ADDICTION

- According to the National Survey on Drug Use and Health (NSDUH), **45%** of people with addiction have a co-occurring mental health disorder.

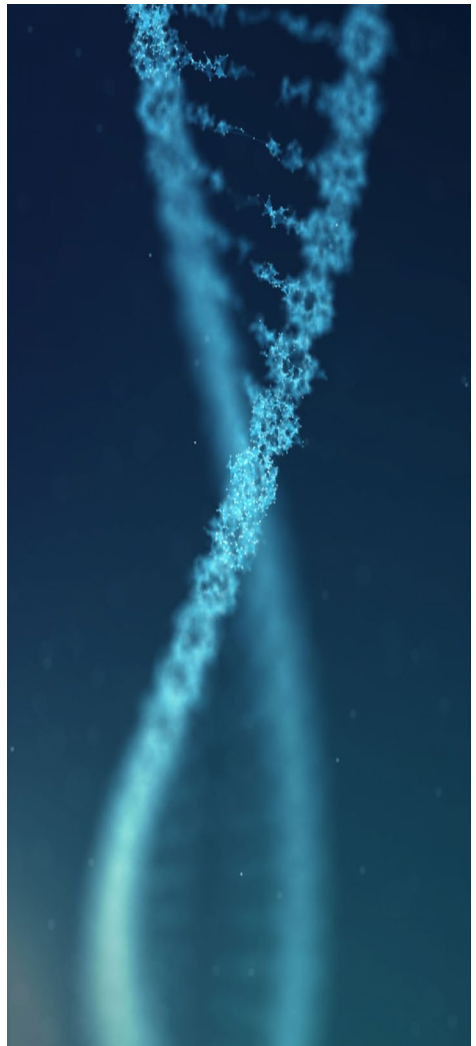
- In the recovery community, we understand that substance and/or activity abuse is often the result of self-medicating a mental health issue or trauma.

- What was initially a way to manage an unwanted emotion, thought, or impulse, created its own unmanageable, co-occurring problem.

PROCESS ADDICTIONS: A NOVEL APPROACH

Historically Difficult to Treat

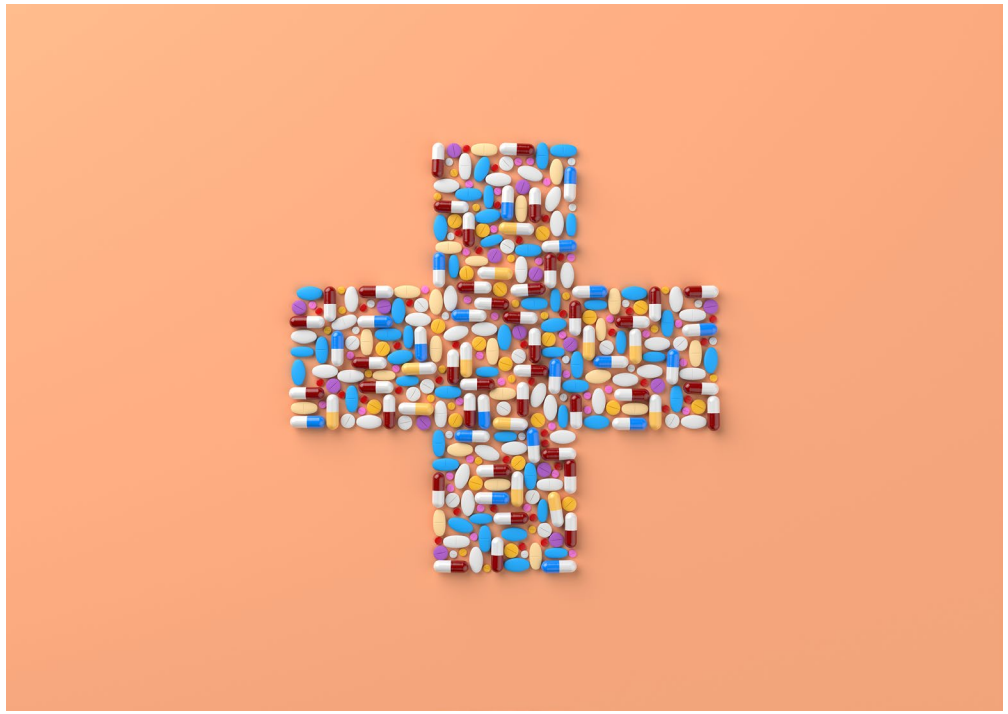
- Process addictions such as gambling are considered more difficult to treat because the thought of engaging in the activity is, in part, responsible for the addiction itself instead of ingesting a substance, the addiction is in the process of participating in an activity.
- Because of the standard noncomprehensive view of process addictions, few resources are made available to sufferers.



A New Method

- The algorithm of identifying, isolating, and measuring specific biomarkers pertaining to mental health is effective in diagnosing and treating process addictions because the same biochemical pathways are engaged in a process addiction as they are in substance use disorders.
- By determining the precise biochemical pathway(s) requiring support and the level to which support is required is what yields measurable and experiential improvement.

WHERE TO START



Eliminate the “try it out” phase of medication by isolating an individual’s specific genes and their associated interaction.

STEP 1

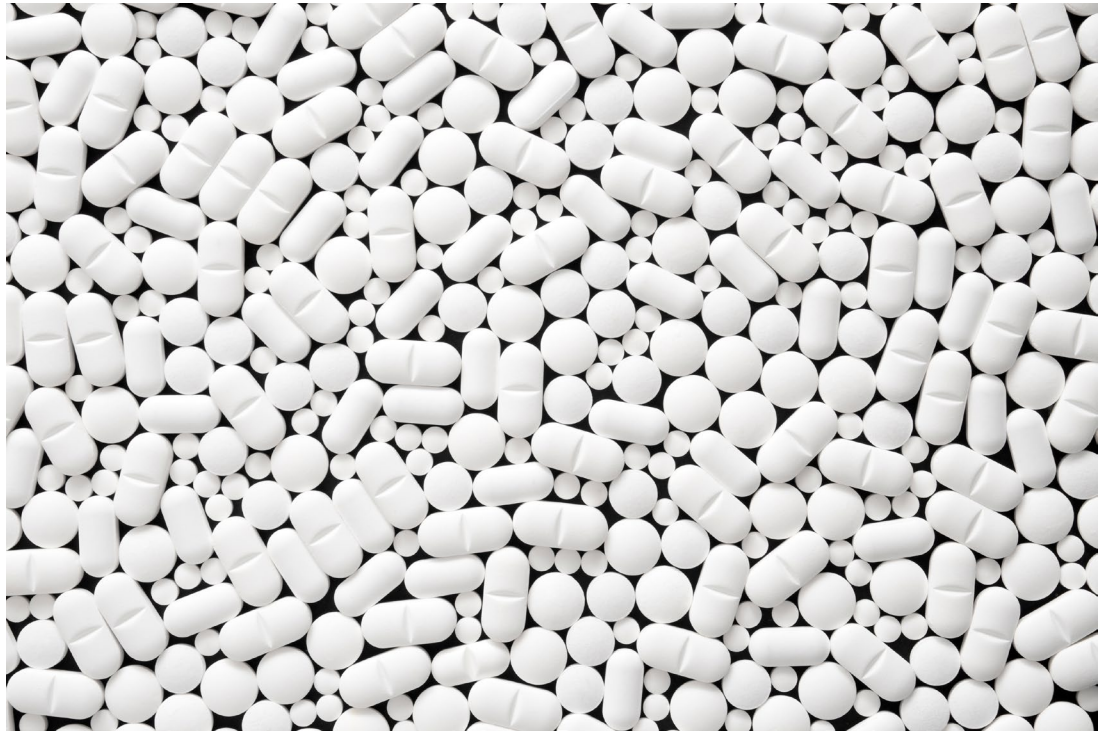
PHARMACOGENOMIC TESTING PANEL

Review an individual's DNA and provide a list of medications that are considered safe, cautionary, and to be avoided.

This hyper-precise testing and analysis yields safer, faster, and more effective outcomes.

DATA DRIVEN, EVIDENCE-BASED STABILIZATION

- Pharmacogenomic testing provides clinicians with an exhaustive 31 page report that negates the inefficient and dangerous “try it out” phase of medications by isolating a patient’s specific genes and associated interactions with particular drugs listed in the report.
- This gives clinicians the ability to prescribe and treat a variety of diagnoses **optimally** based on each patient’s unique genetic weaknesses.



STEP 2

GENETIC PANEL

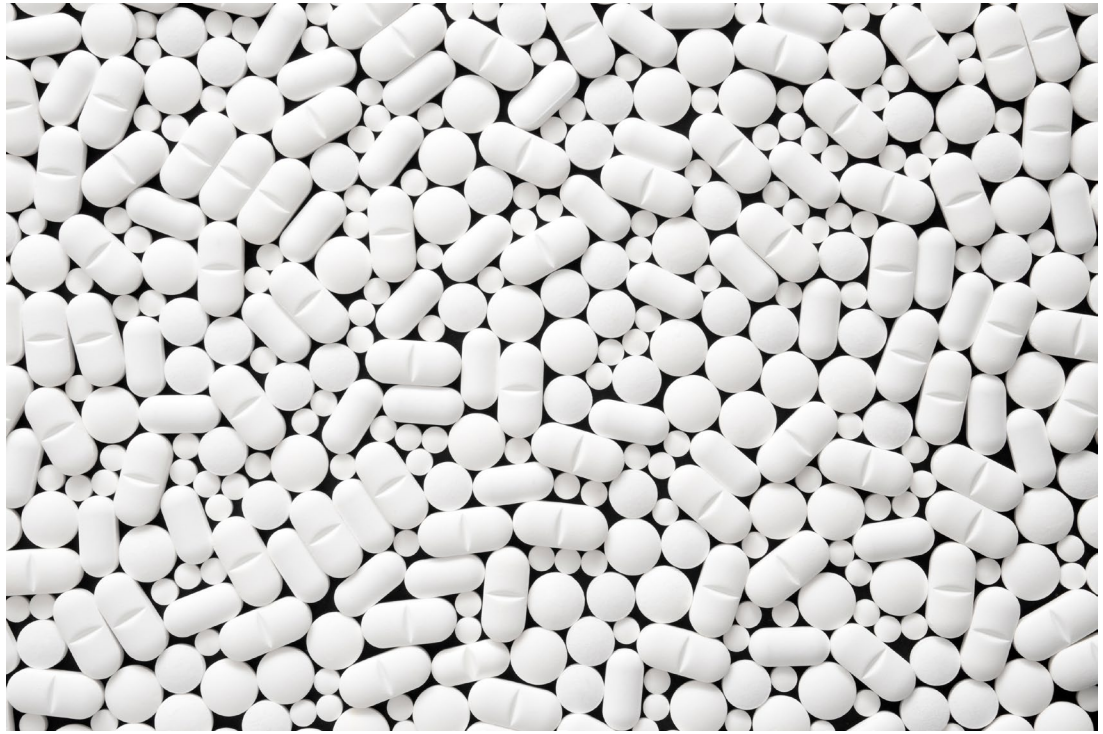
Genetic Single Nucleotide Polymorphisms

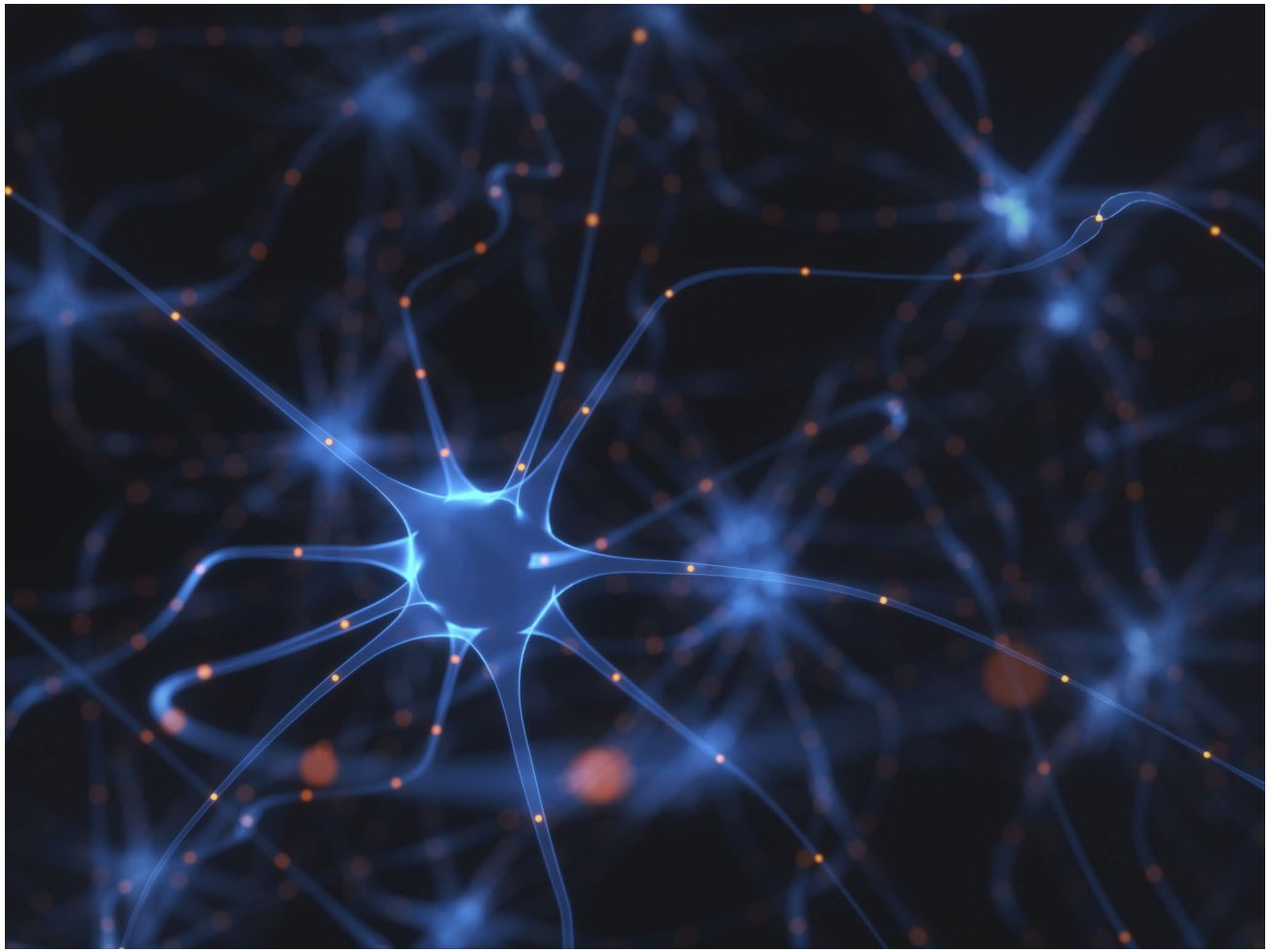
DNA is the building block that contains our hereditary material. Previously, science thought genes were static, however, we now know that we can modify our expression of DNA.

A polymorphism is essentially a bad copy of a gene. In the genetic panel, an individual can have no clinical abnormality, a heterozygous result, or homozygous result.

PATENTED CUSTOM GENETIC PANEL

- In this panel, we identify, isolate, and measure the 69 most correlated Genetic Single-Nucleotide Polymorphisms ranging from genetic variants linked to: addiction, methylation defects, mood disorders, neuropsych conditions, and inflammation.





STEP 3

GENETIC PANEL

Neurotransmitters

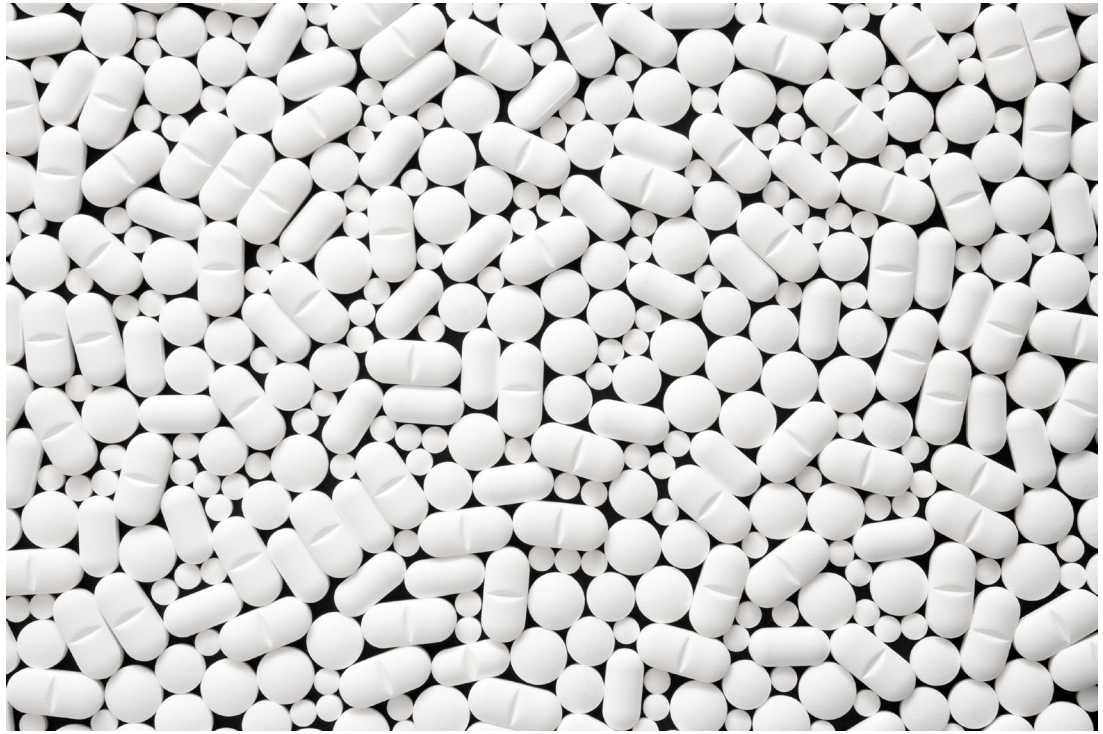
Neurotransmitters are brain chemicals that are responsible for emotional regulation, focus, appetite, sleep, pain, energy, and other vital parts of our lives.

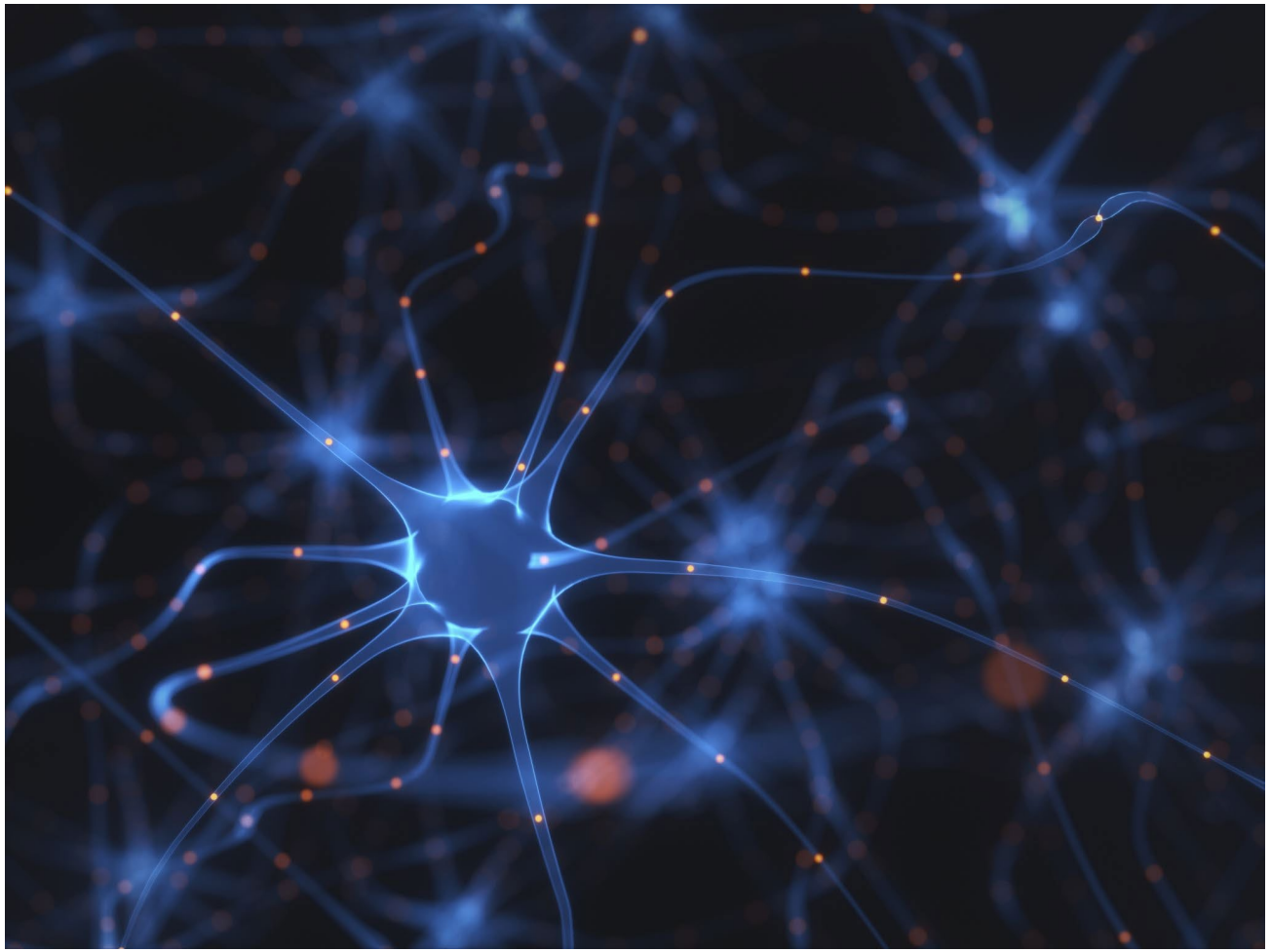
Urinary neurotransmitter levels provide an overall assessment of the body's ability to make and break down neurotransmitters and are representative of whole-body levels.

PATENTED CUSTOM GENETIC PANEL

- In this panel, we identify, isolate, and measure 11 neurotransmitters and 5 hormones.

- This hyper precise testing identifies the specific neurotransmitter(s) requiring support, the level to which support is required, and the clinical correlation to explain the patient's symptomatic expression.





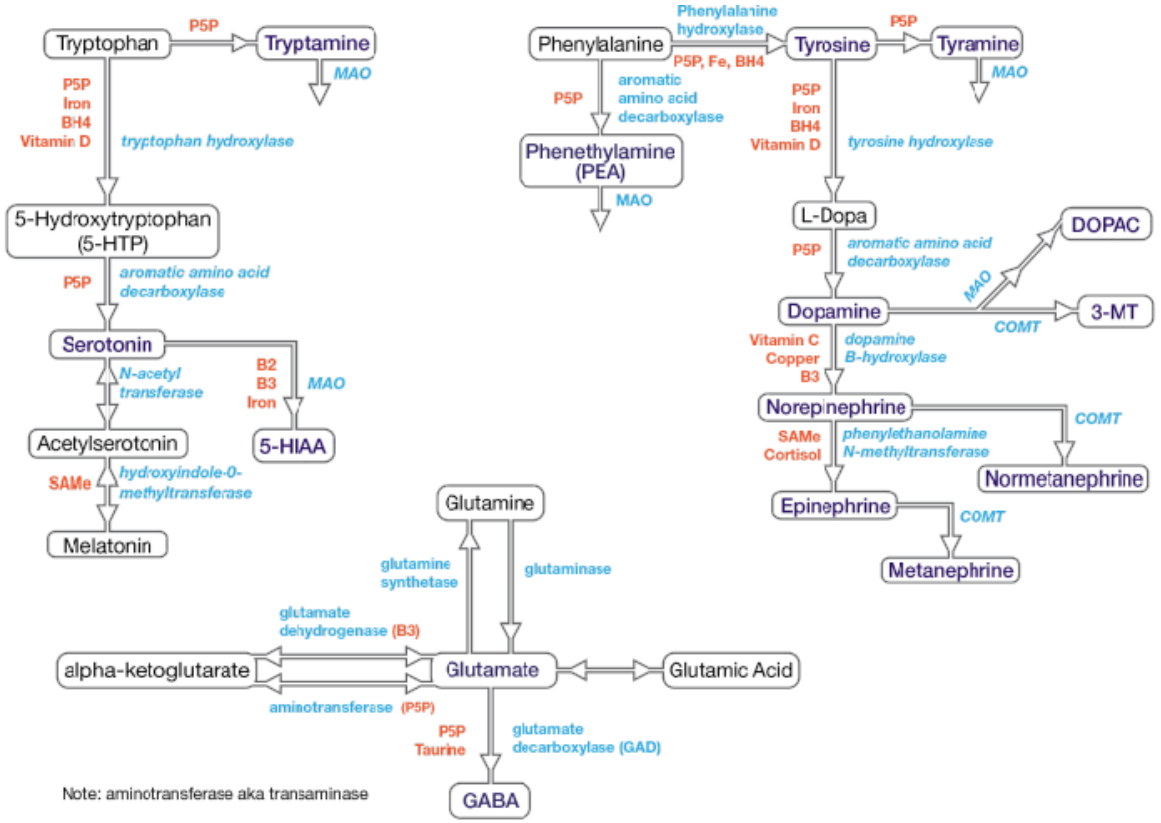
STEP 3

BIOMARKER EVALUATION REPORT

The collection, analysis, and interpretation of the 85 biomarkers in the custom genetic panel in conjunction with the pharmacogenomic test yields a *Biomarker Evaluation Report*.

This report allows for hyper-precise genetic guided **biochemical pathway support** informing the physiological aspect of addiction recovery.

NEUROTRANSMITTER BIOCHEMICAL PATHWAYS



KEY

MAO = monoamine oxidase
Cofactors for *MAO*: **B2, B3, P5P, Fe, Mg**
COMT = catechol-o-methyl-transferase
Cofactors for *COMT*: **SAMe, Mg**
P5P = (pyridoxal-5-phosphate) activated form of vitamin B6
BH4 = (tetrahydrobiopterin)
Endogenous levels can be supported with SAMe, vitamin B3, C, Mo, Zn
MTHF = (methyltetrahydrofolate) active form of folate.
SAMe = endogenous levels can be supported with Mg, MTHF, and methylcobalamin supplementation.

Cofactors = Enzymes =

CASE STUDY

- 2021
- 42-year-old, American, Caucasian male
- Self reported various addictions and mental health challenges throughout his life
  - Current gambling and alcohol addiction
  - Jeopardizing employment, marital, and financial stability
  - Depressive episodes historically preceded and followed gambling/alcohol binges
- Able to stop drinking for periods of time, but suffered chronic relapse
  - Unable to abstain from gambling
- Limited gambling recovery resources
  - Prescribed anti-depressant combination by PCP

TEST DON'T GUESS

- Ensure that prescribed drugs are compatible with client's DNA.
- Determined Effexor was unsafe and Anafranil was cautionary.

Therapeutic Class	Standard Precautions	Caution / Info	Change recommended
Analgesics, Opioid	Methadone (CYP2B6)		
Anticonvulsants	Clobazam Phenytoin		
Antidepressants	Mirtazapine Moclobemide Trazodone	Amitriptyline Clomipramine Desipramine Doxepin Duloxetine Imipramine (CYP2C19, CYP2D6) Nortriptyline Protriptyline Vortioxetine	Venlafaxine

TEST DON'T GUESS

- Polymorphisms in the **SLC6A4** gene are associated with increased risk of anxiety and depression and less effective response to SSRI medications.
  - SERT gene is critical in determining the efficacy of prescribing a Selective Serotonin Reuptake Inhibitor.

WIRED FOR ADDICTION

(-/-) No clinical abnormality | (+/-) Heterozygous result | (+/+) Homozygous result

rsID	Gene	Genetic Result	Therapeutics Associated With Positive Result	Highly Recommended Therapeutics / Neurobiologix Formulas	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
rs6313	HTR2	-/-					
rs[illegible]73	SLC6A4	+/+					
rs4570625	TPH2	-/-					
rs1108580	DBH	+/+					
Methylation for Neurotransmitters							
rs1801131	MTHFR 1298	-/-					
rs1801133	MTHFR 677	+/-					

TEST DON'T GUESS

- Monoamine Oxidase B: higher risk of clinical **depression** and **mood disorders.**
- Catechol-O-methyltransferase: more prone to prolonged episodes of **anxiety, depression and OCD.**
- Glutamic Acid Decarboxylase: associated with **sleep disorders, "half glass empty" syndrome, dysphoria, and spasticity.**

WIRED FOR ADDICTION

Neurotransmitters / Mood

(-/-) No clinical abnormality | (+/-) Heterozygous result | (+/+) Homozygous result

rsID	Gene	Genetic Result	Therapeutics Associated With Positive Result	Highly Recommended Therapeutics / Neurobiologix Formulas	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
Neurotransmitters							
rs4680	COMT V158M	+/-					
rs769407	GAD1	-/-					
rs3828275	GAD1	+/-					
rs6323	MAO-A	-/NA					
rs1799836	MAO-B	+/NA					

TEST DON'T GUESS

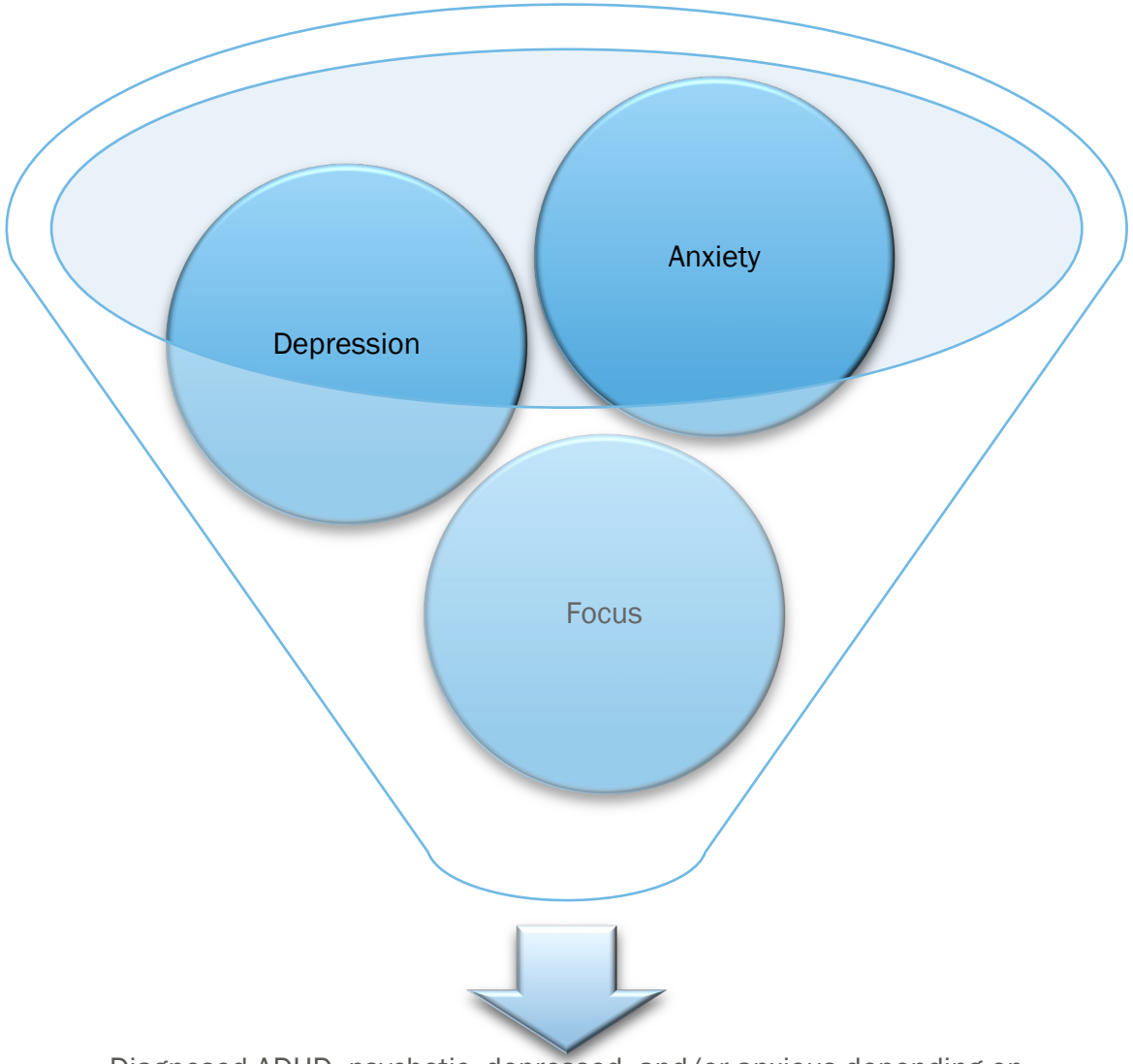
- **Low serotonin:** Mood concerns including anxiety, OCD, depression, anger, sense of discontentment, poor sleep quality, appetite changes, chronic fatigue, rheumatoid arthritis, and over-all lassitude.
- **Low dopamine:** Anxiety/depression, difficulty concentrating, decreased libido and obesity, increased addiction and other stimulation seeking activities.
- **Low norepinephrine and low epinephrine:** Depression, mood changes, fatigue, difficulty concentrating, decreased ability to stay focused on tasks, and diminished sense of personal/professional drive.
- **Upper range N/E Ratio:** Poor conversion of norepinephrine to epinephrine.
- **Low histamine:** Poor digestion and appetite control, learning, memory, and mood, and may result in drowsiness.

Analyte	Result	Unit per Creatinine	L	WRI	H	Reference Interval
Serotonin	27.9	µg/g				60 – 125
Dopamine	68.2	µg/g				125 – 250
Norepinephrine	10.3	µg/g				22 – 50
Epinephrine	0.8	µg/g				1.6 – 8.3
Norepinephrine / Epinephrine ratio	12.9					< 13
Glutamate	17	µmol/g				12.0 – 45.0
Gamma-aminobutyrate (GABA)	3.0	µmol/g				2.0 – 5.6
Glycine	959	µmol/g				450 – 2200
Histamine	7.5	µg/g				14 – 44
Phenethylamine (PEA)	50	nmol/g				32 – 84
Creatinine	106	mg/dL				30 – 225

IMPORTANCE OF DATA INFORMED TREATMENT

- Without genetic guided treatment, individuals such as this patient are relegated to M.A.T. (opioid antagonists and glutamatergic agents), various forms of talk therapy, peer support groups, and/or empirically prescribed pharmaceuticals for behaviors derived from suboptimal physiology.
  - M.A.T. occupies a receptor site without addressing biochemical pathways.
  - Incomplete rehabilitation.

- The genetic panel utilized in this patient's case allows for hyper-precise diagnosis and genetic informed intervention based on identified, isolated, and measured biochemical pathways unique to the individual.



Diagnosed ADHD, psychotic, depressed, and/or anxious depending on **vocabulary** of physician(s). Therefore, prescribed Ritalin, Lithium, Zoloft, and Xanax, etc. Continue psych meds without addressing appropriate biochemical pathways and self medicate with other substances (caffeine, alcohol, nicotine, sugar, tobacco, relationships, etc.) with high odds of recidivism.

IMPORTANCE OF DATA INFORMED TREATMENT

Mental health conditions are fluid with many biochemical factors in addition to lifestyle choices. Diagnosing & treating based on vocabulary and empirical evidence is an unnecessary and dangerous subjective means to selecting medication(s) and treatment modalities in a life-or-death scenario.

- Mental Health diagnosed based on vocabulary
  - Individual's vocabulary
  - Family's vocabulary
  - Judge's vocabulary
  - Counsel's vocabulary
  - Prison staff vocabulary
- Prescribed based on prison medical staff's empirical experience
  - Try a combo of meds & change if mental health declines or plateaus.
  - Counseling can upregulate or downregulate physiology, but not enough to fully optimize a biochemical pathway unilaterally.

Current Standard of Care

1. Pharmacogenomic Testing determined prescribed medications were incompatible.
2. WFA Genetic Panel determined SSRI would be ineffective.
3. WFA Neurotransmitter Panel determined serotonin wasn't the only biochemical requiring support.

Elevating the Standard of Care in Addiction Treatment

The Science of Addiction Recovery

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