



An Integrated Genetic Approach to Health and Wellness.

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Impact of Genetics.

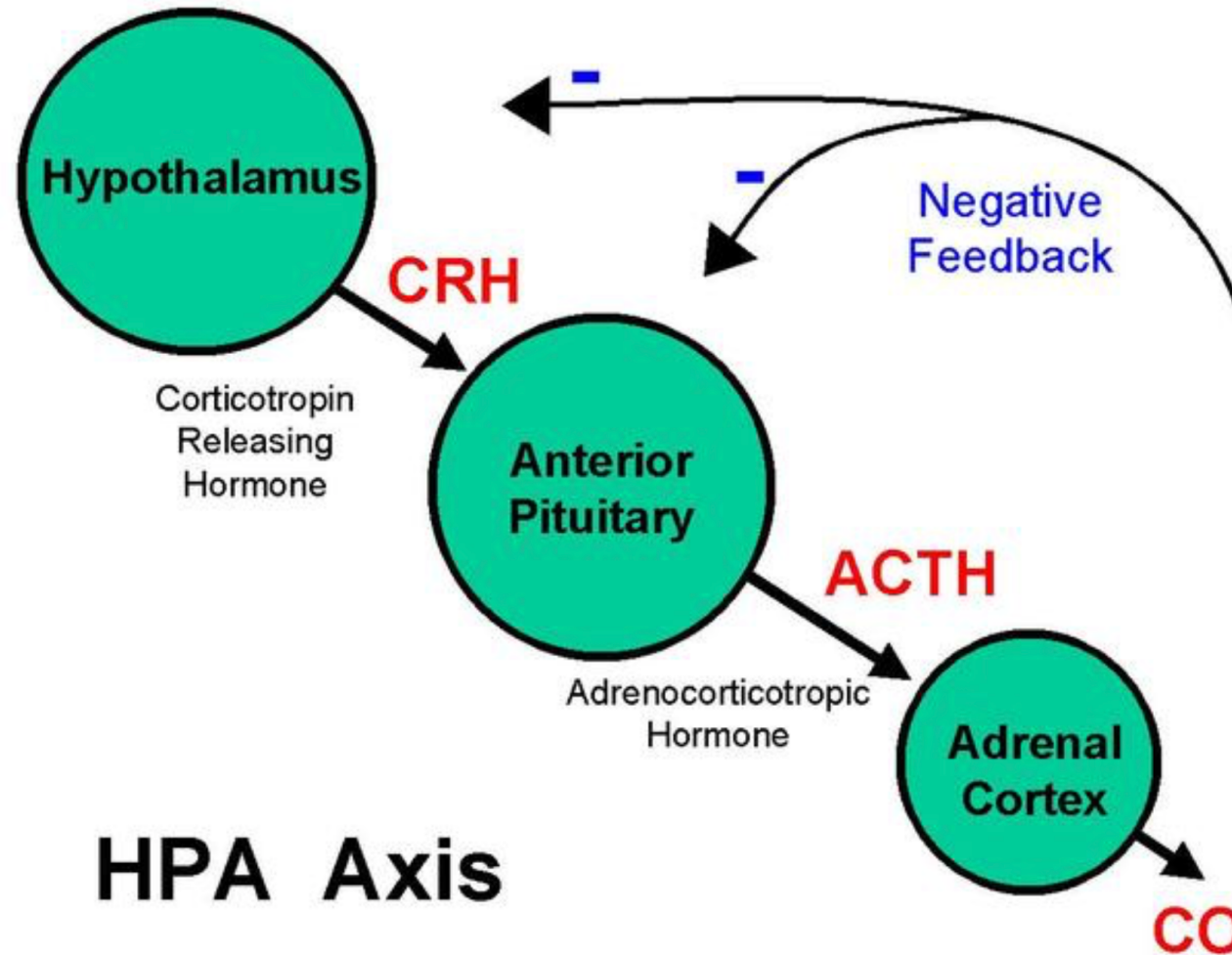
- ❑ On average, cardiovascular disease is 28% heritable.
- ❑ Variant genes increase the risk of breast cancer by 70%.
- ❑ “An individual’s risk of disease from exposure to toxic chemicals is determined by a complex interplay between genetics, physiology and concurrent and prior exposure to drugs and other chemicals.”

- ❑ *Harvard Health Medical School Publishing Sept 2017*
- ❑ *Division of Toxicology of the American Society for Pharmacology and Experimental Therapeutics.*
- ❑ *Genetic Primer for Exercise Science and Health, University of Maryland*

Stats on Mental Health???

- ❑ 90% of visits to health care practitioners are due to stress or stress related illnesses.
- ❑ Tranquilizers, antidepressants and anti-anxiety medications account for 25% of all prescriptions written.
- ❑ 2-year study with 2800 working adults showed wellness programs with targeted stress management reduction in the workplace reduced weight more than diet and exercise.
- ❑ By the time Canadians reach 40 yrs. Of age, 1 in 2 have or have had a mental illness.
- ❑ In any given year 1 in 5 Canadians experience an addiction problem.
- ❑ Approximately 8% of Canadian adults will experience major depression at some point in their lives.
- ❑ *Mental Health Commission of Canada /Soc Sci Med 2010;71-1027 / J Clin Endocrinol Metab 2011;96:486-493./ Science Daily Mar 24 2010*

A Feedback:
mental wellness control panel.



Stress Genes

- ❑ FKBP5 rs3800373
- ❑ NR3C2 rs5522
- ❑ CRHR1 rs242939
- ❑ COMT rs4680
- ❑ Why not the ADRA genes?????

FKBP5 rs3800373

- ❑ Normal Allele is C Variant Allele is A
- ❑ FK binding protein – member of the immunophilin protein family.
- ❑ Regulates glucocorticoid binding and sensitivity.
- ❑ Binding of FKBP5 into the GC receptor reduces cortisol-binding capacity leading to impaired negative feedback regulation.

FKBP5 rs3800373

❑ Characteristics of A allele:

- Increased FKBP5 expression blocking receptors.
- Increased loss of negative feedback in the HPA axis.
- Increased anxiety, depression.
- Prolonged short-term stress response, easier to get “stuck” in a stress loop.
- Increased PTSD- especially from childhood memories.

NR3C2 rs5522

- ❑ Normal Allele is T (A) Variant Allele is C (G)
- ❑ Nuclear receptor subfamily C member is a mineralocorticoid receptor (MR).
- ❑ Cortisol binds into the MR initiating negative feedback in the HPA axis.
- ❑ The greater the number of MR's, the greater the feedback and thus ability to return to the parasympathetic NS.

NR3C2 rs5522

❑ Characteristics of the C Allele:

- Fewer mineralocorticoid receptors.
- Decreased negative feedback in the HPA axis.
- Increased plasma ACTH.
- Increased anxiety, depression and hyperactivity.
- Increased ADD/ADHD.

CRHR1 rs242939

- ❑ Normal Allele is T Variant Allele is C
- ❑ Corticotropin releasing hormone receptor 1 is the receptor that binds CRH, stimulating the HPA axis into the sympathetic stress side.
- ❑ Increased number of CRH receptors allows for a great stimulation of the HPA axis.

CRHR1 rs242939

❏ Characteristics of the C Allele:

- Increased CRH receptors.
- Increased binding of CRH.
- Increased stimulation of the HPA axis.
- Increased anxiety, depression and panic disorders.

COMT rs4680

- ❑ Normal Allele is G Variant Allele is A
- ❑ Catechol-O-methyltransferase is the enzyme produced by the COMT gene.
- ❑ It degrades or metabolizes several catecholamines including dopamine, *adrenaline and noradrenaline* along with estrogens and certain drugs.
- ❑ COMT is very active in the prefrontal cortex.

COMT rs4680

- ❑ Characteristics of the A allele:
 - Decreased COMT production and activity.
 - Increased catecholamine levels.
 - Increased anxiety (Worrier).
 - Increased fear response associated with PTSD
 - Increased dopamine levels.

Support for the Stress Genes

❑ Tryptic Decapeptide, L-Theanine combo:

- Binds into the GABA A1 receptor and not the PBR receptor.
- Increases the sensitivity of the Hypothalamic and Pituitary receptors to increase negative feedback.
- Moderates cortisol and CRH production.

❑ Why not Rhodiola???

- ❑ *Medina, J. H., Peña, Mol. Neurobiol. 6, 377–386 1992 / Papadopoulos, V. Endocr. Rev. 14, 222–240 1993 / Laurent Miclo* Emmanuel Perrin. The FASEB Journal June 2001*

Support for the Stress Genes

- ❑ 8 hours of sleep, every night!!
- ❑ Meditation, deep breathing and yoga.
 - 20 volunteers -8 weeks of mediation and yoga. Novice meditators showed a change in **1561** genes (upreg 874 for health and down reg 687 for stress) and lowered BP, heart rate. Experienced meditators expressed 2209 new genes, most improving health and body's response to psychological stress.

Stress Genes Case Study

Andrew

- ❑ FKBP5 – C/A
- ❑ NR3C2 – C/C
- ❑ CRHR1 – C/C
- ❑ COMT – G/A

Catherine

- ❑ FKBP5 – C/C
- ❑ NR3C2 – T/C
- ❑ CRHR1 - T/T
- ❑ COMT – A/A

Andrew

- ❑ Andrew has always been an anxious man.
- ❑ Was promoted to head of his department 8 months prior.
- ❑ 2 months later he was waking at 3:00 am, had racing thoughts and the inability to let go of issues, even if they had been dealt with.
- ❑ "Feels like I am under water all the time".

Andrew's Plan

- ❑ Tryptic decapeptide combo: 2 caps BID empty stomach one dose before bed, and 1 cap in the middle of the night.
- ❑ L-theanine – 100 mg PRN for racing thoughts.
- ❑ Melatonin 3 mg time released before bed.
- ❑ Massage therapy every other week.
- ❑ Deep breathing – 1 minute 4 times a day.

Andrew's Outcome

- ❑ Within 48 hours he reported feeling “like I can breathe again”.
- ❑ 2 week later he was sleeping 5 out of 7 nights per week, and if he woke, he was able to go back to sleep more easily.
- ❑ 3 weeks later the stress of his new job started to look more like excitement.
- ❑ 2 months later we reduced his supplements to 1 BID, increasing PRN.
- ❑ 1.5 years later he was promoted again. This time he was thrilled about the process and handled it with quiet success.

Catherine

- ❑ Catherine is a mother of 3, one child with special needs.
- ❑ Her father-in-law passed away, and her mother-in-law moved in with her family.
- ❑ She was now caretaking for “4 children” and began resenting the situation, with little understanding from her husband.
- ❑ She began having stomach pains frequently, was angry and overwhelmed all the time.

Catherine's plan

- ❑ L-Glutamine, MSM, NAG, slippery elm, DGL etc combo: 1.5 tbps twice a day in water empty stomach.
- ❑ Multistrain probiotic: 50 B once per day with food.
- ❑ Tryptic milk decapeptide combo:1 BID
- ❑ Counselling.

Catherine's Outcome

- ❑ Within 48 hours she felt the anger easing in her body.
- ❑ 10 days later her stomach was 65% better, and 3 weeks later, she no longer felt her stomach.
- ❑ 2 month later, she and her husband were in counselling together and improving the situation at home.
- ❑ 3 months later she was off all supplements, but maintained counselling as needed and massage each month.
- ❑ Even when "issues arose" with her mother-in-law, Catherine remained calm and symptom free.

Serotonin Genes

- ❑ TPH2 rs4570625
- ❑ 5-HTTLPR rs11867581
- ❑ MAOA rs77905

TPH2 rs4570625

- ❑ Normal Allele is G Variant Allele is T
- ❑ Tryptophan hydroxylase is the enzyme made by the TPH2 gene that converts tryptophan into 5-HTP, the precursor to serotonin.
- ❑ TPH2 is most active in the brain.
- ❑ Serotonin is converted into melatonin, affecting sleep.

TPH2 rs4570625

- ❑ Characteristics of the Variant Allele:
 - Low TPH production.
 - Increased depression.
 - Increased anxiety.
 - Difficulties sleeping, especially waking at 5 am.
 - Increased muscle myalgia and fatigue.

5-HTTLPR rs11867581

- ❑ Normal Allele is A Variant Allele is G
- ❑ 5-HTTLPR is a serotonin transporter gene that is responsible for the re-uptake of serotonin.
- ❑ The normal A allele is called the "long version" or "L" and is associated with normal transportation and production of serotonin from the bowel.
- ❑ The variant G allele, the "short version" or "S", is associated with far less serotonin production and transportation from the bowel.

5-HTTLPR rs11867581

❑ Characteristics of the G Allele:

- Decreased serotonin production and transportation out of the intestines.
- Decreased serotonin uptake.
- Increased depression.
- Difficulty letting go of past events.
- Increased PTSD.
- Increased sugar cravings, especially chocolate.

MAOA rs77905

- ❑ Normal Allele is G Variant Allele is A
- ❑ MAOA gene produces the enzyme monoamine oxidase A.
- ❑ Monoamine oxidase A is involved in the breakdown of the neurotransmitters serotonin, epinephrine, norepinephrine, and dopamine.

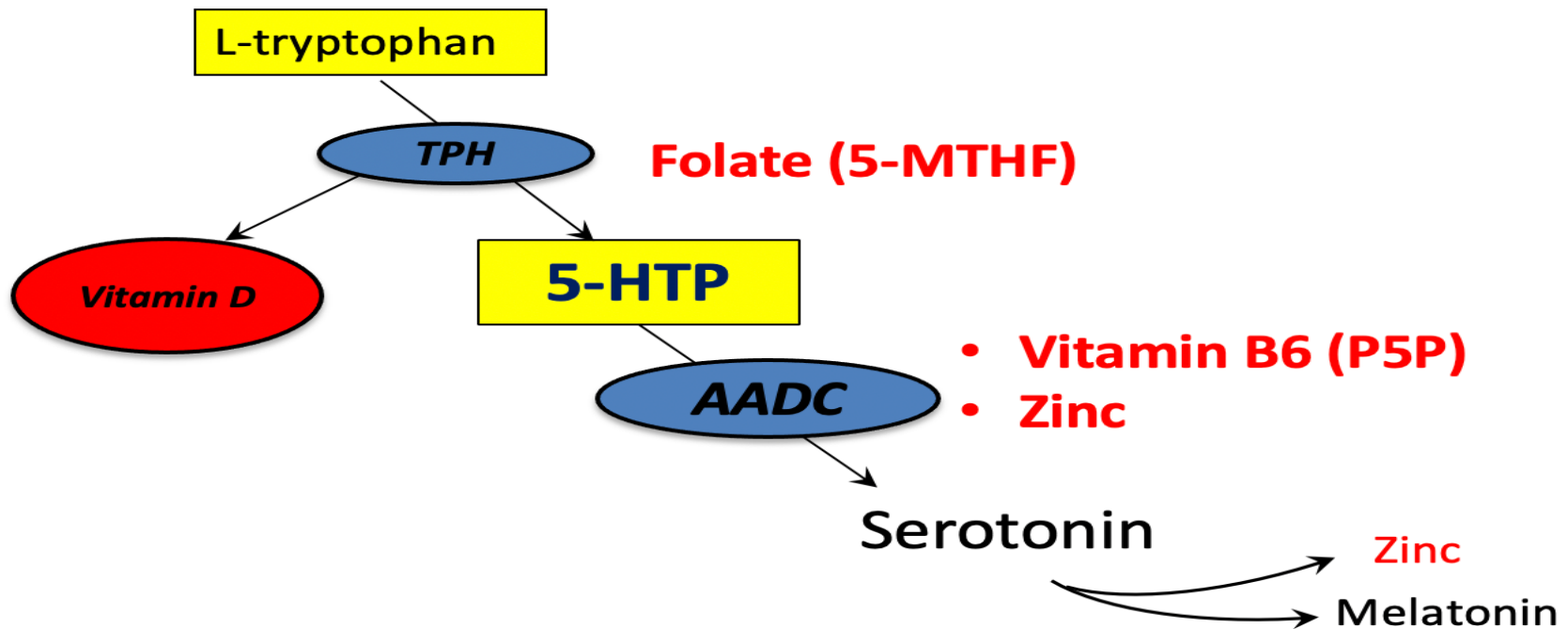
MAOA rs77905

❏ Characteristics of the "G" Allele:

- Note, the normal allele is the one that carries the risk.
- Increased MAOA production.
- Increased clearance of serotonin.
- Increased depression and decreased motivation.
- Decreased anxiety.

Support for Serotonin Genes

❑ 5-HTP, taurine, inositol, zinc, P5P, 5-MTHF combo:



Serotonin Lifestyle Hacks.

- ❑ Boost foods high in tryptophan – turkey, cottage cheese, lean red meat, chicken, eggs, soy or tofu, nuts and seeds.
- ❑ Check your carbohydrate genes, some do better with a higher complex carb diet.
- ❑ Exercise regularly.
- ❑ 8 hours of sleep every night.
- ❑ Spend time in the sun!!!!

Serotonin Case Studies

Valerie

- ❑ 5-HTTLPR – G/G
- ❑ TPH2 - G/G
- ❑ MAOA – G/G

Angela

- ❑ 5-HTTLPR – A/A
- ❑ TPH2 - G/T
- ❑ MAOA – G/A

Valerie

- ❑ Valerie had always considered herself a slightly depressed individual, but over the past 2 years she was “far weepier and more anxious all at the same time”.
- ❑ When a stressful event happened, she had a really difficult time letting it go.
- ❑ She often woke at 5 am, and frequently craved chocolate.
- ❑ She blamed the worsening of all these symptoms on perimenopause.

Valerie's Plan

- ❑ 5HTP combo: 2 capsules BID a day with food.
- ❑ L-glutamine: 1 scoop in water, swish in mouth for 30 seconds and swallow for sweet cravings.
- ❑ Exercise outside!!

Valerie's Outcome

- ❑ In 2 weeks she said she felt “lighter, not as emotionally weighed down.”
- ❑ She started sleeping into 5:30 am, and then 6:00 am, finally until 7:00 am when she had to get up.
- ❑ Chocolate cravings went almost immediately with L-glutamine and by 3 weeks she only periodically needed it.

Valerie's Outcome

- ❑ 2 months later Valerie was feeling “wonderful” and took herself off the 5HTP combo.
- ❑ Within 10 days she was not feeling as well, and by the 3- week mark, she felt weepy and overwhelmed again.
- ❑ Put her back on the 5HTP combo and kept her at this dose always.
- ❑ 3.5 yrs. Later, Valerie is happy, balanced and consistent with her supplements.

Angela

- ❑ Angela was always a happy and easy going individual but after the death of her mother, she was felt angry all the time, shutting her family out.
- ❑ She would spend half the day in bed, with the door shut.
- ❑ Her GP put her on Celexa, and 2 weeks into that she had increased heart rate, felt more agitated and loose stools.
- ❑ They increased her dose, thinking that was the solution and things only got worse.

Angela's plan

- ❑ Tryptic Milk Decapeptide: 2 caps BID day empty stomach for 1 month and then reduce to 1 cap twice a day.
- ❑ Impatiens, Star of Bethlehem, Cherry Plum, Rock Rose and clematis combo: 5 gtt prn.
- ❑ After 10 days on the above, slow reduction in Celexa with her GP.

Angela's Outcome

- ❑ Within 10 days of reducing the Celexa all serotonin syndrome symptoms began to reduce.
- ❑ Her anger reduced within 3 days and was almost gone by 2 weeks
- ❑ She started most of the day out of the bedroom by 3 weeks.
- ❑ 4 yrs later we kept her on the decapeptide combo, 1 BID, increasing as needed for times of stress.

Dopamine Genes

- ❑ DRD2 rs6277
- ❑ DRD2/ANKK1 rs1800497
- ❑ COMT rs4680

DRD2 rs6277

- ❑ Normal Allele is A Variant Allele is G
- ❑ Dopamine receptor D2 is a crucial dopamine receptor that stimulates dopaminergic pathways involved in reward, addiction, learning, motivation and pleasure.
- ❑ Several dopamine receptors on the kidneys, and abnormal coding for this gene alters the Renin Angiotensin System (RAS), increasing bloating, edema and blood pressure.

DRD2 rs6277

❑ Characteristics of the G Allele:

- Reduced DRD2 receptors.
- Less pleasure derived from everyday events.
- Frequent excitement seeking behavior.
- Increased addictions.
- Increased food cravings for chips, cheese, nuts and wine.
- Increased ADD and ADHD.

DRD2/ANKK1 rs1800497

- ❑ Normal Allele is G Variant Allele is A
- ❑ Second most important dopamine receptor that stimulates dopaminergic pathways.
- ❑ This gene, along with DRD2 is involved in demyelination.

DRD2/ANKK1 rs1800497

❑ Characteristics of the A Allele:

- Reduced DRD2/ANKK1 receptors.
- Less pleasure derived from everyday events.
- Frequent excitement seeking behavior.
- Increased addictions.
- Increased food cravings for chips, cheese, nuts and wine.
- Increased ADD and ADHD.

COMT rs4680

- ❑ Normal Allele is G Variant Allele is A
- ❑ Catechol-O-methyltransferase is the enzyme produced by the COMT gene.
- ❑ Metabolizes several catecholamines including *dopamine*, adrenaline and noradrenaline along with estrogens and certain drugs.
- ❑ COMT is very active in the prefrontal cortex.

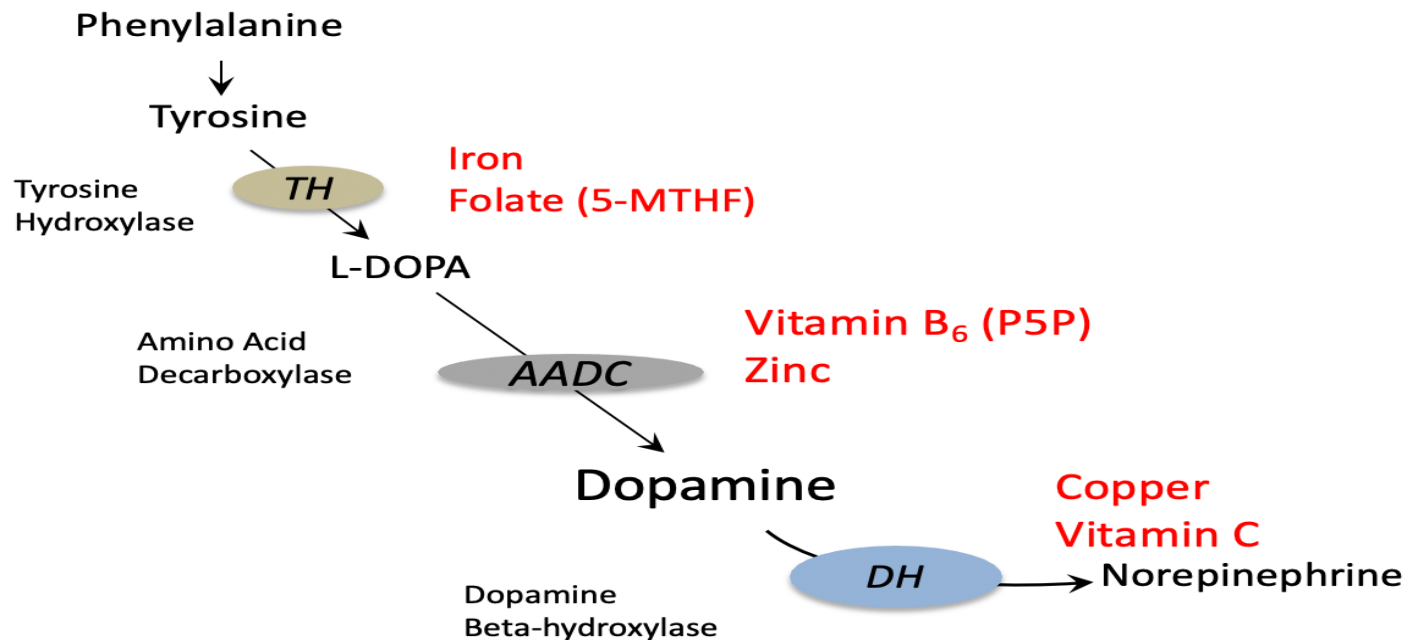
COMT rs4680

❑ Characteristics of the A allele:

- Decreased COMT production and activity.
- Increased dopamine leading to less addictive behaviors, less food cravings.
- Increased pleasure response from smaller stimuli.
- Increased anxiety, OCD and PTSD

Support for Dopamine

- L-tyrosine, Mucuna pruriens, L-dopa, rhodiola, 5-LMTHF, P5P, zinc combo.



Dopamine Life Hacks

- ❑ Do something new!
- ❑ Aged cheddar cheese, walnuts.
- ❑ Regular Exercise.
- ❑ Nonfood treats!!!
- ❑ 8 hours of sleep, every night.

Dopamine Case Studies

Susan

- ❑ DRD2- G/A
- ❑ DRD2/ANKK1 –A/A
- ❑ COMT – G/G

Dan

- ❑ DRD2 – G/A
- ❑ DRD2/ANKK1 – G/G
- ❑ COMT – G/G

Susan

- ❑ A 38 yr. old female, extreme sport athlete.
- ❑ Was injured 4 months ago and unable to work out.
- ❑ Started "dragging herself around." (feeling unmotivated to do anything.
- ❑ Started drinking more wine, every night!
- ❑ Tried an anti-depressant and felt much worse.

Susan's Plan

- ❑ Pulled her off the anti-depressant.
- ❑ L-tyrosine, L-dopa combo: 2 caps BID empty stomach.
- ❑ Pool workouts 3 times a week.
- ❑ Took a drama class.
- ❑ Massage therapy and deep breathing exercises.

Susan's Outcome

- ❑ Within 1 week she started feeling more content, “more like herself”.
- ❑ Within 10 days she had reduced her alcohol intake in half.
- ❑ Continued with pool workouts 5 times a week until she was ready to run again.
- ❑ 3 months later, slowly decreased her supplements, using them only when she couldn't work out regularly.

Dan

- ❑ Dan is 44 yrs. old and lost his job 8 months ago.
- ❑ Initially he embraced the break, but as months passed, the financial stressors increased.
- ❑ He stopped socializing, had racing thoughts all the time, often would not get out of bed, and began eating larger quantities of fried food.
- ❑ GP put him on Wellbutrin, but he got worse on this.

Dan's Plan

- ❑ Tryptic Milk Decapeptide Combo – 2 BID empty stomach.
- ❑ Increase protein in the diet, reduce saturated fats and friend foods.
- ❑ Morning walks with a friend.
- ❑ Worked with his GP to take him off Wellbutrin in a 3-week period.

Dan's Outcome

- ❑ Within 1-week Dan was sleeping better and was able to get out of bed more easily.
- ❑ Within 10 days of coming off Wellbutrin and taking the Tryptic decapeptide combo his racing thoughts diminished, and his focus began to increase.
- ❑ Within 3 weeks he was not only applying for jobs but was excited by the thought of working again.
- ❑ He still struggled with dietary changes. Agreed to make a concerted effort to focus on that.
- ❑ 4 months later Dan had a new job, and 1 year after that was promoted, healthy, happy and said he felt "better than he ever had before."



Questions?

Thank you.