Casual Friday Series

Functional Approaches to Erectile Dysfunction Part II

A Biogenetix Clinical Presentation

BIOGENETIX.COM

Disclaimer

- *Information in this presentation is not intended to diagnose, treat, reverse, cure, or prevent any disease. While this presentation is based on medical literature, findings, and text, The following statements have not been evaluated by the FDA.*
- *The information provided in this presentation is for your consideration only as a practicing health care provider. Ultimately you are responsible for exercising professional judgment in the care of your own patients.*

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It is important to note that the cause of erectile dysfunction is often multifactorial. It is useful to distinguish early, whether the condition has an obvious underlying psychological cause or an organic etiology. Depression, performance anxiety, and other sexual disorders can be strong contributing factors even when organic causes also exist. Aging is an important factor contributing to erectile dysfunction. As patients age, cardiovascular diseases, hypertension, and other co-morbidities play an increasingly significant role in this condition. Diabetes mellitus and metabolic syndrome can affect several organ systems resulting in the accelerated deterioration of erectile function and can disrupt the mechanisms underpinning erections on a molecular level.[8][9] Other causes of erectile dysfunction include neurological diseases (such as multiple sclerosis), hormonal causes (e.g. hypogonadism, thyroid), traumatic (e.g. pelvic fractures, spinal cord injuries), hyperlipidemia, stroke, sleep apnea, COPD, glaucoma, multiple sclerosis, sequela of priapism, depression, prostatic hyperplasia with lower urinary symptoms (BPH with LUTS), iatrogenic (e.g. post transurethral resection of the prostate) and a variety of medications (antidepressants, antihypertensives, antipsychotics, opioids, and recreational drugs).[10][11][12][13][14][15][16][17][18]

https://www.ncbi.nlm.nih.gov/books/NBK562253/

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Cardiovascular disease is a very significant risk factor for erectile dysfunction. Almost 50% of men with known coronary artery disease proven by cardiac catheterization have significant erectile dysfunction.[19] Part of the reason for this is that the coronary arteries and the penile cavernosal arteries are similar in size and tend to develop atherosclerotic problems similarly. Since the cavernosal arteries are smaller, they will tend to develop blockage from atherosclerotic plaques earlier resulting in vasculogenic ED years before the clinical appearance of coronary artery disease. Both cardiovascular disease and ED involve endothelial cell dysfunction in their pathophysiology.[20]

These patients will often demonstrate subclinical atherosclerosis long before any overt ED by as much as ten years. The cavernosal arteries being of smaller diameter means that vasculogenic ED often precedes coronary artery disease, myocardial infarctions and strokes by up to five years.[3][21] Younger men who present with unexplained ED appear to have a very significant increase, up to fifty-fold, of their cardiovascular risk in later life compared to an age-matched control group.[4][22] Patients should be informed that ED is a significant indicator of underlying heart disease and they should be referred for further cardiovascular risk screening and treatment.[3][4][5][6][7][22]

The Prostate Cancer Prevention Trial Database showed that having ED increased their cardiovascular risk roughly equivalent to the risk of smoking or having a family history of myocardial infarctions.[23] A meta-analysis of 14 studies totaling over 90,000 men with erectile dysfunction, found that men with ED enjoyed 44% more cardiovascular events, 62% more myocardial infarctions, 39% more strokes and a 25% increased risk of death compared to patients presenting without ED. Erectile dysfunction correlates with an increased risk of CV events.[24]

This means that erectile dysfunction has useful independent predictive value for future cardiovascular events and is why all patients with ED should be screened for cardiovascular risk.[21] If their cardiovascular risk is intermediate, non-invasive testing for subclinical atherosclerosis and/or an exercise stress test is suggested, but if they are high risk, a formal cardiology referral is recommended.[4][25][26][27]

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- About 40% of men with ED will have hypertension while 35% of all hypertensive men will also have ED.[28][29][30]
- Hyperlipidemia is found in about 42% of men with ED.
- Undiagnosed diabetes is up to three times as likely in men with erectile dysfunction (28%) compared to non-diabetic men with normal erections (10%).[28][31][32]
- Among men over 50 years of age, diabetics are roughly twice as likely to have ED (46%) compared to non-diabetics (24%).[33]
- The longer a patient has diabetes and the more severe, the greater the risk of ED.[33]
- One-third of diabetic men will have hypogonadism which may partly explain the high correlation between diabetes and ED.[34]
- Up to 35% of all men with ED will also have hypogonadism and about 6% will have abnormal thyroid function.[35][36] While testosterone deficiency can negatively impact erectile function, vascular disease and diabetes are far more likely causes of ED.[37]
- Obesity is associated with a 50% increase in ED compared to men of normal weight.[38] One-third of the obese men with ED who enrolled in a weight loss program resolved their ED problem in 2 years.[39]
- In smokers who quit, erectile quality improved 25% after one year.[40]

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- Heavy alcohol users also report an increased risk of ED compared to the general population.[31] The precise cause is uncertain but is thought to be due to direct alcoholic toxicity to the corporal endothelium, loss of corporal smooth muscle tissue, and early neuropathy.[41]
- There is a strong correlation between BPH with LUTS and ED. The majority of men with symptomatic BPH, up to 72%, will also have ED.[42][43][44]
- Patients with depression are almost 40% more likely to have ED than normal men without depression. Conversely, the incidence of depression in men with ED is almost three times greater.[45]
- Obesity and morbid obesity are significant risk factors for ED. Treatment of obesity with bariatric surgery has been shown to significantly improve sexual performance.[46][47][48]

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One-quarter of all cases of ED are thought to be due to prescription medications. Of the twelve most commonly prescribed medications in the US, eight list erectile dysfunction as a possible side effect.[35][50] These drugs would include most antidepressants (especially SSRIs), cimetidine, ketoconazole, spironolactone, sympathetic blockers (methyldopa, clonidine, and guanethidine), thiazide diuretics, and other antihypertensives. (Angiotensin Converting Enzyme (ACE) inhibitors and calcium channel blockers are the least likely to cause ED.) Beta-blockers are only a minor contributor to ED, while alpha-blockers actually improve erectile function.[51][52]

Of the prostate cancer patients who undergo radical prostatectomy surgery, 85% can expect erectile dysfunction post-operatively compared to an ED rate of only 25% for men who received definitive radiation therapy.[53][54] (This data refers to patients who did not have ED prior to their prostate cancer treatment.) Interestingly, the use of robotic surgery for radical prostatectomies has not changed the post-operative incidence of ED.

The role of bicycle riding in ED is somewhat controversial. Traditional racing bicycle seats place considerable pressure directly on the perineal nerves as well as the pudendal and cavernosal arteries which suggests it could be a potential problem to serious cyclists.[55][56] A 2020 meta-analysis of 3,330 cyclists compared to 1,524 non-cycling controls indicated a significantly increased risk of ED in the cyclists.[57]

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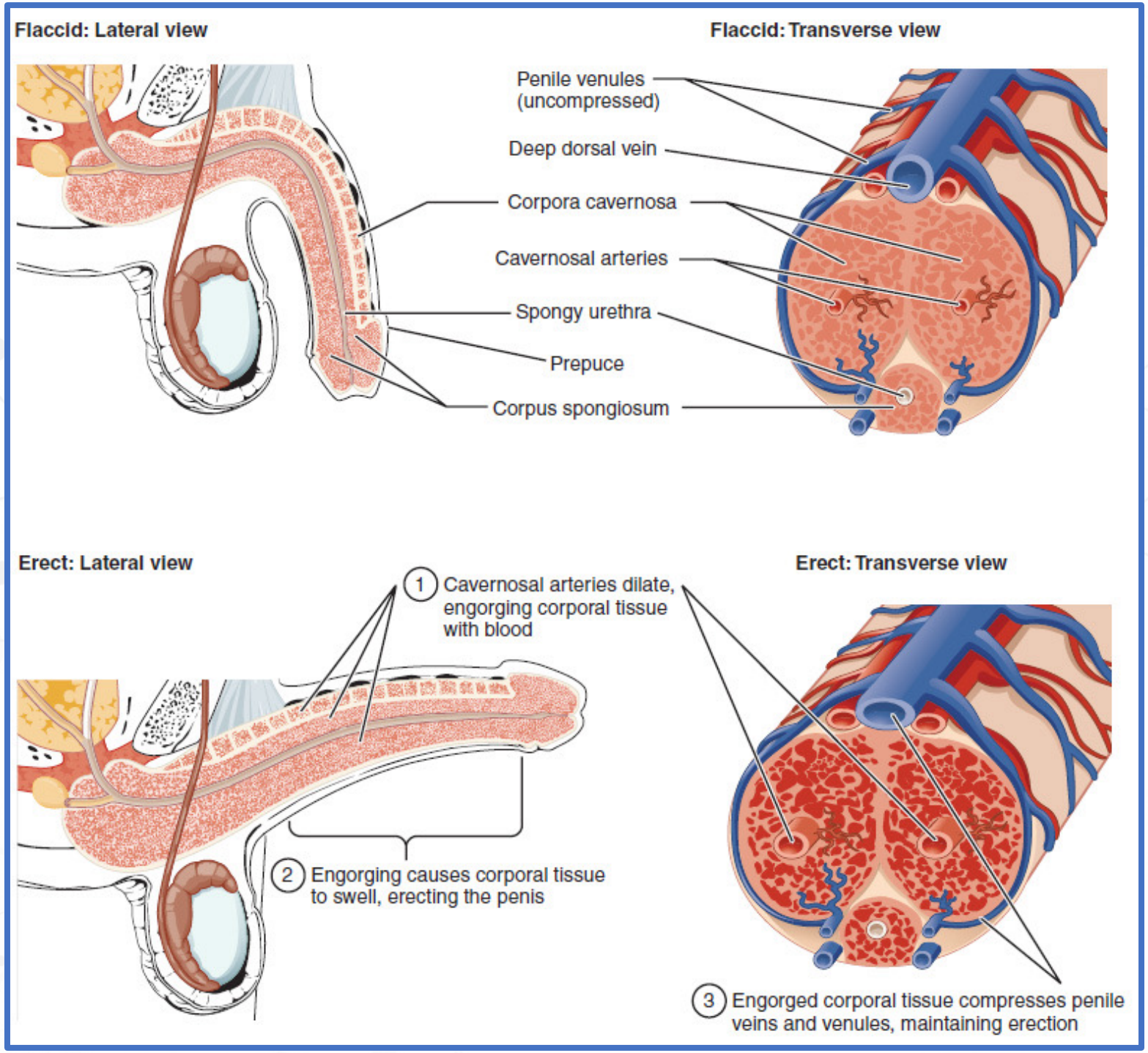
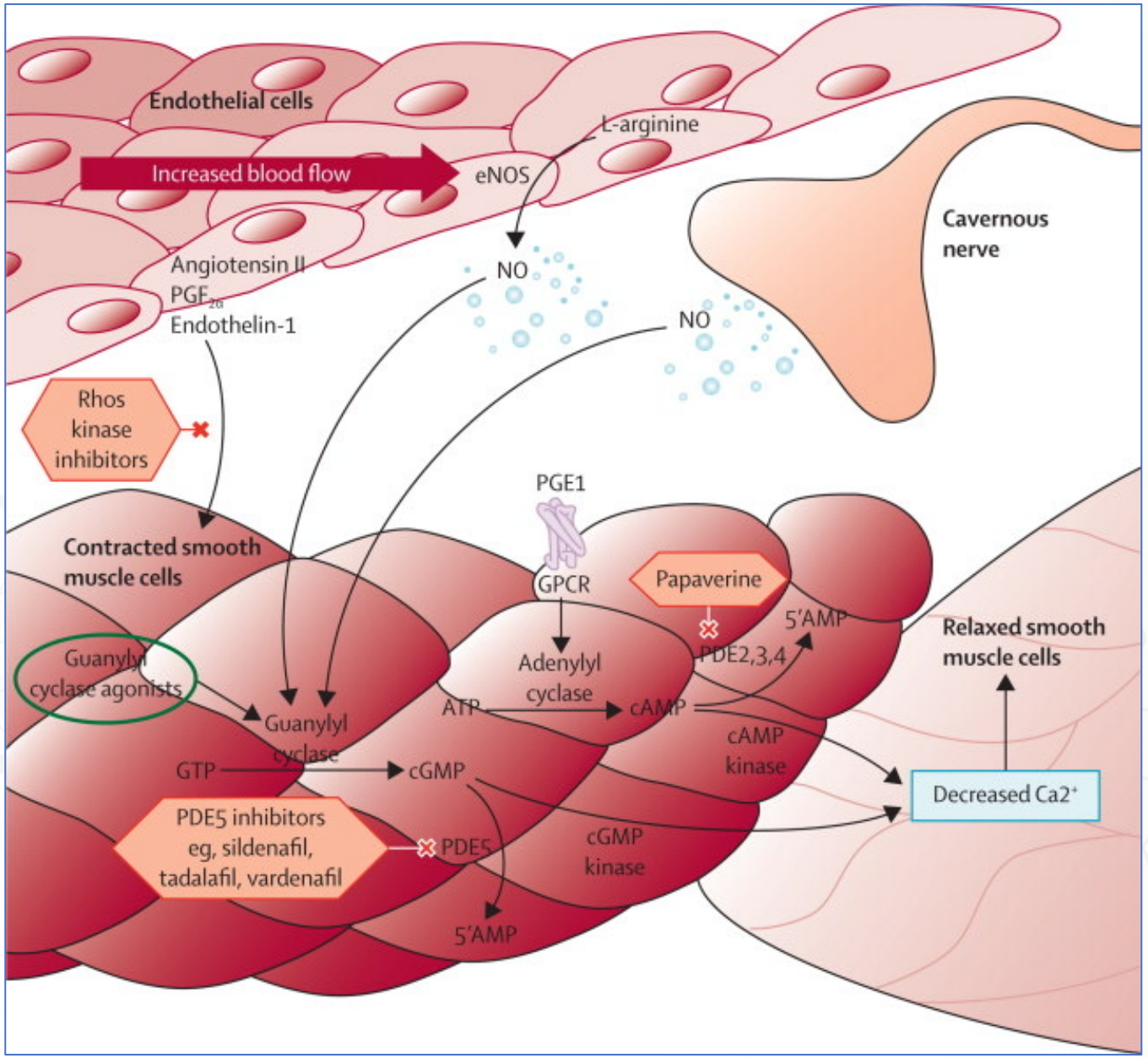

Flaccid: Lateral view
Flaccid: Transverse view
Penile venules (uncompressed)
Deep dorsal vein
Corpora cavernosa
Cavernosal arteries
Spongy urethra
Prepuce
Corpus spongiosum
Erect: Lateral view
Erect: Transverse view
1 Cavernosal arteries dilate, engorging corporal tissue with blood
2 Engorging causes corporal tissue to swell, erecting the penis
3 Engorged corporal tissue compresses penile veins and venules, maintaining erection

1. Hypothalamus > parasympathetic > sacral plexus
2. Sacral plexus > penile cavernosal nerves
3. Cavernosal nerves release nitric oxide (NO) to initiate erection
4. Local endothelial cells release NO to maintain erection
5. NO stimulates cGMP in smooth muscle
6. Calcium channels closed, potassium channels open and rushes in
7. Low calcium concentrations cause smooth muscle to relax and fill with blood
8. Smooth muscle begins to contract again once cGMP is degraded by phosphodiesterase enzymes.



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The Vascular Endothelium and Human Diseases

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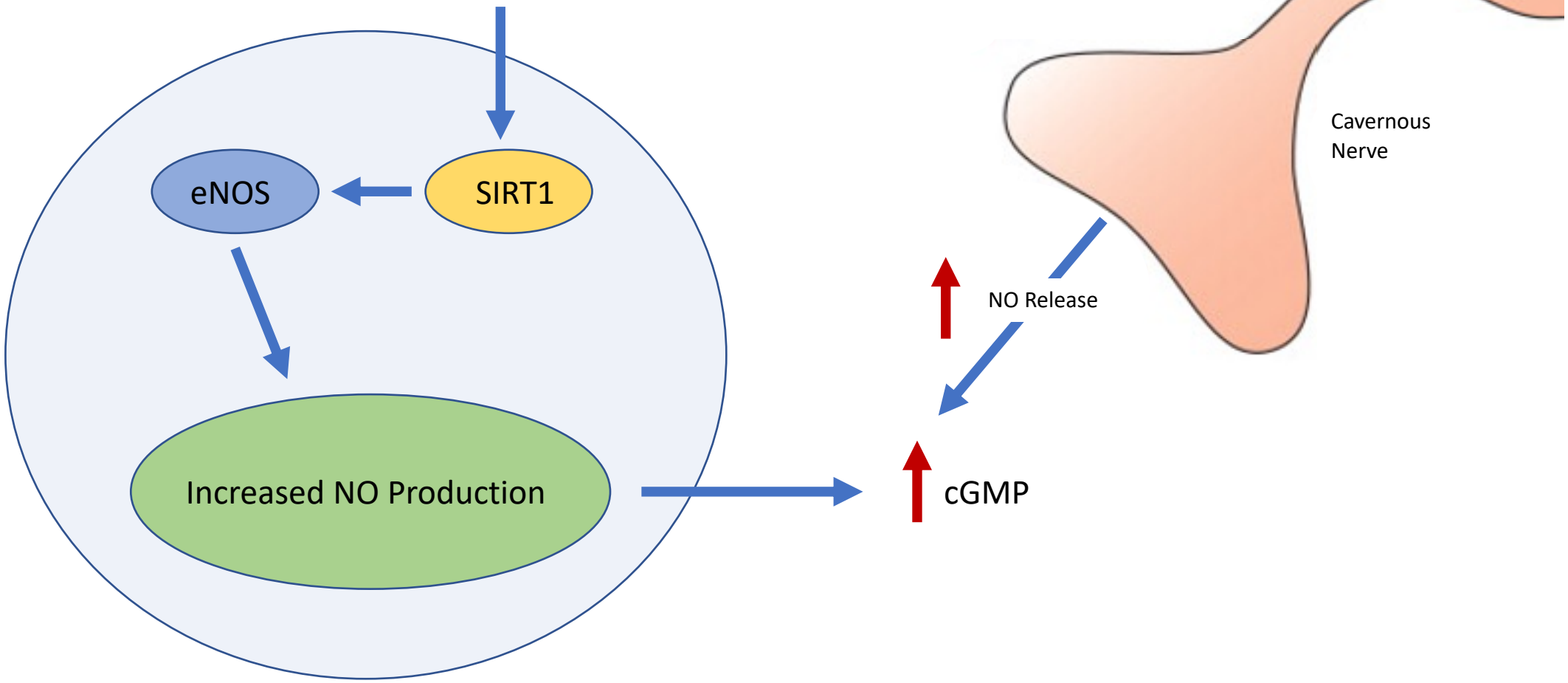
Endothelial dysfunction is characterized by a shift in the actions of the endothelium toward reduced vasodilation, a proinflammatory state, and prothrombic properties. It is associated with most forms of cardiovascular disease, such as hypertension, coronary artery disease, chronic heart failure, peripheral vascular disease, diabetes, chronic kidney failure, and severe viral infections. Free radicals can disrupt the balance of NO, damage the endothelium, and leave it overly permeable, allowing toxins to pass into body tissues [17]. In most instances, the human body has an adequate supply of antioxidants obtained from various foods to neutralize these free radicals; but if the body is depleted of these antioxidants, or if there are too many coexistent factors, injury to the endothelium and a change in the balance of NO may occur. If the endothelium becomes damaged and the NO levels become imbalanced, cells that should remain in the blood can pass through blood vessels into the adjacent body tissue. Some of these proteins include C - reactive protein, which is produced by the liver and causes inflammation [18]. When NO action is inhibited, endothelial signaling can become impaired, resulting in widespread disease, because the endothelium actively maintains approximately 60,000 miles of blood vessels in the human body. Several factors that can increase the number of free radicals in the body including obesity, smoking, sleep deprivation, acute microbial infections, high glucose intake, and exposure to metals and air pollutants. When the endothelium is functioning normally, it helps to regulate blood clotting, assists the body's immune response, controls the volume of fluid and the amount of electrolytes and other substances that pass from the blood into the tissues, and produces dilation or constriction of the blood vessels (Fig. 1) [19]. When endothelial dysfunction is present, however, the ability to perform one or more of these functions is reduced. Actually measuring a patient's endothelial function is not routinely done; but when it is, the ability of the blood vessels to dilate and/or constrict in response to drug administration can be assessed. Endothelial dysfunction is thought to play a major role in the development of atherosclerosis, angiogenesis in cancer, vascular leakage, infectious diseases, and stroke. Endothelial dysfunction can be caused by several conditions, including diabetes or metabolic syndrome, hypertension, smoking, and physical inactivity [20].

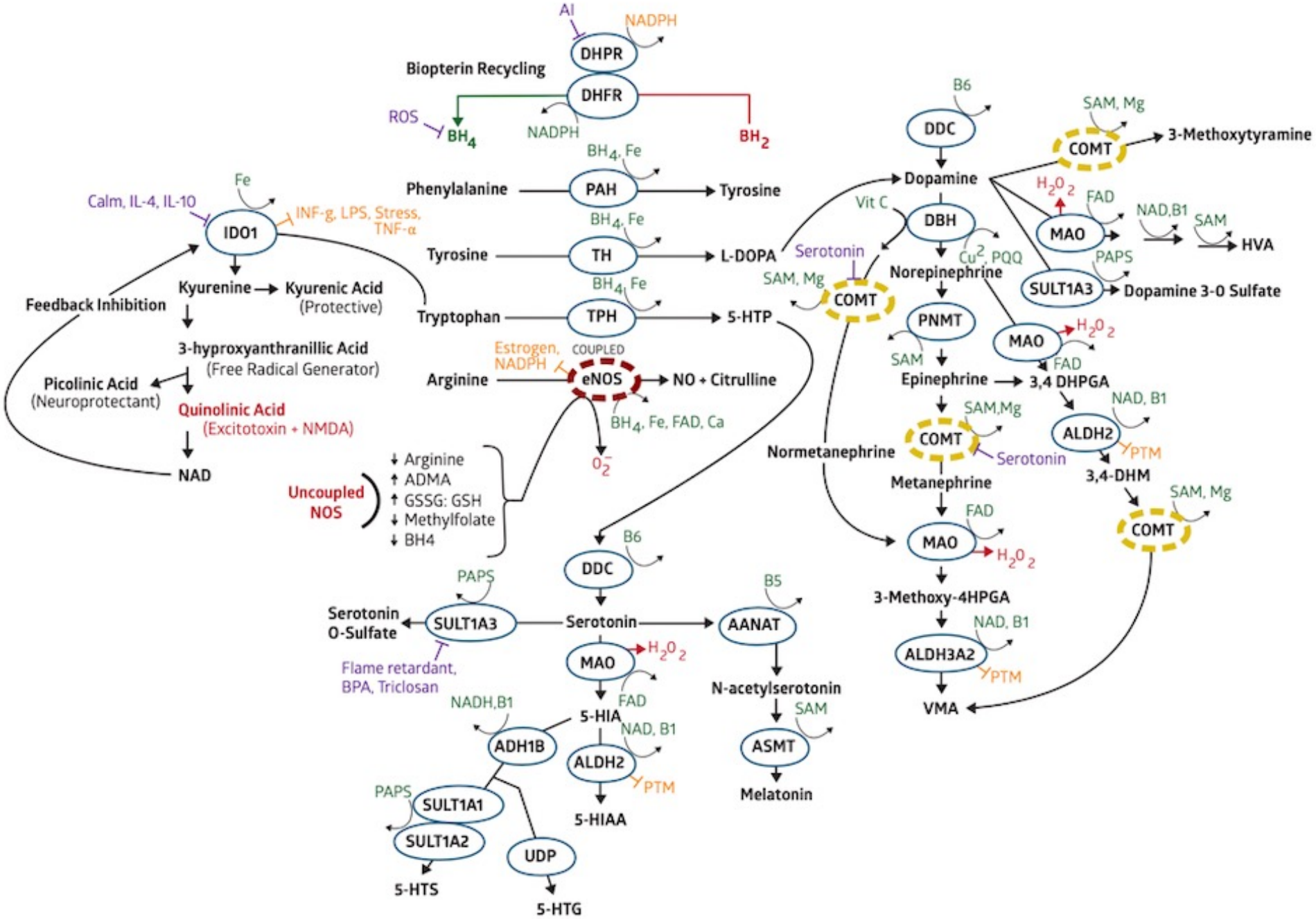
ROS, URIC ACID

Resveratrol
Anti-aging/antioxidant stimuli

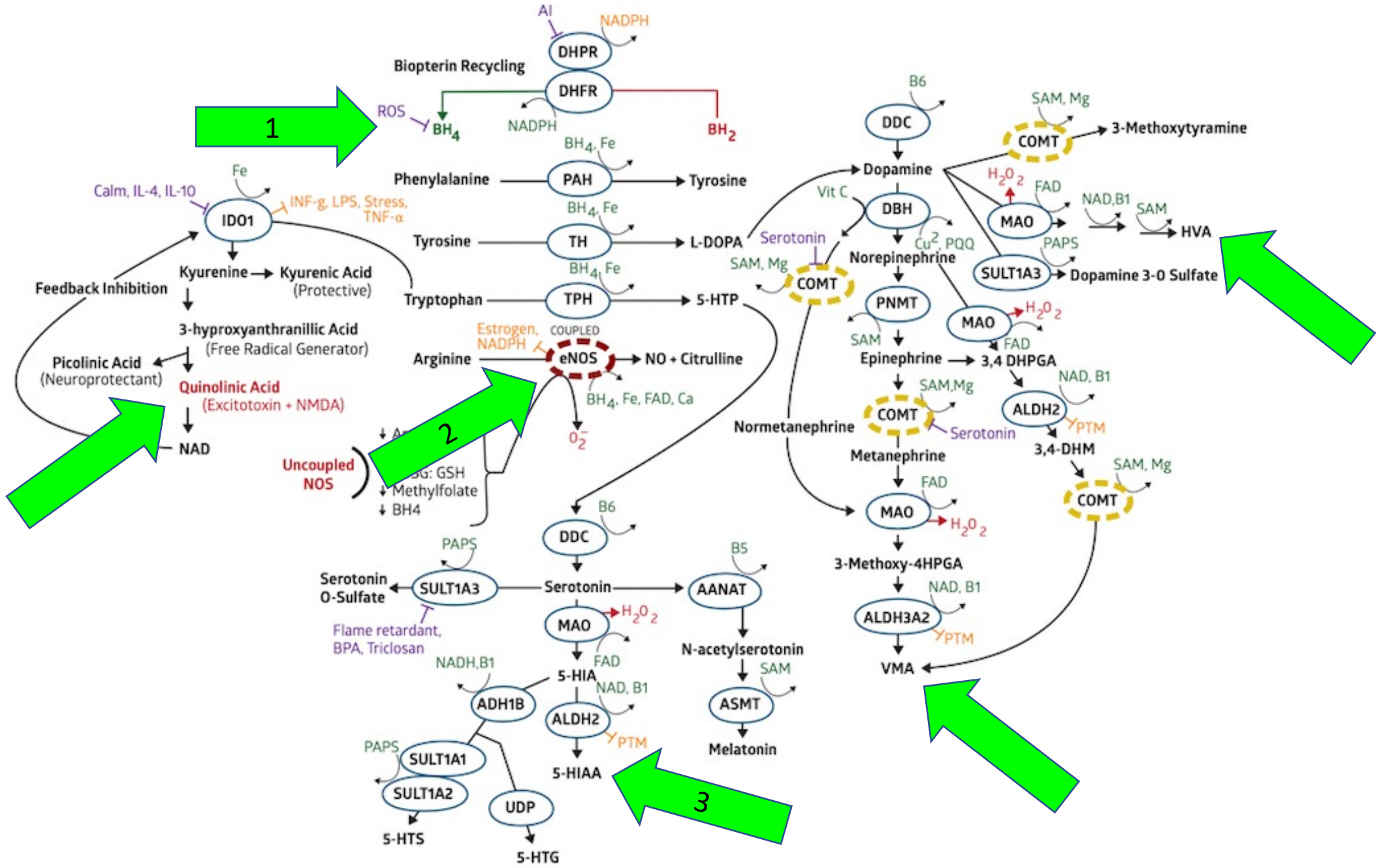


Endothelial Maintenance

Nerve Initiation



Strategene Report
Ben Lynch ND



Strategene Report
Ben Lynch ND

44yo Male

Dx:
Obesity
DM2
HBP
Hyperlipidemia
ED
CKD
Depression Dis.

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲ **Glucose** [01]	**175**	**High**		mg/dL	65-99
▲ **BUN** [01]	**27**	**High**		mg/dL	6-24
▲ **Creatinine** [01]	**3.19**	**High**		mg/dL	0.76-1.27
▼ **eGFR If NonAfricn Am**	**22**	**Low**		mL/min/1.73	>59

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
Lipids [01]					
▲ **Cholesterol, Total** [01]	**262**	**High**		mg/dL	100-199
▲ **Triglycerides** [01]	**237**	**High**		mg/dL	0-149
▼ **HDL Cholesterol** [01]	**39**	**Low**		mg/dL	>39
▲ **VLDL Cholesterol Cal**	**45**	**High**		mg/dL	5-40
▲ **LDL Chol Calc (NIH)**	**178**	**High**		mg/dL	0-99
▲ **T. Chol/HDL Ratio**	**6.7**	**High**		ratio	0.0-5.0

▼ **Protein, Total** [01]	**5.7**	**Low**		g/dL	6.0-8.5
▼ **Albumin** [01]	**2.9**	**Low**		g/dL	4.0-5.0
Globulin, Total	2.8			g/dL	1.5-4.5
▼ **A/G Ratio**	**1.0**	**Low**			1.2-2.2
Bilirubin, Total [01]	<0.2			mg/dL	0.0-1.2

44yo Male c/ED

Hgb A1c with eAG Estimation

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲ **Hemoglobin A1c** [01]	**9.1**	**High**		%	4.8-5.6
Please Note: [01]					

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
TSH [01]	3.880		uIU/mL	0.450-4.500
Thyroxine (T4) [01]	6.8		ug/dL	4.5-12.0
T3 Uptake [01]	31		%	24-39
Free Thyroxine Index	2.1			1.2-4.9

HLA DRB1,3,4,5,DQB1 (IR)

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
DRB1 [02]				
DRB1*13:01:01G				
DRB1 [02]				
DRB1*15:03:01G				

44yo Male c/ED

Fibrinogen Activity

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲ **Fibrinogen Activity** [01]	**686**	**High**		mg/dL	193-507

Insulin

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Insulin [01]	9.1		uIU/mL	2.6-24.9

Ferritin, Serum

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Ferritin, Serum [01]	105		ng/mL	30-400

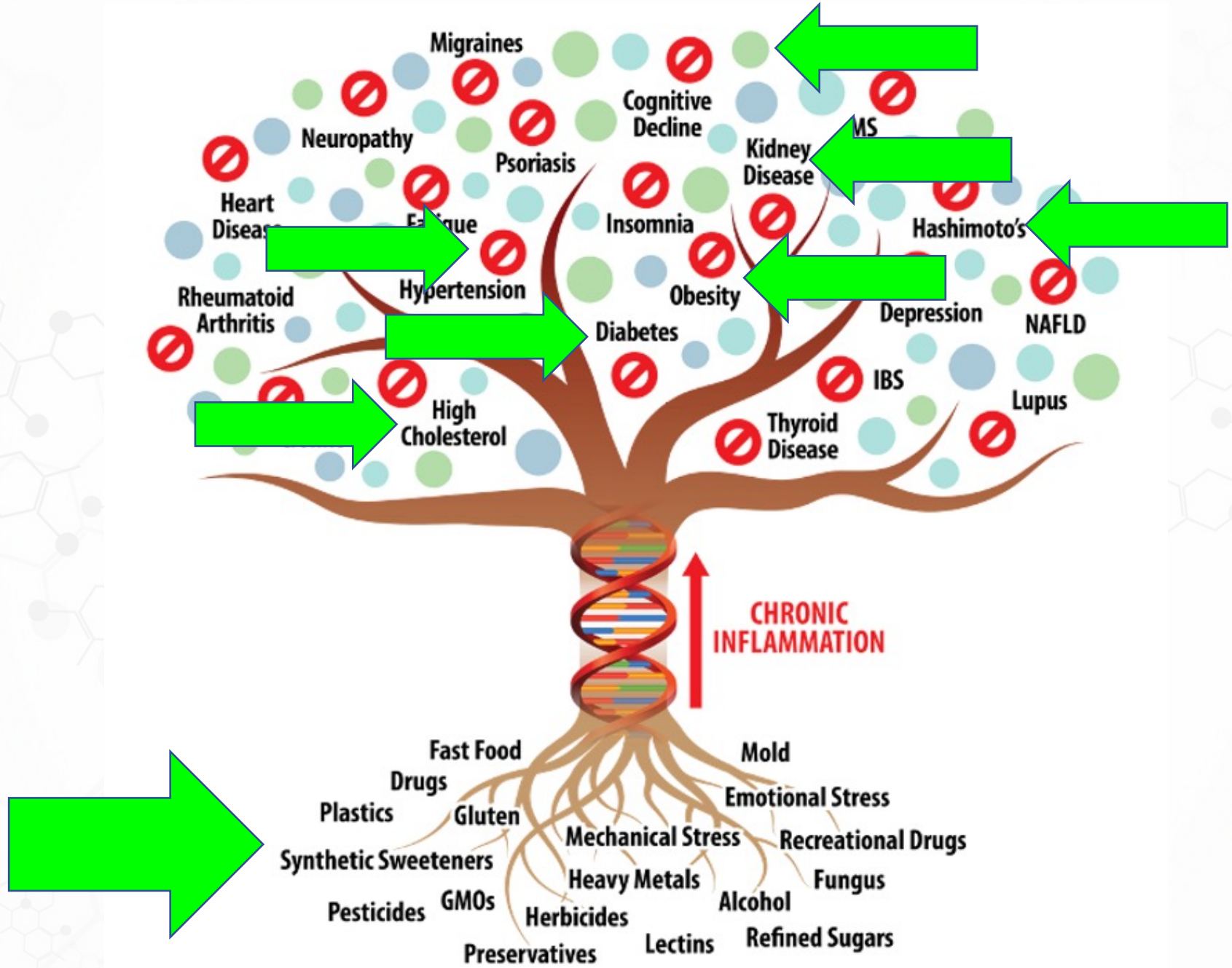
DHEA-Sulfate

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▼ **DHEA-Sulfate** [01]	**17.9**	**Low**		ug/dL	102.6-416.3

C-Peptide, Serum

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲ **C-Peptide, Serum** [01]	**6.6**	**High**		ng/mL	1.1-4.4

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲ **Homocyst(e)ine** [01]	**15.2**	**High**		umol/L	0.0-14.5


Migraines
Cognitive Decline
Neuropathy
Psoriasis
MS
Kidney Disease
Heart Disease
Insomnia
Hashimoto's
Hypertension
Obesity
Rheumatoid Arthritis
Depression
NAFLD
Diabetes
IBS
High Cholesterol
Lupus
Thyroid Disease
CHRONIC INFLAMMATION
Fast Food
Mold
Drugs
Emotional Stress
Plastics
Gluten
Mechanical Stress
Recreational Drugs
Synthetic Sweeteners
Heavy Metals
Fungus
Pesticides
GMOs
Alcohol
Herbicides
Refined Sugars
Lectins
Preservatives

60yo Male

DX:
ED
Hyperlipidemia
Hashimoto's

Carbon Dioxide, Total [01]	22			mmol/L	20-29
Calcium [01]	9.4			mg/dL	8.7-10.2
Protein, Total [01]	7.2			g/dL	6.0-8.5
▲ **Albumin** [01]	**5.0**	**High**		g/dL	3.8-4.9
Globulin, Total	2.2			g/dL	1.5-4.5
▲ **A/G Ratio**	**2.3**	**High**			1.2-2.2
Bilirubin, Total [01]	0.6			mg/dL	0.0-1.2
Alkaline Phosphatase [01]	81			IU/L	44-121
			Please note reference interval change		
AST (SGOT) [01]	34			IU/L	0-40
ALT (SGPT) [01]	44			IU/L	0-44

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
Lipids [01]					
▲ **Cholesterol, Total** [01]	**314**	**High**		mg/dL	100-199
▲ **Triglycerides** [01]	**219**	**High**		mg/dL	0-149
▼ **HDL Cholesterol** [01]	**36**	**Low**		mg/dL	>39
▲ **VLDL Cholesterol Cal**	**44**	**High**		mg/dL	5-40
▲ **LDL Chol Calc (NIH)**	**234**	**High**		mg/dL	0-99
▲ **T. Chol/HDL Ratio**	**8.7**	**High**		ratio	0.0-5.0
Please Note: [01]					

Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲ **Glucose** [01]	**115**	**High**		mg/dL	65-99
BUN [01]	20			mg/dL	6-24
Creatinine [01]	1.19			mg/dL	0.76-1.27
eGFR If NonAfricn Am	67			mL/min/1.73	>59
eGFR If Africn Am	77			mL/min/1.73	>59

Labcorp currently reports eGFR in compliance with the current
recommendations of the National Kidney Foundation. Labcorp will
update reporting as new guidelines are published from the NKF-ASN
Task force.

60yo Male c/ED

Thyroid Antibodies

	Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲	**Thyroid Peroxidase (TPO) Ab** [01]	**44**	**High**		IU/mL	0-34
	Thyroglobulin Antibody [01]	<1.0			IU/mL	0.0-0.9

Thyroglobulin Antibody measured by Beckman Coulter Methodology

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Iron Bind.Cap.(TIBC)	320		ug/dL	250-450
UIBC [01]	244		ug/dL	111-343
Iron [01]	76		ug/dL	38-169
Iron Saturation	24		%	15-55

GGT

	Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
▲	**GGT** [01]	**90**	**High**		IU/L	0-65

60yo Male c/ED

Thyroid Panel With TSH

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
TSH [01]	2.500		uIU/mL	0.450-4.500
Thyroxine (T4) [01]	7.4		ug/dL	4.5-12.0
T3 Uptake [01]	25		%	24-39
Free Thyroxine Index	1.9			1.2-4.9

Ferritin

Test	Current Result and Flag	Previous Result and Date	Units	Reference Interval
Ferritin [01]	319		ng/mL	30-400

Volatile Organic Compounds (VOCs)

Test Name (mcg/g)	In Control	Moderate	High	Current Level	Previous Level
2-Methylhippuric Acid (2MHA)	≤74.00	74.01~792.29	≥792.30	7.92	
3-Methylhippuric Acid (3MHA)	≤74.00	74.01~792.29	≥792.30	443.12	
4-Methylhippuric Acid (4MHA)	≤74.00	74.01~792.29	≥792.30	2862.96	
2-Hydroxyisobutyric Acid (2HIB)	≤1005.00	1005.01~5789.99	≥5790.00	647.37	
Phenylglyoxylic Acid (PGO)	≤105.60	105.61~387.89	≥387.90	14.60	
N-acetyl phenyl cysteine (NAP)	≤0.45	0.46~2.89	≥2.90	0.25	

Comments

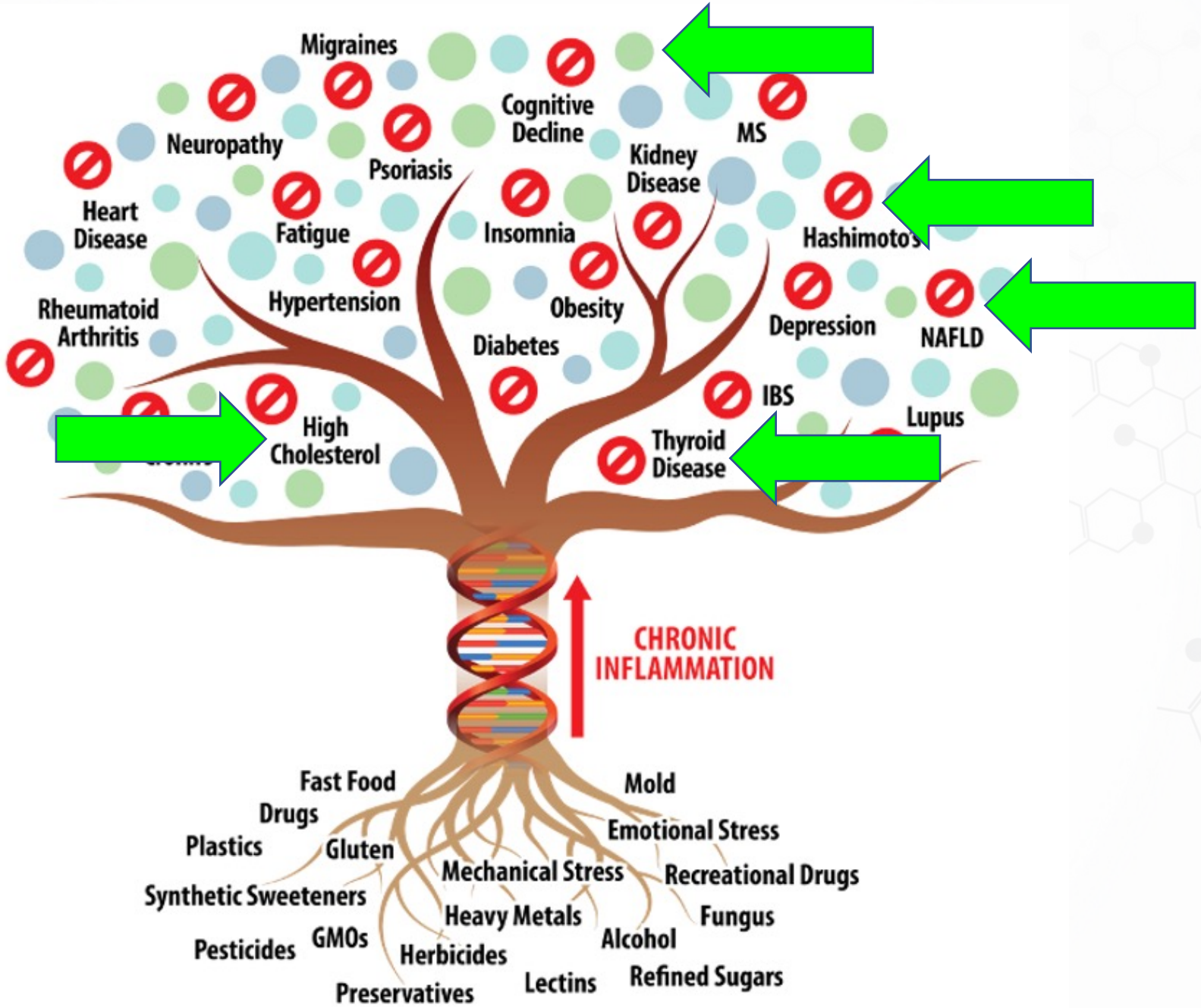
MHAs are metabolites of xylene (dimethylbenzenes). Xylenes are widely used as solvents in products including paints, detergents, pesticides, fuel, perfumes, and exhaust fumes. The main effect of inhaling xylene vapor is depression of the central nervous system (CNS), with symptoms such as headache, dizziness, nausea, and vomiting. Long-term exposure may lead to irritability, depression, insomnia, agitation, extreme tiredness, tremors, hearing loss, impaired concentration, and short-term memory loss. A condition called chronic solvent-induced encephalopathy, commonly known as "organic solvent syndrome" has been associated with xylene exposure.

Phthalate Metabolites

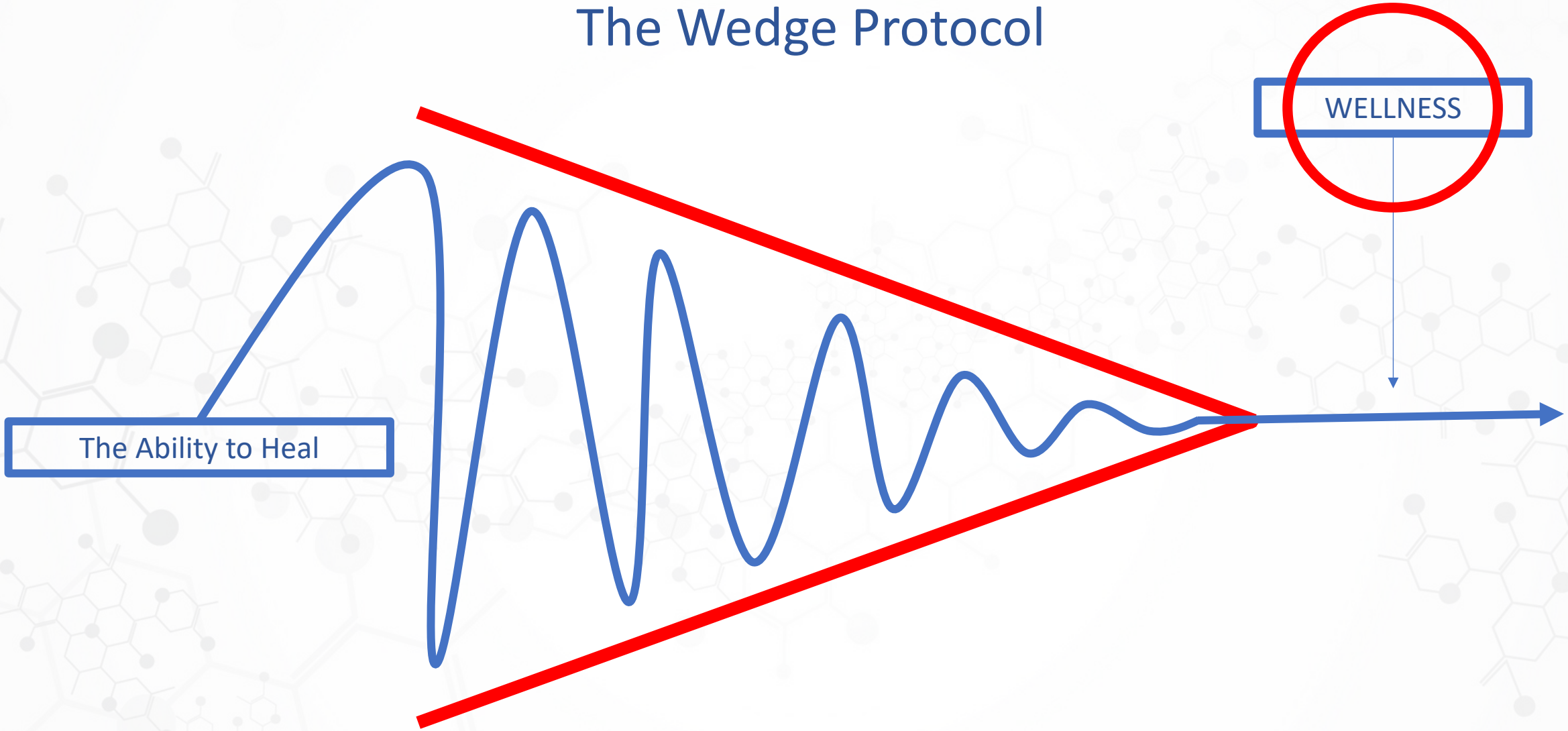
Test Name (mcg/g)	In Control	Moderate	High	Current Level	Previous Level
Monoethyl Phthalate (MEP)	≤5.90	5.91~678.89	≥678.90	3.23	
mono-2-ethylhexyl phthalate (MEHP)	≤5.00	5.01~23.89	≥23.90	3.97	
mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)	≤42.00	42.01~168.99	≥169.00	38.83	
mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)	≤20.00	20.01~109.99	≥110.00	67.55	
Mono-ethyl phthalate (MEtP)	≤305.00	305.01~1478.22	≥1478.23	8.78	

Comments

MEOHP is a metabolite of mono(2-ethylhexyl) phthalate (MEHP), which belongs to the most common environmental toxin phthalates. Phthalates, often known as plasticizers, are a group of chemicals used to make plastics more flexible and harder to break. They are widely used in cosmetics, adhesives, detergents, lubricating oils, automotive plastics, and plastic clothes. People are exposed to phthalates by eating or drinking contaminated foods but also by breathing in air that contains phthalate vapors or dusts. Inhaling phthalates can irritate the nose and throat causing coughing and wheezing, headache, dizziness, and nausea. Phthalates have been classified as endocrine disruptors which may cause reproductive damage, depressed leukocyte function, and even cancer. Phthalate exposure has also been associated with diabetes and insulin resistance, breast cancer, obesity, metabolic disorders, and immune disorders. Phthalate exposure and adverse child neurodevelopment, including the development of ADHD and autistic behaviors and lower cognitive and motor development, has also been reported.


Migraines
Neuropathy
Psoriasis
Cognitive Decline
MS
Kidney Disease
Heart Disease
Fatigue
Insomnia
Hashimoto's
Hypertension
Obesity
Depression
NAFLD
Rheumatoid Arthritis
Diabetes
IBS
High Cholesterol
Lupus
Thyroid Disease
CHRONIC INFLAMMATION
Fast Food
Mold
Drugs
Emotional Stress
Plastics
Gluten
Mechanical Stress
Recreational Drugs
Synthetic Sweeteners
Heavy Metals
Fungus
Pesticides
GMOs
Herbicides
Alcohol
Preservatives
Lectins
Refined Sugars

The Wedge Protocol



Biogenetix BioG-Max Resveratrol

Supplement Facts

Serving Size: 2 pumps (1mL)
Servings Per Container: 50

	Amount per Serving	% Daily Value
Resveratrol	15mg	†
Essential Phospholipids (from purified sunflower lecithin)	70mg	†

† Daily Value not established.

5 pumps, 2x daily // 2 pumps, 3x daily