**Cardiac Protocol**

**Cardiac At-A-Glance Supplement Considerations**

These recommendations are built upon the understanding that patient is taking **Edison Multivitamin** with its targeted key nutrient delivery.

**HbA1c**

**PRO Gluco Adjust**

3 pills per day to start with along with diet and lifestyle changes

* Chromium
* *Garcinia Cambogia*
* Gymnema sylvestre
* Bitter Melon Fruit (Momordica charantia)
* Fenugreek
* Alpha Lipoic Acid
* Vanadium (from vanadyl sulfate)

**hsCRP**

**E-FlamX**

2 to 4 pills per day depending on symptoms and severity of elevation

* Turmeric/Curcumin/Boswellia

**E3 Omega**

7 dropperfuls per day

* Fish Oil/Algae Oil (EPA/DHA/with D)

**Vitamin D**

**D3 (chewable Edison)**

½ to 1 chewable table per day

**Lipid Lowering**

**Niacin 500 (**Sustained-Release Niacin)

***Important:*** 1 pill in middle of large meal (to lessen niacin flushing) taken 1 to 3 times a day depending on severity of elevations of lipid levels

**PRO Gluco Adjust (Note: Add if Triglycerides elevated)**

3 pills per day to start with along with diet and lifestyle changes

**Adrenal Support**

**Adreno Care Plus**

2 pills 1 to 2 times a day at lowest cortisol levels

* Pantothenic Acid
* Cordyceps
* Eleuthro Extract
* Rhodiola Extract

**Stress Response**

1 pill 1 to 2 times a day for patients with high/high normal cortisol levels

* Relora + B Vitamins

Testing should determine the presence of any risk factors contributory to a higher risk of heart disease including high hemoglobin A1c (HbA1c), high-sensitivity C-reactive protein (hsCRP), and cholesterol/triglycerides/LDL/HDL and low levels of vitamin D. High cortisol levels can also be associated with heart disease. Supplement considerations should address any imbalances in these cardiac risk factors.

**Testing Considerations**

• **HbA1c** – High blood glucose levels associated with diabetes can damage the heart over time. In approximately 68% of individuals aged 65 or older who have diabetes, death occurs due to some form of heart disease.1 HbA1c is a measurement of blood glucose levels over time. Studies indicate high HbA1c levels are a cardiac risk factor. Andersson and colleagues found that in overweight cardiovascular patients with type-2 diabetes, higher HbA1c levels correlated with an increased likelihood of having adverse cardiovascular outcomes and all-cause mortality.2 In another study, higher HbA1c correlated with increased coronary artery disease risk.3

• **hsCRP** – hsCRP levels are an indicator of inflammation and aging (inflamm-aging). Elevated concentrations of CRP are a marker of damage to the lining of blood vessels. Chronic inflammation is associated with coronary artery disease risk, even more so than high cholesterol levels, as indicated in the book by Doctors Jonny Bowden and Stephen Sinatra, *The Great Cholesterol Myth*. As these doctors point out in their book and Harvard Medical School observed on its website, only half the people who have heart attacks have high LDL cholesterol.4 High levels of hsCRP are associated with an increased risk of heart disease,5 supporting the damaging role of inflammation in cardiac health. A hsCRP test can also determine if a patient who has already had a heart attack is likely to have another.6 People who have had a heart attack whose hsCRP level is high are more likely to have another heart attack compared with people whose hsCRP level is normal.6

It is important to keep in mind that hsCRP is a non-specific test, as inflammation in areas of the body other than the heart and vascular system may cause an elevated result.

**• Vitamin D** – A large amount of evidence indicates low vitamin D levels are a risk factor for heart attacks, congestive heart failure, peripheral arterial disease, strokes, high blood pressure, and cardiovascular-related conditions including diabetes.7-9 An analysis of NHANES III 1988 - 1994 found that low vitamin D levels correlated with cardiovascular disease (CVD).10 The Health Professionals Follow-Up Study, a prospective nested case-control study of 18,225 US men followed between 1993 and 1999, established a relationship between low vitamin D and an elevated risk of myocardial infarction (heart attack) compared with men who have sufficient 25-hydroxyvitamin D [25(OH)D].11

In the blood, measurements can be taken for 25-hydroxyvitamin D or 1,25-dihydroxyvitamin D. 25-hydroxyvitamin D is the primary form in the blood. It is an inactive precursor to 1,25-dihydroxyvitamin D, the active form. 25-hydroxyvitamin D has a long half-life and higher levels in the blood, so vitamin D testing usually measures this form of vitamin D.

**• Cholesterol/triglycerides/LDL/HDL Lipid Panel** – This is standard testing among conventional physicians to monitor a patient’s risk of heart disease. However, among integrative and naturopathic doctors, whether high cholesterol is indeed a cardiac risk factor is a controversial topic. As noted earlier, even Harvard Medical School points out that only half the people who have heart attacks have high low-density lipoprotein (LDL) cholesterol, which is considered the harmful form of cholesterol. However, in mapping out a patient’s overall cardiovascular health, a lipid panel can add to your knowledge base. From a conventional perspective, cholesterol is a risk factor for heart disease because excessive amounts of it can lead to fatty deposits on blood vessel walls. This obstructs blood flow through the arteries, which can lead to a heart attack. Cholesterol deposits on the vessels can also detach and lead to a blood clot that causes a heart attack or stroke.12

Lipid panels include measurements of high-density lipoprotein (HDL) cholesterol, generally considered a more beneficial form. The total cholesterol measurement in lipid panels reflects the combination of LDL, HDL, plus other cholesterol particle types. In interpreting the test, it is important to look at either the cholesterol ratio or the non-HDL cholesterol as these are a better indication of a patient’s lipid status than total cholesterol.13

Triglyceride testing is important because high triglyceride levels are often an indication of factors that contribute to heart disease such as metabolic syndrome or type 2 diabetes or prediabetes. High triglycerides can also paint a picture of the type of diet a patient is eating, since consuming lots of refined carbohydrates and sugars can lead to high triglyceride concentrations.14

**• Salivary Cortisol Test** – Both low and high levels of the stress hormone cortisol can lead to cardiac-related problems. High cortisol levels are associated with metabolic syndrome and abdominal fat, a major component of the metabolic syndrome.15 High cortisol also is linked to elevated CRP.16 Psychological stress is a contributor to high cortisol levels, and stress is an independent risk factor for heart disease.17,18 Additionally, stress leads to impaired sleep, which in turn is a heart disease risk factor. Low cortisol levels are also problematic as cortisol is released in response to inflammation. Therefore, low concentrations of cortisol impair the body’s ability to quench inflammation.Salivary cortisol measurement is considered superior to serum cortisol in evaluating adrenal function and is a non-invasive procedure.19

**Cardiac Protocol**

**Research Supporting Use of Recommended Supplements**

**HbA1C**

Chromium, *Garcinia Cambogia*, Gymnema sylvestre, Bitter Melon Fruit (Momordica charantia), Fenugreek, Alpha Lipoic Acid, Vanadium (from vanadyl sulfate)

Most of these ingredients have been found to lower HbA1C levels. For example, a four-month, controlled, single-blind, randomized study of 71 type 2 diabetes patients with high HbA1c found that HbA1c concentrations were significantly lower in the chromium group compared with controls.20 In an open label study, patients with type 2 diabetes were given 500 mg/day of Gymnema sylvestre for three months.21 The intervention group experienced reduced HbA1c, as well as improved fatigue, blood glucose, and lipid parameters. A randomized, double-blinded, placebo-controlled, clinical trial of 24 patients determined that2,000 mg/day of bitter melon fruit (Momordica charantia) for three months significantly reduced HbA1c and improved insulin secretion.22

Fenugreek also has beneficial effects in blood sugar support. In a triple-blind, randomized, controlled clinical trial of 88 type 2 diabetic (T2DM) patients, 10 grams/day of powdered whole fenugreek seeds for eight weeks led to a significant decline in HbA1c as well as serum insulin concentrations, homeostatic model assessment for insulin resistance, total cholesterol, and triglycerides.23

In a randomized, double-blind, placebo-controlled study, 38 patients with type 2 diabetes were given 300, 600, 900, and 1,200 mg/day of alpha-lipoic acid or a placebo for six months.24 Supplementation led to reductions in HbA1c and fasting plasma glucose.24 Furthermore, vanadyl sulfate supplementation at 150 mg or 300 mg/day has led to a significant decline in HbA1c and fasting glucose in patients with type 2 diabetes.25

**hsCRP**

Turmeric/Curcumin, Boswellia, Fish Oil

Curcumin, the primary active component in the spice turmeric, is well studied for its anti-inflammatory properties. In one of the many double-blind randomized clinical trials on this botanical, a dose of 1,500 mg/day lowered hsCRP and triglycerides in type 2 diabetic patients.26

In rodents, when curcumin was combined with boswellia, it produced a more healthy inflammatory response with reductions in CRP, as well as other inflammation markers.27

Fish oil is another supplement studied for its effects on CRP. One of the many studies on the topic found a combination of EPA and DHA polyunsaturated fatty acids lowered hsCRP in 201 middle-aged and elderly Chinese people.28 In this study, fish oil supplementation for 12 weeks also lowered triglycerides and fasting glucose and raised HDL cholesterol.

**Vitamin D**

Vitamin D3 + K2

If testing reveals low vitamin D levels, vitamin D3 in the amount of 2,000 to 4,000 IU per day should be added to a patient’s regimen. In rare individuals, high vitamin D3 supplementation can lead to a buildup of calcium in the blood, therefore it is prudent to test patients’ vitamin D levels after 3 and 6 months of supplementation and then once yearly. Vitamin K2 is also critical for cardiac health and should be used in conjunction with vitamin D. Vitamin K2 can reduce arterial stiffness,29improve mitochondrial function,30 and lead to a 12% increase in maximal cardiac output during exercise.30

**Lowering LDL, non-HDL cholesterol, and Triglycerides**

Sustained-Release Niacin

Sustained-release niacin is an effective way to support healthy cholesterol without the “niacin flush” that occurs with the immediate-release form. Clinically, it has been used extensively for this purpose.

An example of a study investigating its effects was a randomized, double-blind, placebo-controlled, crossover trial of 85 participants with hypercholesterolemia greater than 5.82 mmol/L (225 mg/dL).31 For eight weeks, the subjects consumed an American Heart Association Step I Diet then were randomized into either a group receiving 1,500 mg/day sustained-release niacin or a placebo for two months. At the end of that time, the subjects were crossed over to the opposite group for two months followed by another two-month period where all the subjects took 2,000 mg/day of sustained-release niacin. Supplementation with either dose of the sustained-release niacin led to reductions in total serum cholesterol, low-density lipoprotein cholesterol, triglycerides, and lipoprotein(a), a marker of heart disease risk. In addition, HDL cholesterol levels increased.

High doses of niacin can cause an elevation in liver enzymes in some people, so testing of this parameter is warranted in patients supplementing with this nutrient.

**Cortisol Imbalances and Adrenal Support**

*Rhodiola*,*Eleutherococcus*, *Cordyceps,* *Magnolia,* *Phellodendron*

Adaptogens are botanical substances that protect the adrenal glands, balance cortisol levels, and protect the body from stress. Some of the most effect adaptogens in regards to reducing cortisol are *Rhodiola rosea*, *Magnolia officinalis* and Phellodendron amurense (Relora®).32-37 *Eleutherococcus senticosus*has been shown to both raise or lower cortisol levels, indicating there is “a threshold of stress below which ES [*Eleutherococcus senticosus*]increases the stress response and above which ES decreases the stress response.”38

Panax ginseng and *Bupleurum falcatum* also are known for their stress-relieving properties.39,40

**Diet**

Consuming a diet low in sugar and refined carbohydrates can maintain healthy triglyceride and HbA1c levels. Eating more fiber can also lower triglycerides and cholesterol. Consumption of fish high in omega-3 fatty acids such as salmon can improve hsCRP.

**Exercise**

Regular exercise is known to reduce the risk of heart disease and to eliminate risk factors for heart disease such as high blood pressure.41 Some studies indicate frequent exercise is associated with improved HDL cholesterol.42

**Lifestyle**

Recommend stress-reduction practices such as meditation/prayer and yoga. Also urge patients to receive seven to eight hours of sleep each night.

**References:**

1. American Heart Association. Cardiovascular disease and diabetes. https://www.heart.org/en/health-topics/diabetes/why-diabetes-matters/cardiovascular-disease--diabetes Accessed August 22, 2019.
2. Andersson C, et al. Relationship between HbA1c levels and risk of cardiovascular adverse outcomes and all-cause mortality in overweight and obese cardiovascular high-risk women and men with type 2 diabetes.Diabetologia. 2012 Sep;55(9):2348-55.
3. Au Yeung SL, et al. The Impact of Glycated Hemoglobin (HbA1c) on Cardiovascular Disease Risk: A Mendelian Randomization Study Using UK Biobank.Diabetes Care. 2018 Sep;41(9):1991-7.
4. Harvard Health Publishing. Harvard Medical School. C-Reactive Protein test to screen for heart disease: Why do we need another test? <https://www.health.harvard.edu/heart-health/c-reactive-protein-test-to-screen-for-heart-disease> Published: June, 2009, Updated: March 21, 2017, Accessed August 22, 2019.
5. Cozlea DL, et al. The Impact of C Reactive Protein on Global Cardiovascular Risk on Patients with Coronary Artery Disease. Current Health Sciences Journal. 2013 Oct Dec;39(4):225-31.
6. Mayo Clinic. C-reactive protein test. <https://www.mayoclinic.org/tests-procedures/c-reactive-protein-test/about/pac-20385228> Accessed August 22, 2019
7. Johns Hopkins Medicine. <https://www.hopkinsmedicine.org/heart_vascular_institute/clinical_services/centers_excellence/womens_cardiovascular_health_center/patient_information/health_topics/vitamin_d_and_the_heart.html> Accessed August 22, 2019
8. Danik JS, Manson JE. Vitamin D and Cardiovascular Disease. Curr Treat Options Cardiovasc Med. 2012 August;14(4):414-24.
9. Kheiri B, et al. Vitamin D deficiency and risk of cardiovascular diseases: a narrative review**.** Clin Hypertens. 2018 Jun 22;24:9.
10. Kendrick J, et al. 25-Hydroxyvitamin D deficiency is independently associated with cardiovascular disease in the Third National Health and Nutrition Examination Survey. Atherosclerosis. 2009 Jul;205(1):255-60.
11. Giovannucci E, et al. 25-hydroxyvitamin D and risk of myocardial infarction in men: a prospective study.Arch Intern Med. 2008 Jun 9;168(11):1174-80.
12. High cholesterol. Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/high-blood-cholesterol/symptoms-causes/syc-20350800> Accessed August 22, 2019.
13. Cholesterol ratio or non-HDL cholesterol: Which is most important? Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/high-blood-cholesterol/expert-answers/cholesterol-ratio/faq-20058006> Accessed August 22, 2019.
14. Francisco Lopez-Jimenez, M.D. Mayo Clinic Staff. Triglycerides: Why do they matter? https://www.mayoclinic.org/diseases-conditions/high-blood-cholesterol/in-depth/triglycerides/art-20048186 Accessed August 22, 2019.
15. Epel ES, et al. Stress and body shape: stress-induced cortisol secretion is consistently greateramong women with central fat.Psychosom Med. 2000 Sep-Oct;62(5):623-32.
16. de Punder K, et al. Association between chronotype and body mass index: The role of C-reactive protein and the cortisol response to stress.Psychoneuroendocrinology. 2019 Jul 24;109:104388. [Epub ahead of print.]
17. Pimple P, et al.Psychological Distress and Subsequent Cardiovascular Events in Individuals With Coronary Artery Disease.J Am Heart Assoc. 2019 May 7;8(9):e011866.
18. Dyball D, et al. The association between PTSD and cardiovascular disease and its risk factors in male veterans of the Iraq/Afghanistan conflicts: a systematic review.Int Rev Psychiatry. 2019 Feb;31(1):34-48.
19. Vining RF, et al. Salivary cortisol: a better measure of adrenal cortical function than serumcortisol.Ann Clin Biochem. 1983 Nov;20 (Pt 6):329-35.
20. Paiva AN, et al. Beneficial effects of oral chromium picolinate supplementation on glycemic control in patients with type 2 diabetes: A randomized clinical study.J Trace Elem Med Biol. 2015 Oct;32:66-72.
21. Kumar SN, et al. An open label study on the supplementation of Gymnema sylvestre in type 2 diabetics.J Diet Suppl. 2010 Sep;7(3):273-82.
22. Cortez-Navarrete M, et al. Momordica charantia Administration Improves Insulin Secretion in Type 2 Diabetes Mellitus.J Med Food. 2018 Jul;21(7):672-7.
23. Rafraf M, et al. Effect of Fenugreek Seeds on Serum Metabolic Factors and Adiponectin Levels in Type 2 Diabetic Patients.Int J Vitam Nutr Res. 2014;84(3-4):196-205.
24. Porasuphatana S, et al. Glycemic and oxidative status of patients with type 2 diabetes mellitus following oral administration of alpha-lipoic acid: a randomized double-blinded placebo-controlled study.Asia Pac J Clin Nutr. 2012;21(1):12-21.
25. Goldfine AB, et al. Metabolic effects of vanadyl sulfate in humans with non-insulin-dependent diabetes mellitus: in vivo and in vitro studies.Metabolism. 2000 Mar;49(3):400-10.
26. Adibian M, et al. The effects of curcumin supplementation on high-sensitivity C-reactive protein, serum adiponectin, and lipid profile in patients with type 2 diabetes: A randomized, double-blind, placebo-controlled trial.Phytother Res. 2019 May;33(5):1374-83.
27. Khayyal MT, et al. Micellar solubilisation enhances the antiinflammatory activities of curcumin and boswellic acids in rats with adjuvant-induced arthritis.Nutrition. 2018 Oct;54:189-96.
28. Song J, et al. Dose-dependent effects of fish oil on cardio-metabolic biomarkers in healthy middle-aged and elderly Chinese people: a double-blind randomized controlled trial.Food Funct. 2018 Jun 20;9(6):3235-43.
29. Mansour AG, et al. Vitamin K2 supplementation and arterial stiffness among renal transplant recipients-a single-arm, single-center clinical trial. J Am Soc Hypertens. 2017 Sep;11(9):589-97.
30. McFarlin BK, et al. Oral Consumption of Vitamin K2 for 8 Weeks Associated With Increased Maximal Cardiac Output During Exercise.Altern Ther Health Med. 2017 Jul;23(4):26-32.
31. Aronov DM, et al. Clinical trial of wax-matrix sustained-release niacin in a Russian population with hypercholesterolemia.Arch Fam Med. 1996 Nov-Dec;5(10):567-75.
32. Li J, et al. Effect of Schisandra chinensis on interleukins, glucose metabolism, and pituitary-adrenal and gonadal axis in rats under strenuous swimming exercise.Chin J Integr Med. 2015 Jan;21(1):43-8.
33. Benson S, et al. An acute, double-blind, placebo-controlled cross-over study of 320 mg and 640 mg doses of Bacopa monnieri (CDRI 08) on multitasking stress reactivity and mood.Phytother Res. 2014 Apr;28(4):551-9.
34. Talbott SM, et al. Effect of Magnolia officinalis and Phellodendron amurense (Relora®) on cortisoland psychological mood state in moderately stressed subjects.J Int Soc Sports Nutr. 2013 Aug 7;10(1):37.
35. Du J, et al. Effect of Herba Epimedil Brevicornus and prepared Radix Rehmannia on glucocorticoid receptor in glucocorticoid receptor down-regulated rats. [Article in Chinese, Abstract in English.] Zhongguo Zhong Xi Yi Jie He Za Zhi. 2008 Jan;28(1):64-7.
36. Olsson EM, et al. A randomised, double-blind, placebo-controlled, parallel-group study of the standardised extract shr-5 of the roots of Rhodiola rosea in the treatment of subjects with stress-related fatigue.Planta Med. 2009 Feb;75(2):105-12.
37. Choudhary D, et al. Body Weight Management in Adults Under Chronic Stress Through Treatment With Ashwagandha Root Extract: A Double-Blind, Randomized, Placebo-Controlled Trial.J Evid Based Complementary Altern Med. 2017 Jan;22(1):96-106.
38. Gaffney BT, et al. The effects of Eleutherococcus senticosus and Panax ginseng on steroidal hormone indices of stress and lymphocyte subset numbers in endurance athletes.Life Sci. 2001 Dec 14;70(4):431-42.
39. Kim HG, et al. Antifatigue effects of Panax ginseng C.A. Meyer: a randomised, double-blind, placebo-controlled trial. PLoS One. 2013 Apr 17;8(4):e61271.
40. Lee B, et al. Bupleurum falcatum prevents depression and anxiety-like behaviors in rats exposed to repeated restraint stress. J Microbiol Biotechnol. 2012 Mar;22(3):422-30.
41. Gorostegi-Anduaga I, et al. Effects on Cardiovascular Risk Scores and Vascular Age After Aerobic Exerciseand Nutritional Intervention in Sedentary and Overweight/Obese Adults with Primary Hypertension: The EXERDIET-HTA Randomized Trial Study.High Blood Press Cardiovasc Prev. 2018 Dec;25(4):361-8.
42. Woudberg NJ, et al. Exercise intervention alters HDL subclass distribution and function in obese women. Lipids Health Dis. 2018 Oct 10;17(1):232.