The Role of Nutritional and Botanical Agents in the Management of Type II Diabetes Mellitus

Featuring "Diamend"—The Best Diabetes Product

Diabetes is reaching an epidemic level not only in the US, but also world-wide. There are 26 million patients diagnosed diabetic in the US, and 87 million who are pre-diabetic; essentially, one out of every three people in the US are - or are becoming - diabetic. If nothing changes the CDC predicts that by 2050, 50% of Americans will be diabetic. Worldwide, there are 350 million diabetic patients, with a concentration in areas of higher economic status and greater urbanization areas. 90-95% of diabetic patients are Type 2, and the number diagnosed in the childhood or teenage years is also increasing. World-wide occurrence of the auto-immune Type 1 diabetes is also increasing.

The etiological factors for developing Type 2 diabetes are multifactorial. They include: excess intake of refined sugar; excess intake of saturated fat; overeating; abdominal weight gain; lack of exercise; environmental toxins (mercury lead, arsenic, bisphenol A, persistent organic pollutants); nutrient deficiencies; genetics; gut dysbiosis; and hormone dysregulation. Insulin resistance is the key metabolic abnormality in Type 2 diabetic patients, resulting in increased appetite, elevated glucose levels, higher BMIs, higher insulin secretion, and mixed hyperlipidemia.

There are many complications associated with being a prediabetic or diabetic patient, as a result of increased glucose and lack of antioxidants that lead to increased oxidation reactions. Diabetic damage occurs because of increased reactive oxygen species, such as superoxide anion radicals, hydroxyl radicals, peroxynitrite radicals, and lipid peroxidation. Diabetic patients have an increased risk of cardiovascular disease, eye problems (such as retinopathy and cataracts), nephropathy, and neuropathy. Physiologically this is because those body cells do not require insulin, and so cannot screen out excess glucose by becoming insulin resistant, as can fat and liver cells. Therefore, because eye, renal, nerve and endothelial cells absorb glucose at the level it is in the serum, a great deal of oxidative damage occurs to the cells and they can suffer devastating complications. Death from diabetes is usually caused by a heart attack or stroke. Diabetic patients have the highest occurrence of adult blindness, and are the highest population developing End Stage Renal Disease, and non-traumatic limb amputations.

Standard conventional care of diabetic patients includes medications, beneficial lifestyle changes and associated medications. There are the oral hypoglycemic medications: Metformin, sulphonylureas, DPP-IV inhibitors, SGLT2 sodium-glucose transporter, and the thiazolidinediones. There are also diabetic injections: GLP-1 drugs, and the various forms of basal and bolus insulin. Outside of the focus on medication, standard care encourages patients to stop smoking, lose weight, have good stress management, and eat healthier although many patients are not given specific directives or counseling in those regards.

There are three basic treatment goals for US diabetic patients—A1C <7%; Blood pressure ≤ 130/80 mm/hg, and cholesterol <200 and LDL <100. These goals are in accord with The UKPDS and DCCT studies, which proved that the lower the A1Cs of a patient, the less complications developed. A JAMA study showed an A1C over 5.5 indicates that the glucose level in the patient is causing damage to their body. Diabetic

patients can often require 3-4 separate hypertensive agents to bring their BPs down to a safe level. On top of that, the CDC shows that 68% of Americans are either overweight or obese, and central, abdominal weight is a key factor in insulin resistance. Even so, standard care is failing to control this disease worldwide. A WHO bulletin of 2011 unfortunately, stated that 90% of American patients do not meet those three treatment goals.

Approaches using micronutrients and botanical agents have been shown in numerous clinical studies to afford the best chances of obtaining those treatment goals without risking the sometimes problematic side-effects of hypoglycemia from overmedication of glucose-lowering agents.

A low carbohydrate diet is recommended for T2DM patients. The Nutrition and Metabolism Society devotes their entire dietary research to showing that low-carb diets are not just appropriate to T2DM, but also extremely safe and effective at lowering glucose levels, decreasing insulin resistance, enhancing appetite control, promoting weight loss, as well as normalizing lipid panels. Exercise - including aerobic, resistance, and high intensity interval training - needs to be offered in ways which self-motivate patients to perform them regularly. Sleep studies to rule out apnea are vital and sleep needs to be from 6-9 hours to promote appropriate regulation of leptin and ghrelin. Diet diaries, nutrient status measurements, hormonal evaluation, gut dysbiosis, and environmental xenobiotic burdens can all serve as extremely meaningful tests to help discern all possible etiologies for T2DM development. Last, adding in dietary and botanical supplements has been shown in studies to be very effective in helping the body lower glucose levels, lower lipid levels, decrease blood pressure, prevent and reverse diabetic complications.

Focusing on supplementation, some of the most studied, most efficacious, and most beneficial supplements, **which are all in "Diamend"**, include:

1. **Zinc**—Needed to produce, secrete and activate insulin receptors on the cell, studies have shown that adding zinc to diabetic patients can be helpful. Hyperglycemia can cause pathological losses of zinc in the urine. Zinc also has an antioxidant effect on cells in diabetic patients.

2. **Chromium polynicotinate**—Chromium has a vital role in binding to the insulin receptor to activate it on body cells, reducing insulin resistance. In many studies chromium as a supplement has been shown to lower glucose levels, lipids, A1C, and insulin in diabetic patients.

3. **Gymnema sylvestre**—Known as Gurmur, or "sugar destroyer" in Ayurvedic medicine, Gymnema has been consistent in showing it's benefits in patients with diabetes. Studies on the herb has shown it may be helpful in lowering glucose levels. It was shown to regenerate pancreatic tissues allowing more insulin to be produced, and help regulate insulin secretion. It also increases the utilization of glucose at the cell, via reducing insulin resistance, and can help decrease appetite and reduce sugar cravings.

4. **Cinnamon**—Studies continue on cinnamon, and have have shown that cinnamon lowers stomach emptying times and post-prandial glucose levels; it reduces glucose in T2DM patients who had poor diabetic control. It has also shown to be helpful in lowering insulin levels, blood pressure, and the

hemoglobin A1C. This is a safe herb. Cinnamon Cassia (AKA Cinnamonum burmanii) is the type of cinnamon with the best effect on patients.

5. **Berberine HCL**—A leading study on humans showed that Berberine HCL equaled the effects of Metformin on diabetic patients. In the pilot study, the A1C, fasting and post-prandial glucose, plasma triglycerides, cholesterol and LDL, and fasting glucose and HOMAR were reduced, as well as body weight. Berberine is also a liver protectant and activates AMP protein kinase at the cell which promotes GLUT 4 translocation which allow more glucose to be absorbed from cells. This is very significant and berberine is an important component in diabetic supplements, due to its efficacy and its safety profile.

6. **R-ALA**—Alpha lipoic acid has numerous benefits to the diabetic patient. It is both a water- and fat-soluble antioxidant, and has shown to protect patients with fatty liver from liver disease progression. It can help insulin resistance and has been shown to protect diabetics from developing complications in their nerves, eyes, and kidneys. It is very safe. The R isomer is the only active isomer in the body, and since it can now be stabilized, should be the form recommended to patients, instead of regular lipoic acid where half the isomers are the non helpful "s" isomer.

7. **Taurine**—Taurine is an inexpensive amino acid, underused as a diabetic treatment. Taurine has been found to be a potent hypoglycemic agent, and it can also enhance the effect of insulin. One study showed giving taurine to diabetic patients for a month required a reduction in their insulin dosing, to avoid taurine-induced hypoglycemia. It was also noted that patients had reductions in cholesterol and triglycerides as well. Taurine is found naturally in the eye tissue and heart tissue and is protective of oxidative damage in both.

8. **Benfotiamine**—Also known as allithiamine, this fat soluble form of thiamine has been shown in studies to be very capable at reducing the formation of Advanced Glycosylated End-products (AGEs) which are well known to lead to the development of diabetic complications. Benfotiamine increases the production of Thiamine Pyrophosphate, which increases transketolase activity; transketolase blocks glucose induced damage by preventing AGE formation. Since AGE formation promotes oxidative damage throughout the body, benfotiamine has been shown to treat and improve retinopathy, nephropathy and neuropathy

9. **Bilberry extract**—Bilberry extract is rich in bioflavonoids and anthocyanosides, and has a specific affinity for the eyes. In a rat study it was shown that ingesting bilberry extract reduce hyperglycemia and insulin sensitivity via activation of AMP-activated protein kinase. In several studies, Bilberry was analyzed in T2DM patients with retinopathy and it was found to induce a clear improvement in their retinopathy, with marked reduction or disappearance of retinal hemorrhages. It may also be beneficial in improving microcirculation and lowering glucose levels. As retinopathy is a leading complication in diabetic patients, and diabetes is the main cause of adult blindness, this study is remarkably important.

10. **Green Tea leaf extract**—Green tea contains the catechin EGCG which has been shown in numerous studies to be a safe and effective antioxidant. It has been shown to improve glucose tolerance in patients. In a study in Japan, green tea was shown to reduce the risk for T2DM onset. Green tea was shown to

decrease hepatic glucose production and over-secretion of glucose from the liver is a continual problem causing hyperglycemia in T2DM patients. Green tea has also been shown to be an effective anti-angiogenesis factor which may have a significant effect on preventing retinopathy. It has also shown to promote fat oxidation and thermogenesis.

11. **Curcumin extract**—Curcumin seems to have multiple benefits in diabetes. It has been shown to be a marked inhibitor of reactive oxygen species, which interferes with Protein Kinase C, thus providing a benefit in diabetes protection and the prevention of complications. It was shown to reduce progression in NAFLD patients, reduce renal lesions, reduce broad oxidative damage, and reduce cytokine expression. Curcumin prevented retinopathy in streptozotocin-induced rats

12. **Gingko biloba**—This plant has been associated with reducing the risk of dementia and cognitive decline, but it has also been shown in human studies to reduce fibrinogen levels, and improved retinal capillary blood rate in T2DM patients with retinopathy. It was shown to protect diabetic kidneys in animal studies. Gingko has also been shown to inhibit or reduce functional and morphological retina impairments. It was shown to reduce platelet aggregation in T2DM patients, too.

13. **Vanadium**—This mineral has been shown to be an insulin mimetic, reducing insulin resistance. In numerous studies of the diabetic rat, vanadium has been shown to reduce elevated glucose and lipids. The best absorbed form of vanadium is Bis(maltolato)oxovanadium IV (BMOV)—it is 2-3x more potent than vanadyl sulfate and has shown less toxicity.

14. **Resveratrol** is a bioflavonoid that has been shown in diabetic studies to protect pancreatic cells, reduce inflammatory cytokines, and increase antioxidants. It may also help improve insulin's actions, lower levels of glucose, A1C and insulin. It was also shown to help decrease body weight, systolic BP and cholesterol and triglycerides.

Using a comprehensive alternative medicine treatment protocol, many diabetic patients can avoid using medications and even attain reversal of their diabetic condition so they have well controlled A1C levels, and also lower lipids, lose weight, have better energy, and well regulated serum glucose readings. Diabetes is a condition which does not have to lead to progressive complications and early death from cardiovascular disease. It is preventable, treatable and reversible when treated by astute physicians addressing all the obstacles to cures and setting up a winning treatment plan with their patients. "**Diamend**" will be an excellent addition to any diabetic protocol.