APPENDICES A

In aging adults, dietary choices are one of the key components of insulin resistance. The rising rates of T2D in the elderly worldwide is thought to be caused by a sedentary lifestyle, and excessive consumption of processed foods high in sugar, animal fat, and refined grains [4]. It has been demonstrated that dietary changes may be significantly effective in preventing, treating, and even reversing T2D [5,6]. Dietary improvement targets the root causes of T2D and reduce the need of medication, particularly in the elderly [7]. A plant based whole food diet rich in greens, specific fruits, nuts, and seeds is protective against T2D [8]. T2D 6.9 diet plan has been specifically developed to reverse early-stage T2D with HbA1c up to 6.9 using scientific evidence to design a dietary plan that is easy to produce, duplicate and easy to follow.

First when awake drink a juice of 1 lemon with 1oz spring water room temperature.

6.30 am Breakfast: 1 Enzymes, Take 1 Enzyme. Green Smoothie: 2 scoops Hemp protein blended with 1 Tbsp. almond butter, 1 Tbsp. walnut butter, 1 banana, ½ avocado, 1 Tbsp. ground flax seeds, 1 Tbsp. ground sesame seeds, 1 Tbsp. raw coconut oil, 1tsp cinnamon, spring water. Then take 2 Tbsp. Multivitamin, 1 Evening Primrose, 1 lipoic acid, 1 Vitamin B, 3 full dropper Magnesium mix in 2oz water, 2 Probiotic, 1 Zinc, 1 Cranberry pill, 8oz spring water

12.30pm Lunch: 1 Enzymes, Take 1 Enzyme. Green Smoothie: 2 scoops Hemp protein blended with 1 Tbsp. almond butter, 1 Tbsp. walnut butter, 1 banana, ½ avocado, 1 Tbsp. ground flax seeds, 1 Tbsp. ground sesame seeds, 1 Tbsp. raw coconut oil, 1tsp cinnamon, spring water. Then take 2 Tbsp. Multivitamin, 1 Evening Primrose, 1 lipoic acid, 1 Vitamin B, 3 full dropper Magnesium mix in 2oz water, 2 Probiotic, 1 Cranberry pill, 8oz spring water.

6.00 pm Dinner: 1 Enzyme, Large mixed salad: Romaine lettuce, 1 Persian Cucumber sliced,
1 Carrot shredded, 1 diced tomato, ½ avocado diced, olives, crushed walnuts and sunflower seeds with sardines in tomato sauce or tuna in water. Dressing: (extra virgin cold pressed olive oil, fresh lemon juice, Himalayan or Celtic or sea salt, ground ginger). Then take: 2 Tbsp Multivitamin, 1 Evening Primrose, 1 lipoic acid, 1 Vitamin B, 2 Probiotic, 1 Cranberry pill, 1 tsp garlic, 8oz spring water.

8.30 pm Snack: 1 Evening primrose, 1 tsp turmeric, 1 tsp garlic,

Suggested Supplements Program:
Liquid Multivitamin/Mineral (ALIVE) (Nature's way)
Enzymes Digest Extra (Vitamin Shoppe)
Super Omega 3 (Carlson Laboratories)
Evening Primrose (Solgar) 1300 mg,
Zinc 50 mg (Solgar)
Liquid Ionic Magnesium (Trace Minerals Research)
Probiotic 25 Billion (Now)
Alpha lipoic acid 100 mg Jarrow Formula
Cranberry pill 1000 mg, gelatin free
Nutiva Organic Hemp Protein powder

Suggested Exercise Program: Walk for 30 min after dinner

Monitor blood sugar twice a day when you wake up fasting and 2 hours after meal

Plant protein: Hemp protein powder

An epidemiological study demonstrated that plant protein consumption was highly and inversely associated with T2D [9]. Another study found that hempseed proteins markedly increased proprotein convertase (PCSK9) protein levels, thus, mimicking the activity of statins, and decreasing cholesterol production and increasing LDL-R and PCSK9 protein levels. Also, edestin 2, a protein in hempseed is antagonist to the angiotensin-converting enzyme ACE as well

as a glucose uptake activity [10]. A systematic review and meta-analysis of randomized controlled trials showed that daily consumption of plant protein significantly decreased fasting glucose and fasting insulin in individuals with T2D [11].

Almonds: Almond butter

12-week randomized crossover clinical trial showed that consumption 0f 2oz of almonds daily increased dietary intakes of PUFA, MUFA, fiber, magnesium and vitamin E. It decreased total cholesterol by 6%, LDL by 11.6%, and LDL to HDL ratio by 9.7%. It decreased apolipoprotein (apo) B levels by 15.6%, apo B/apo A-1 ratio by 17.4%. It decreased fasting insulin by 4.1%, fasting glucose by 0.8% and homeostasis model assessment of insulin resistance index by 9.2% [12]. Another study concluded that almonds not only lower serum cholesterol levels, but also decrease the postprandial blood glucose response [13].

Walnuts: Walnut butter

A RCT demonstrated that consumption of 1oz of walnuts daily for six weeks increased insulin response by 26%, and decreased HbA1c from 5.7 to 5.5 [14]. Another RCT concluded that consumption of 10z of walnuts significantly reduced fasting insulin [15]. A *National Health and Nutrition Examination Survey* data from the years 1999 through 2014 on T2D risk reported that increase of walnut consumption was associated with a 12% decrease in T2D [16].

Banana: Ripe, under ripe or green

Bananas give the smoothies a rich and creamy texture, making it palatable to individuals not used to real food taste. Depending on the situation and how fast patients intend to regulate their blood sugar, different ripeness stages may be used to get faster results. A study showed that a 4oz under-ripe banana raised postprandial blood glucose response by only 62 points, and a ripe banana by 106 points, while 4oz of white bread caused 181 point surge [17]. A randomized controlled trial demonstrated that daily consumption of green banana, which is composed of resistant starches, significantly decreased HbA1c, fasting glucose, diastolic blood pressure, body weight, BMI, waist and hip circumferences, fat mass percentage, and increased lean mass percentage, in both pre-diabetic and diabetic patients [18]. As the patient postprandial blood glucose response diminishes to normal range, they can increase the banana's ripeness.

Avocado: Ripe

A randomized crossover study concluded that a diet rich in monounsaturated fat enriched with avocado for T2D patients improved lipid profile and controlled blood glucose offering good alternative management to T2D [19]. Another meta-analysis study showed that consuming diets high in monounsaturated fat improved MetS factors among T2D patients [20].

Flaxseed: Ground flaxseeds

Flax lignan complex and secoisolariciresinol diglucoside (SDG) in flaxseed play a significant role in making it a potent antioxidant, hypolipidemic, and hypoglycemic. SDG therapy decreased the condition of diabetes using serum glucose levels by 75% in the streptozotocin model of diabetes and by 72% in the BBdp rat model of diabetes [21]. An open label study showed that daily consumption of 10 g of ground flaxseed for 4 weeks in patients with T2D decreased fasting glucose by 19.7% and HbA1c by 15.6%. Total cholesterol decreased by14.3%, triglycerides by 17.5%, LDL by 21.8%, and apolipoprotein B and an increase I HDL by 11.9% [22].

Sesame seeds: Ground white sesame seeds

A randomized controlled trial found that 90 days of consumption of white sesame seeds oil reduced fasting glucose from 187 to 137 mg/dl, significantly lowered HbA1c, and improved liver and kidney function [23]. Another study on rodents concluded that sesame oil daily intake significantly reduced blood glucose, HbA1c, lipid peroxidation, and antioxidant levels in diabetic rodents [24].

Coconut oil: Virgin, cold processed coconut oil

Coconut oil is a natural antioxidant, it is a rich source of capric acid, caproic acid, lauric acid, and tocotrienols, which all are natural antioxidants. These elements protect the body from free radicals damage which play a primary role in T2D, aging, atherosclerosis, and cancer [25]. Small scale research indicates that coconut oil can support decreasing insulin resistance, and waist circumference [26]. Coconut oil also has a higher amount of polyphenolic antioxidants which many studies have shown polyphenols antidiabetic and insulin sensitizing effects. Studies in animals, concluded that virgin coconut oil prevent the development of insulin resistance and hyperglycemia [27].

Cinnamon: Cassia cinnamon powder

A randomized clinical trial using 1, 3, or 6 g of cassia cinnamon (cinnamon bark) per day found that after 40 days of daily consumption in T2D patients, all 3 levels of cinnamon decreased fasting glucose by 18% to 29%, triglyceride 23 to 30%, LDL cholesterol 7% to 27%, and total cholesterol 12% to 26% [29].

Large Mixed Salad

Studies show that high consumption of vegetables that contain good sources of fiber, antioxidants, polyphenols are protective and prevent the development of type 2 diabetes [30]. Another study showed that high consumption of certain raw fruits and vegetables reduced blood glucose levels both fasting and post-prandial, and also reduced the insulin dependency for most of the patients participating in the study by at least 50% [31].

Fish: Salmon, mackerel, tuna, and sardines

Fish is an excellent substitute for meat. It contains less fat. Fish like sardines, mackerel and wild caught salmon are rich source of omega 3 fatty acids. Fish and its oil has been shown to have antithrombotic and anti-atherosclerotic properties since it inhibits thromboxane A2 synthesis and suppresses cellular proliferation responsible for the development of atherosclerosis [32]. The association between fish intake and asymptomatic carotid atherosclerosis has been investigated in a cross sectional study, which found that high fish ingestion was linked with a reduced prevalence of asymptomatic carotid atherosclerosis [33]. Two village populations in Japan a fishing village and a farming village were examined for atherosclerotic plaques which was obtained through an ultrasonography. The examination showed that all different measures that define atherosclerosis are lower in the fishing village in both women and men. It showed a drastic 5 to 8-fold difference in the number of atherosclerotic plaques between the two villages. The omega 3 evaluation showed an inverse association with the amount of plaques, and omega 6 showed a weak positive [34]. Even 1 to 2 servings of tuna or dark fish per week was associated with a significantly decreased development of coronary artery atherosclerosis in women with coronary artery disease [35].

Supplements: Liquid Multivitamin/Mineral (Alive) (Natura's Way)

A study showed that supplementing with a multivitamin, multimineral, and vitamin D significantly decreased HbA1c and hs-CRP [36]. Another study noticed that to avoid deficiencies and maintain homeostasis, the majority of diabetic patients should be taking daily vitamins and minerals [37].

Supplements: Probiotics 25 billion (Now)

Diabetes has been associated with poor gut flora; supplementing with probiotics insure a balanced gut flora. Studies have shown that probiotics significantly decreased glucose levels and decreased HbA1c, and that probiotics supplementation significantly decreased FPG, HbA1c, insulin, and HOMA-IR in diabetic patients [38]. A recent study showed various concentrations of "*L. acidophilus*, *L. casei*, *L. rhamnosus*, *L. bulgaricus*, *B. breve*, *B. longum*, and *Streptococcus thermophilus* strains along with fructo-oligosaccharide for 8 weeks significantly decreased fasting glucose in T2D patients, and significantly improved the level of glutathione and the antioxidant status in T2D patients [39]. A meta-analysis of 12 randomized controlled trials showed that probiotics drastically decreased glucose levels, reduced HbA1C, fasting insulin level, HOMA-IR level, decreased total cholesterol, and decreased triglyceride levels [40].

Another meta-analysis of randomized clinical trial found that probiotics increased HDL levels, systolic and diastolic blood pressure values, and improved dyslipidemia and to promote better metabolic control [41].

Supplements: Liquid Ionic Magnesium (Trace Minerals Research)

Magnesium has been shown to regulate glucose homeostasis and insulin activities [42]. A study showed that Mg is involved in glucose metabolism and enhances exercise, and also helps in lower hsCRP level [43]. Different study mentioned that daily administration of 250 mg of elemental Mg indicated a significant improvement in HbA1C, insulin level, C-peptide, homeostatic model assessment of insulin resistance (HOMA.IR), and homeostatic model assessment (HOMA) after three months of intervention [44].

Supplements: Super Omega 3 (Carlson Laboratories)

Many studies found the beneficial effect of omega-3 supplement on waist circumference, glucose regulation, Hb1Ac, leptin and leptin/adiponectin ratio, promoting reductions in hepatic triglyceride synthesis and accelerating triglyceride clearance [45].

Supplements: Evening Primrose (Solar) 1300mg

A study showed that taking evening primrose with sardine oil and vitamin E for 4 weeks significantly decreased fasting glucose, hemoglobin A1c, total cholesterol, body weight and body fat mas [46]. Other studies also mentioned that evening primrose oil significantly decreases blood glucose in T2D patients [47].

Supplements: Alpha lipoic acid 100 mg

A randomized study showed that taking different doses of ALA ranging from 300-1200 mg/daily for six months, showed a significant decrease in HbA1c and fasting blood glucose [48].

APPENDICES B

People living with T2D are at a high risk for all-cause mortality and cardiometabolic damage. However, it has been suggested that diabetes can be prevented by a healthy lifestyle and healthy body weight [48]. Fortunately, because environmental factors are modifiable, disease manifestation from these factors is largely preventable [49]. T2D as a lifelong disease can lead to severe complications and increased risk for mortality however, lifestyle changes can severely impact the course of this disease.

Sleep Optimization and Diabetes Control

Although pre-diabetes and diabetes have a strong genetic basis, they are largely environmentally driven through lifestyle factors [50]. Sleep has emerged as an additional lifestyle behavior, important for metabolic health and energy homeostasis. Sleep imbalance may promote diabetes onset or hinder glucose control and insulin sensitivity in those with pre-existing diabetes [50]. Research shows that insufficient sleep and/or poor-quality sleep can result in oxidative stress as well as overactivation of the sympathetic nervous system. Furthermore, changes in the appetite-regulating hormones leptin (related to satiety) and ghrelin (related to hunger) have been observed in response to short and/or insufficient sleep duration [50]. Disruption of the regulation of these hormones from sleep loss has also been linked to an increased appetite for carbohydrate-dense foods and intake of calories from sweet foods (snacks). Orexin activation is associated with increased sympathetic nervous system activation, increased cortisol and suppressed growth hormone secretion, which can all predispose to hyperglycemia [50].

Postprandial Walking and Glucose Metabolism

Physical activity guidelines are a cornerstone of advice to prevent and reverse T2D. Physical activity has been shown to lower blood glucose levels and reduce cardiovascular risks. Current physical activity guidelines for people with T2D promote at least 150 min activity per week [51]. Research shows that postprandial walking may be more effective at lowering the glycemic impact of the evening meal in T2D compared with pre-meal or no exercise. Statistics also reported a significant glucose reduction in the 2-h postprandial glucose spike (1.9±1.3 vs. 2.7±1.4 mmol/L after postprandial evening walking; researchers observed that the evening post-meal walk was the most effective in lowering blood sugar levels for a full 24 hours [51]. Trials conducted on separate days when subjects consumed a standardized dinner with a moderate glycemic effect and 2 exercise days for 20 minutes of self-paced treadmill walking immediately before or 15 to 20 minutes after eating, blood samples showed absolute and relative changes in glucose levels [52]. Twenty minutes of self-paced walking done shortly after dinnertime resulted in lower plasma glucose levels at the end of exercise compared to values at the same time point when subjects had walked pre-dinner. Postprandial walking may be more effective at lowering the glycemic impact of the evening meal in individuals with T2D [52].

Stress and Glucose Metabolism

High anxiety can result in the release of sympathetic hormones that can elevate both cortisol and glucose levels, decrease insulin release, or affect the sensitivity and resistant of the insulin hormone. Research shows that stress and anxiety from life can affect the patient's insulin and glucose function, which can exacerbate their diabetes [53]. Plus, anxiety in people without diabetes can put them at risk of weight gain and high cholesterol which can eventually lead them to hyperglycemia. Furthermore, when patients go through physiological, mental, or pathological stress, they will release adrenergic and catecholamine hormones which are norepinephrine and epinephrine from the adrenal medulla. The sympathetic hormone plays a significant role in affecting the blood sugar levels and the function of insulin in the body [53]. These adrenergic hormones can stimulate glucose production and reduce the insulin level, therefore worsening the diabetic condition [53].

APPENDICES C

We believe that the mindset discussion is an integral part of T2D 6.9 NI, without it, excitement, enthusiasm, motivation, adherence, and discipline would be lacking. Patients can either believe that a particular event or condition is simply fixed and is impossible to reverse or improve and therefore they surrender to the condition and its dire consequences in this case T2D. Or they can believe that it can be improved and even reversed and start working towards achieving it.

Patients at the beginning of the condition are in “fixed mindset” mode. Our discussion with them helps them transit from “fixed mindset” to “growth mindset”. It is the belief that human capacities are not fixed and set in stone, but can be developed and improved over time [54]. A study showed that a fixed mindset view overall significantly correlated with increased anxiety [55]. This may be why individuals with a fixed mindset resist learning opportunities; while those with a growth mindset embrace them [56].

Working on the patient self-limiting believes is crucial to make the transition from disease mode to health mode. Since disease is a thought and health is a thought, and both thoughts need constant support and attention to manifest and become reality. Limiting beliefs are the enemy of a “growth mindset”.

Once the transition is made, patients start to feel and comprehend the meaning of patient empowerment. Once they feel that they oversee their health, they assume the duties and responsibilities that come with the new role with fervency, enthusiasm, and excitement.