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DIABETES IS OPTIONAL

The management of type 2 diabetes has evolved significantly over the years, with an increasing focus on natural remedies and lifestyle modifications complementary to conventional medicine. In a Terry Talk, "Diabetes is Optional", by Dr. Jacob Teitelbaum, he discusses the potential of various natural supplements, such as *Hintonia latiflora*, berberine, and grape seed extract, along with dietary changes like the keto diet, in managing and possibly reversing type 2 diabetes.[1] He advocates for holistic medicine, urging people to use alternative medicine and minimize their reliance on prescription medications. The recommendations support a growing interest in integrative medicine, this critical review will look at the strengths of the information presented, evaluating its scientific basis.

Dr. Jacob Teitelbaum is a board-certified physician who specializes in treating chronic conditions like fatigue and fibromyalgia. After experiencing chronic fatigue syndrome himself, he became passionate about finding holistic ways to help people manage health issues. He's written several books, including *From Fatigued to Fantastic!* and *The Complete Guide to Beating Sugar Addiction.* Teitelbaum's clinical work has focused on natural treatments and patient education to help people feel better and take control of their health.[2]

Type 2 diabetes is a chronic condition in which the body becomes resistant to insulin or doesn't produce enough of it, leading to high blood sugar levels. Unlike Type 1 diabetes, which is often diagnosed in childhood, Type 2 is usually linked to lifestyle factors and is more common in adults, however, it is increasing in younger people as well. Lifestyle factors that can lead to type 2 diabetes include poor diet high in processed and sugary foods, being overweight, and prolonged stress, all of which can lead to insulin resistance. Insulin resistance occurs when the body's cells become less responsive to insulin. Insulin is a hormone that helps glucose from the blood enter cells to be used for energy. Over time, high sugar intake leads to the body needing more insulin to keep blood sugar levels under control. This cycle continues until the body can't compensate anymore leading to high blood sugar levels.

One of the key strengths of the Terry talk is the speaker's advocacy for a nutrient-rich diet, particularly the ketogenic diet. The ketogenic diet is a high-fat, low-carbohydrate diet designed to shift the body's metabolism into a state of ketosis, where fat becomes the primary energy source instead of glucose. This diet has gained popularity for its potential to improve insulin sensitivity and weight loss. For example, choosing dark chocolate or stevia as a healthier sweetener option gives people with diabetes a better alternative when dealing with sugar cravings. Additionally, the speaker's focus on magnesium, vitamin D, and other vitamins addresses the often overlooked nutrient deficiencies that can happen in individuals managing chronic conditions like diabetes.[1] This focus on comprehensive nutrition is an important aspect of diabetes management that is often skipped over in traditional healthcare.

An additional strength of the talk is how it promotes a holistic and integrative approach to diabetes management. The speaker emphasizes the importance of combining lifestyle changes, dietary modifications, and natural supplements. Lifestyle changes such as increasing physical activity and reducing stress levels. One of the natural remedies mentioned is *Hintonia latiflora*, commonly known as "copalchi", native to Mexico, which has been traditionally used to manage diabetes. Copalchi is derived from the bark of *Hintonia*, containing bioactive compounds like 4-phenyl coumarins, glycosides, cucurbitacins, and coutareagenin, which contribute to its antihyperglycemic effects. Iridoids, a key bioactive compound in copalchi, offer significant antioxidant and anti-inflammatory

benefits, supporting its cardioprotective, hypolipidemic, and hepatoprotective effects.[3] *Hintonia* acts as a potent alpha-glucosidase inhibitor. A 2013 study identified thielavins A, J, and K, compounds isolated from a fungus associated with *Hintonia,* as potent inhibitors of this enzyme. The compounds were identified through bioassay-guided fractionation of an organic extract from the fungus. Alpha-glucosidase inhibition slows carbohydrate breakdown, leading to more stable blood sugar levels post-meal, which is beneficial for those managing diabetes.[4] Thielavin K, for example, showed greater inhibitory effects than acarbose, a standard diabetic medication. This finding shows *Hintonia*'s effectiveness as a natural alpha-glucosidase inhibitor, which could offer a more holistic approach to managing blood sugar. Further kinetic analysis demonstrated that these compounds function as non-competitive inhibitors. The thielavins bind in a pocket near the enzyme's active site, similarly to acarbose. This binding interaction, facilitated by both hydrophobic interactions and hydrogen bonding, contributes to the potent inhibition.[4]

Another study explores the dual effects of *Hintonia latiflora* extract. The research demonstrates that *Hintonia latiflora* extract not only lowers blood glucose levels but also has vasodilatory effects. In vitro tests using aortic rings from guinea pigs showed that *Hintonia* could relax blood vessels pre-contracted with noradrenaline but did not affect contractions induced by potassium, meaning that its vasodilation mechanism does not involve blocking calcium channels. The active compound coutareagenin was also shown to reduce intracellular calcium release in rat vascular cells, supporting a potential role in relaxing blood vessels. In vivo studies with rabbits confirmed these effects; *Hintonia* extract administration resulted in mild vasodilation in the abdominal aorta and carotid artery, combined with a decrease in blood flow velocity and significant blood glucose reduction. Importantly, these changes happened without affecting heart rate or blood pressure, which could be helpful for managing diabetes without cardiovascular strain. The combination of lowering blood glucose levels and vasodilatory actions implies that *Hintonia latiflora* extract may help reduce diabetic vascular complications.[5]

The Terry Talk also mentions grape seed extract as a natural supplement. Grape seed extract is derived from grapes, which are rich in proanthocyanidins, a potent antioxidant that is known to protect cells from oxidative damage.[1] A study titled *Antioxidant effects of a grape seed extract in a rat model of diabetes mellitus* explored grape seed extract to determine its therapeutic effects in managing diabetes. Researchers investigated the effects of the extract on oxidative stress and antioxidant defense mechanisms in diabetic rats. In the study, they first induced diabetes in rats by using streptozotocin (STZ), a chemical that selectively damages insulin-producing beta cells in the pancreas, mimicking the conditions of diabetes mellitus. After the induction of diabetes, the rats were divided into groups, where one group of rats were diabetic treated with this extract and the others served as controls. The extract was given orally at specific doses over a set time. The researchers monitored various parameters, such as fasting plasma glucose levels, markers of oxidative stress like lipid peroxidation, and the activity of antioxidant enzymes like superoxide dismutase and catalase. They found that grape seed extract administration led to a significant reduction in fasting plasma glucose levels, which could potentially improve glycemic control. Furthermore, the extract was found to reduce oxidative stress by lowering lipid peroxidation and protein carbonylation, which are both markers of cellular damage often elevated in diabetics. This was linked to the antioxidant enzyme activity, including superoxide dismutase and catalase. These enzymes play a key role in neutralizing free radicals and preventing further oxidative damage.[6] By recommending natural remedies like *Hintonia latiflora* and grape seed extract, the speaker encourages individuals to take control of their health without relying on only traditional medicine. This perspective resonates with individuals who look for alternatives to conventional treatments, especially those concerned about side effects or the possibility of being overprescribed.

Dr. Teitelbaum's talk presents various ways of dealing with diabetes, but there are some aspects to consider. Genetic predispositions and multiple chronic conditions can affect the efficiency at which people are able to manage or even reverse type 2 diabetes through lifestyle measures alone. For instance, people with a family history of diabetes may have a higher risk, such an individual will not be able to control diabetes simply by maintaining a healthy diet and exercising. These people might need further management or special treatments that could help them maintain their blood glucose levels, even when they implement a healthier way of living. Another problem is the oversimplification of complex medical issues. For instance, when discussing herbal supplements such as grape seed extract and *Hintonia latiflora*, very little information was given about how this might interact with medications or patients with comorbidities. Comorbid conditions, such as obesity, hypertension, or cardiovascular diseases can complicate diabetes management by influencing factors like insulin resistance or inflammation. This makes it more difficult for lifestyle interventions to achieve the desired outcomes. Another aspect is the potential barriers to implementing lifestyle changes such as socioeconomic factors or cultural differences. The talk emphasizes the importance of diet and exercise but fails to notice the reality that not everyone has access to healthy food or gyms, especially in lower socioeconomic areas. Cultural factors may also influence dietary preferences or alternative therapies.

In conclusion, we explored Dr. Jacob Teitelbaum's Terry Talk, which emphasizes the potential of lifestyle changes, such as dietary changes and natural remedies, in managing and possibly reversing type 2 diabetes. He talked about a number of alternative therapies, including *Hintonia latiflora* and grape seed extract, along with dietary interventions like the ketogenic diet. While the overall message is promoting prevention and holistic care, it's important to consider challenges, such as genetic predispositions, comorbidities, and potential barriers that may complicate the effectiveness of lifestyle interventions alone. Reinforcing prevention and focusing on care plans that attend to individual needs in both lifestyle and medicinal areas should help provide a balanced approach to diabetes. Teitelbaum's emphasis on the empowerment of the patient in taking responsibility for one's health may affect healthcare systems of the future and shift it toward a pro-active, holistic system and away from one so focused on symptom management. This change could lead to an improvement in the outcomes for patients, a reliance less on medications, and a focus on personal empowerment for the best quality of life.

References

1. Terry Talks Nutrition by Terry Lemerond. (2021, November 1). *Diabetes is Optional! With Jacob Teitelbaum, MD*. YouTube. https://www.youtube.com/watch?v=UAg7nGx-nU4
2. Teitelbaum, J. (2012, June 11). *About Jacob Teitelbaum, M.D.* Vitality101.com. https://www.vitality101.com/about-dr-teitelbaum
3. González-Castelazo, F., Soria-Jasso, L. E., Torre-Villalvazo, I., Cariño-Cortés, R., Muñoz-Pérez, V. M., Ortiz, M. I., & Fernández-Martínez, E. (2023). Plants of the Rubiaceae Family with Effect on Metabolic Syndrome: Constituents, Pharmacology, and Molecular Targets. *Plants*, *12*(20), 3583–3583. https://doi.org/10.3390/plants12203583
4. Rivera-Chávez, J., González-Andrade, M., González, M. del C., Glenn, A. E., & Mata, R. (2013). Thielavins A, J, and K: α-Glucosidase inhibitors from MEXU 27095, an endophytic fungus from *Hintonia latiflora*. *Phytochemistry*, *94*, 198–205. https://doi.org/10.1016/j.phytochem.2013.05.021

5. Vierling, C., Baumgartner, C. M., Bollerhey, M., Erhardt, W. D., Stampfl, A., & Vierling, W.(2014). The vasodilating effect of a *Hintonia latiflora* extract with antidiabetic action. *Phytomedicine : International Journal of Phytotherapy and Phytopharmacology*, *21*(12), 1582–1586. https://doi.org/10.1016/j.phymed.2014.07.009
6. Chis, I. C., Ungureanu, M. I., Marton, A., Simedrea, R., Muresan, A., Postescu, I.-D., & Decea, N. (2009). Antioxidant effects of a grape seed extract in a rat model of diabetes mellitus *Diabetes and Vascular Disease Research*, *6*(3), 200–204. https://doi.org/10.1177/1479164109336692