## Six Management Steps to Reverse Type 2 Diabetes

As outlined above, the underlying abnormality in Type 2 diabetes is insulin resistance. There is no deficiency of insulin hormone until at a very advanced stage of Type 2 diabetes. In the advanced stage, the pancreas gland gets filled with fat, which chokes up insulin-producing beta cells. In contrast to Type 2 diabetes, Type 1 diabetes of young patients occurs from a total absence of insulin-producing capacity of the pancreas gland. These patients must receive insulin to survive.

The natural management of Type 2 diabetes focuses on lowering insulin demand to overcome insulin resistance via a six-step process:

1. Medical assessment to evaluate the severity of the disease and the social support system.
2. Establish a holistic meal plan.
3. Establish a Balanced Lifestyle Plan.
4. Adopt Time-Restricted Eating (TRE) or Intermittent Fasting (IF) schedule with close monitoring of antidiabetic drug dose and blood glucose levels
5. Plan on regular exposure to sunlight and normalize Vitamin D levels.
6. Stress management.

### *Management Step #1: Medical assessment to evaluate the severity of the disease and the social support system.*

Prepare a baseline patient profile record based on medical assessment and laboratory testing. The baseline medical record is vital for periodic follow up on the adequacy of the reversal and management. The medical evaluation and testing must include the following:

- ***Medical history***. Duration of condition, age of onset, antidiabetic drugs, and insulin or other injections, blood glucose control, frequency of blood glucose monitoring, complications—retinopathy, nephropathy, heart disease, dental problems, neuropathy, infections, and frequency of hypoglycemia episodes. (Diabetologist or personal physician consultation)

- ***Lifestyle behaviors***. Prepare a minimum of a three-day realistic report on the number of meals, meal times, including late-night eating habits, the composition of meals concerning macro- and micronutrients, and snack consumption. Sleeping habits (time of wake up, alarm clock or no alarm clock), and activity exercise patterns.

The Type2 diabetes Counselor compiles the patient chart, including the above information as well as the following:

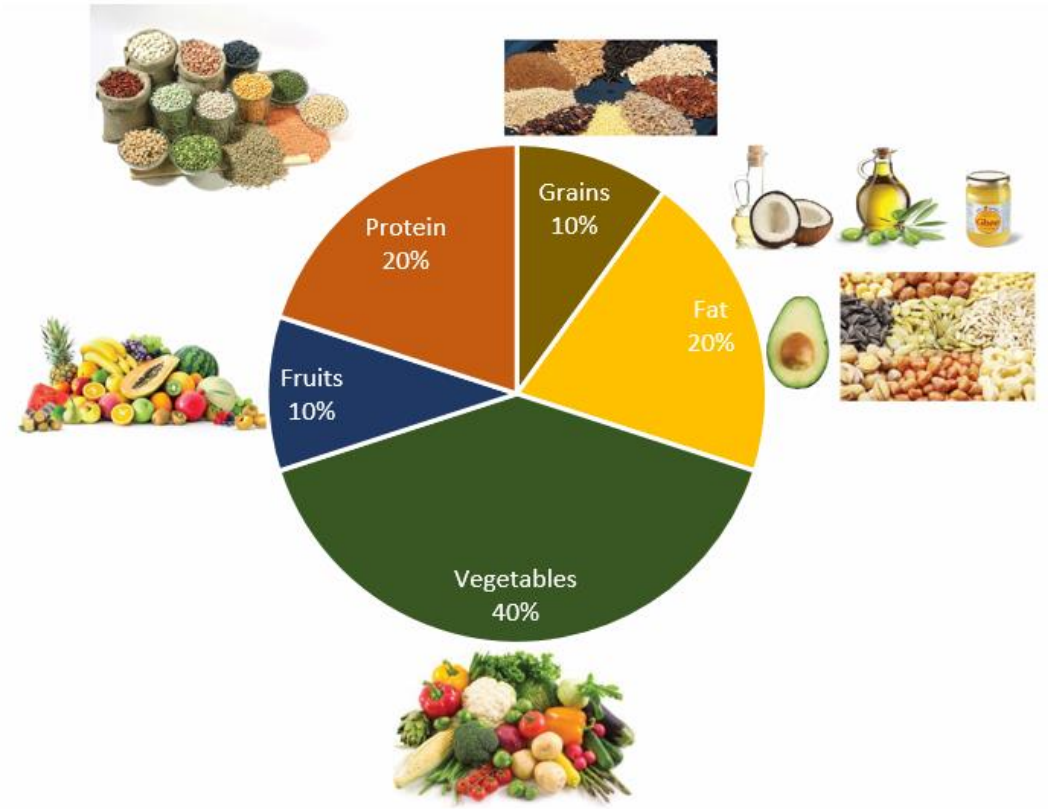
1. Psychosocial status—assess the social support system, fear, anxiety, motivation, and ability to comply with the management plan.
2. Alcohol, smoking and other addictions

3. Physical evaluation: age, height, weight, and waist circumference
    i. Heart rate, blood pressure (sitting and supine)
    ii. Foot examination for neuropathy, circulation—the color of skin, capillary refill, and toenail.
4. Laboratory evaluation:
    - Fasting and 2-hour post-meal blood glucose level record of a week
    - Hemoglobin A1 C levels recent or within the past one month
    - C Peptide levels (patient's capacity to make insulin)
    - Lipid Profile—check total cholesterol, HDL, and LDL cholesterol and triglyceride levels.
    - Spot urine albumin and creatinine ratio and serum creatinine and GFR calculation
    - Thyroid screen for the presence of hypothyroidism
    - Vitamin D and B12 levels
    - Blood chemistry to check for sodium and potassium levels
    - Specialty consultation reports for retinopathy, heart disease, nephropathy as indicated

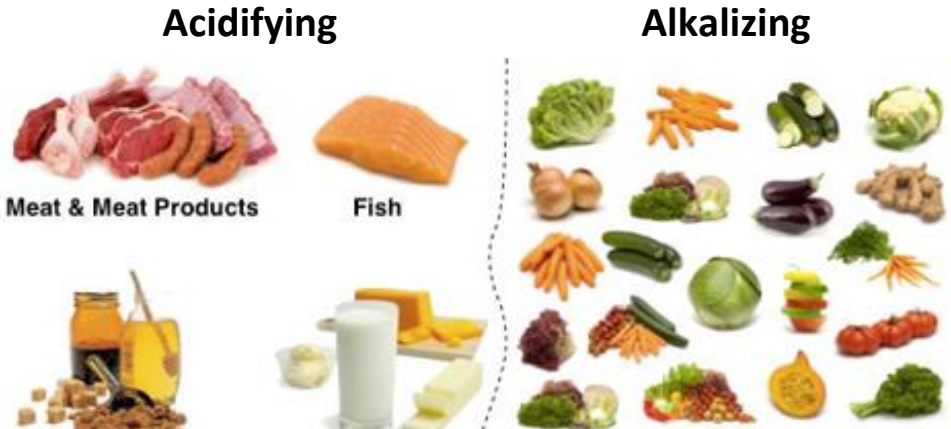
***Management Step #2: Establishing a Holistic Meal Plan***

(For details, refer to Holistic Meal and Balanced Lifestyle section on the website www.foodlifestylebalance.com)

Design the holistic meal plan using the following guidelines:



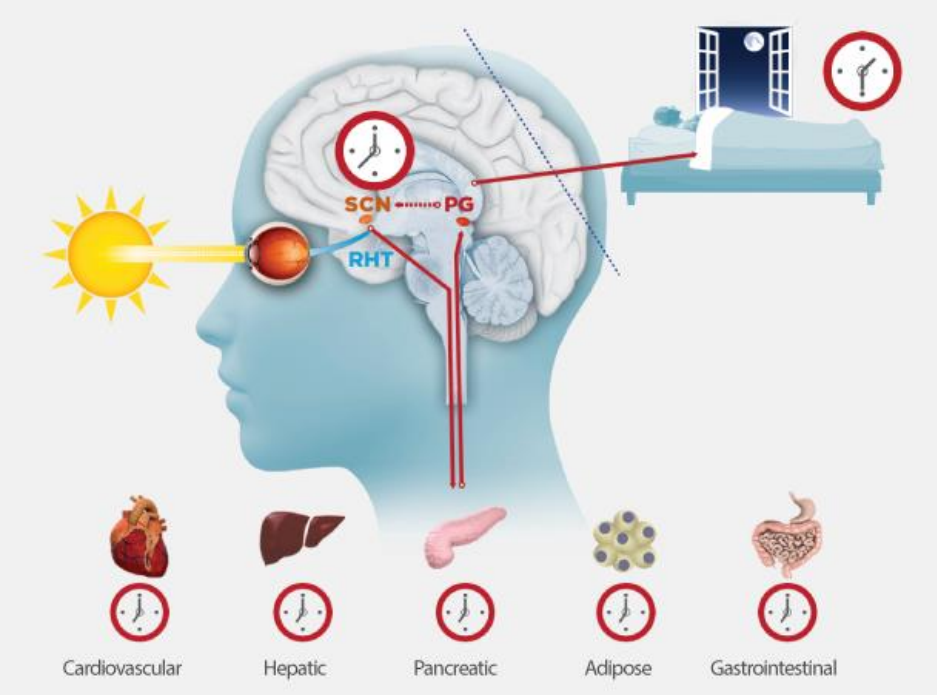

1. Eliminate refined high-glycemic carbohydrates in all forms—white sugar and refined wheat flour products, including sweets, bread, baked goods, pre-prepared packaged, and fast foods, including boxed cereals, snacks, and breakfast options in packages.
2. Eliminate refined oils in all form—only consume natural cold compressed oils such as coconut, mustard, sesame oils (25-30 gm or 5-6 teaspoons) with 2-3 teaspoons of ghee for digestive health.
3. Eliminate all sugary beverages, including fruit juices (freshly squeezed as well as boxed).
4. Eliminate milk products except for small amounts of curd as thin lassi. Milk has insulin-like growth hormone and lactose sugar, both of which aggravate insulin resistance.
5. Eliminate acidic foods; the body is naturally alkaline. Acidic foods cause swelling and inflammation in the body. See the list of acidic versus alkaline foods on the next page.
6. Minimize grain consumption. Eat whole coarsely ground grains, and eliminate grains ground into the form of refined flours.
7. Vitamin and natural herbal supplements—include fenugreek seeds, cinnamon, ginger, and turmeric in the diet to reduce inflammation and lower blood sugar.

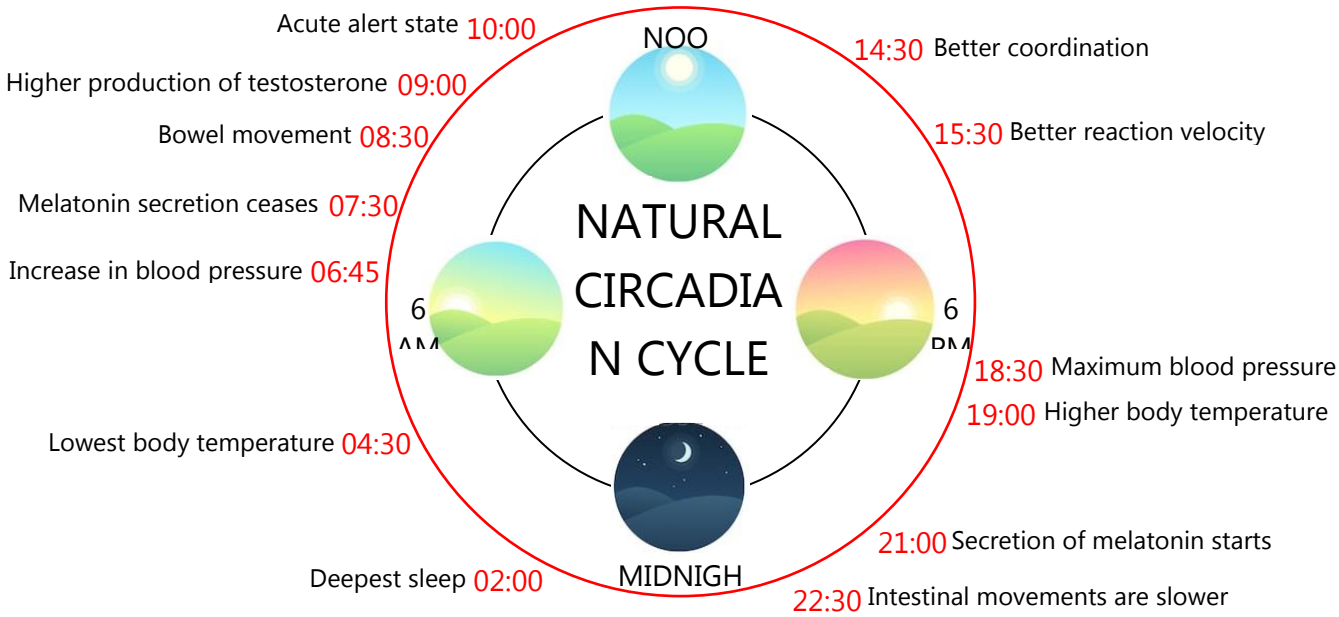


***Management Step# 3: Establishing a Balanced Lifestyle Plan***

(For details, refer to the sections Holistic Meal and Balanced lifestyle & Brain Clock on the website www.foodlifestylebalance.com)

Nature has established a well-tuned and precisely balanced lifestyle plan for all living beings, including humans. The essential survival behaviors of Fasting/Feeding, Sleep/Wake, and Activity/Rest are under the control of the biological brain clock located in a specialized area of the brain. The brain clock works in harmony with light and dark signals of the sun cycle. Every organ system in the body works in coordination with the brain clock system (see image below). The unique research into the biologic clock system and its 24-hour rhythms called circadian rhythm earned three medical physiologists (Drs. Hall, Rosbash, and Young) a Nobel prize in October 2017. The brain clock controls all body functions and behaviors such as digestion, metabolism, hormonal balance, sleep-wake, fasting-feeding, and activity cycles. When humans lose harmony with natural circadian rhythms, they fall victim to disease and dysfunction. The lifestyle of humans in the past 50-60 years has changed at a fast pace leading to a disconnection with the natural harmony.



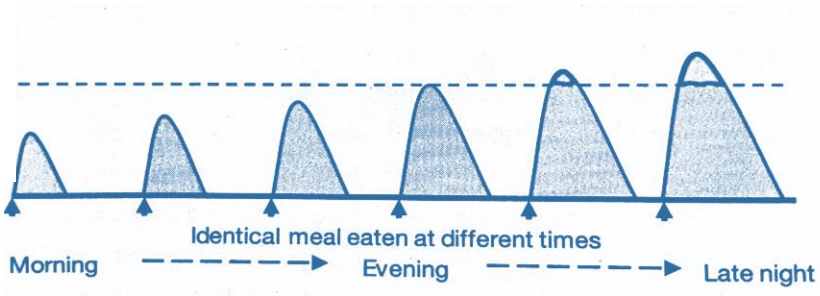

***Natural Circadian Cycle versus Balanced Lifestyle***

The balanced lifestyle is about keeping a disciplined approach to the following four essential behavior parameters controlled by circadian brain clock:

1. **When to eat.** Eating time influences the digestion of food, glucose utilization, and quality of sleep.

- ***Digestion of food***. Absorption, digestion, and metabolism of the food are best during daylight hours. The intestinal movements and digestion slow down after 10 PM ( see image natural circadian cycle). The food consumed after 8 PM will not move along the digestive tract at a healthy pace and not get digested properly. Late-night eating leads to indigestion, acid reflux, and bloating.

- ***Glucose utilization.*** During the daytime hours, the demand for energy is high. The body is more sensitive to insulin during daylight hours. At night time energy needs are lower, so the body is more resistant to insulin. Even if one were to eat similar meals at different times of the day, the blood glucose levels would be lower in the morning hours and higher at night hours. Late-night eating after 8 PM invariably leads to high blood glucose levels, abnormal fat storage, obesity, and insulin resistance.




***Glucose Blood Levels vs. Meal Times***
***(from "The Circadian Code" by Satchin Panda, 2018)***

- ***Sleep quality.*** Late-night eating after 8 PM is disruptive to deep rejuvenating sleep. When the food reaches the digestive tract, it increases blood flow, which raises the body's core temperature (*Jathar Agni* in Ayurveda). For deep rejuvenating sleep, the body's core temperature must come down. It takes the body 2-3 hours to cool down for deep sleep.

2. **How often to eat.** The frequency of meals influences glucose utilization. Before 1970, the traditional number of meals in a day was 2-3 amongst the populations around the world. Food and lifestyle diseases such as obesity and Type 2 diabetes were rare. Globally, eating frequency has multiplied amongst urban communities. Eating every 2-3 hours creates a vicious cycle of a consistent supply of glucose from the digestive tract with simultaneous insulin demand. A meal of any size, small or big, provides glucose supply for energy lasting 2-3 hours. After this time, the body must fall back on reserve energy of stored glycogen and fat. The habit of eating frequent meals prevents the body from using up the stored energy—glycogen and fat.

   ***The best way to use up stored glycogen energy is to exercise, and the best way to use stored fat energy is prolonged overnight fasting of greater than 16 hours each day and to eat no more than two meals a day.***

3. **When to wake up and sleep, Wake-U**p time in the morning resets the sleep time the following night. So the key to a healthy sleep routine is to get up early in the morning even if the bedtime

changes. The early wake-up and going outdoors ensure exposure to the morning sun or bright morning light. Lack of exposure to sunlight or morning light reduces the synthesis of the sleep hormone melatonin in the brain. Additionally, exposure to bright artificial white light and blue light from cell phones and digital devices minimizes the release of stored melatonin. Both melatonin synthesis and release are critical to deep rejuvenating sleep. It is during the deep sleep that the body rests, repairs, and rejuvenates itself to keep itself disease-free. Lack of proper sleep elevates the level of the stress hormone cortisol, which contributes to insulin resistance and weight gain.

4. **Activity and Exercise.** Muscles use up 80% of glucose energy produced in the body. Physical inactivity and lack of exercise mean extra leftover glucose for making reserve energy fat. An exercise/activity routine to help reverse Type 2 diabetes and obesity is:

    a) Exercise first thing in the morning on an empty stomach, so the body uses up stored glycogen and fat energy. Walking is an activity; it is not an exercise to lose weight and get rid of stored fat. To make walking into an exercise routine, use a high-low impact walking routine. An easy way to accomplish this at no risk of fall is to walk for 5 minutes, followed by stationary jogging for 1-2 minutes. In a 30-minute walking, there can be six cycles of high-low impact routine.

    b) Start the day with breathing exercises or pranayama and yoga for 15-30 minutes. The most straightforward pranayama exercises are Om chanting ten times and Kapalbhati. Yoga has become an international phenomenon because of its health benefits. The world has a designated international Yoga day, thanks to our Prime Minister, Narendra Modi.

    c) Climbing stairs is an aerobic exercise. Start with one flight of stairs and advance to your capacity. Individuals with knee arthritis typically have a problem coming down the stairs, but no difficulty climbing the stairs. Climbing stairs will build muscle strength and help minimize joint strain and pain.

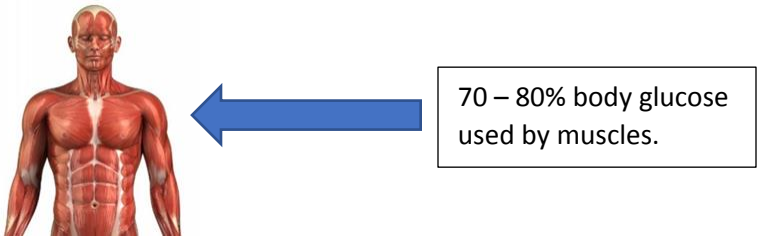
    d) Bike riding, swimming when possible.

    e) Stay active the entire day, logging 7-10,000 steps a day (this amounts to 2-3 miles of walk in a day).

    f) Simple weight training using weights within the capacity to build arm muscles.

    g) Young adults and children must engage in vigorous exercise or sports at least 2-3 times a week.

    Building muscles is the best way to utilize glucose energy and minimize insulin resistance as muscles can use up to 80% of glucose consumed.



***Management Step #4: Setting up Time-Restricted Eating (TRE) or Intermittent Fasting (IF) plan in conjunction with antidiabetic drug and blood glucose management.***

(For details on TRE plan, review this section on the website www.foodlifestylebalance.com)

The TRE or IF programs simplify the science of keeping the body lean and disease-free. Instead of an elaborate routine of calorie counting or different kinds of diet plans, it shifts the focus to merely watching the clock for mealtimes.

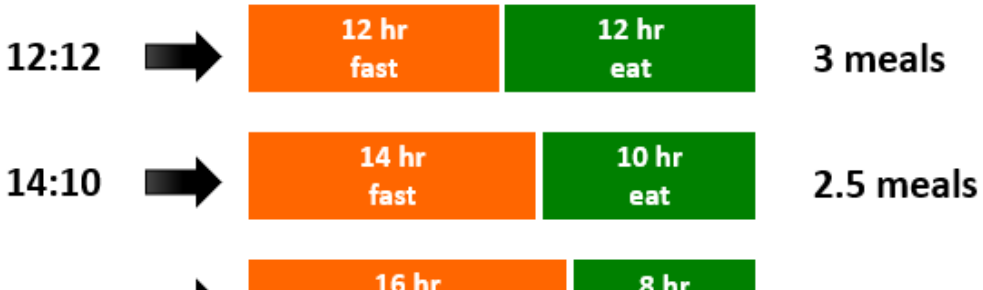

***"Watch the Clock and not the Calories."***

The TRE/IF plans are gaining widespread popularity and receiving mainstream media attention for the management of Obesity and Type 2 diabetes. The campaigns on freedom from diabetes are using fasting methods as the primary treatment strategy. The significant advantage of TRE plans is that there is no restriction on the amount of food consumed at each mealtime. That prevents muscle loss and micronutrient deficiency. An essential requirement of TRE plans is strict adherence to holistic meals as per the guidelines outlined above. The TRE plan reverses Type 2 diabetes and obesity via three mechanisms:

1. TRE Plan steers the body towards the fat-burning ketogenic pathway. The body remains in a fat-burning ketogenic channel during overnight fasting hours. It reverts to the glycolytic pathway of glucose burning during the daytime feeding hours.

2. The plan normalizes blood glucose and insulin levels. The prolonged fasting duration of 16-18 hours or longer reduces the levels of glucose as well as insulin. Lower insulin levels also mean less fat synthesis and less appetite. High insulin levels are a trigger for fat storage.

3. The plan reverses insulin resistance because fasting is associated with reduced insulin levels. A significant advantage of the TRE plan is the reversal and control of all the diseases related to insulin resistance.

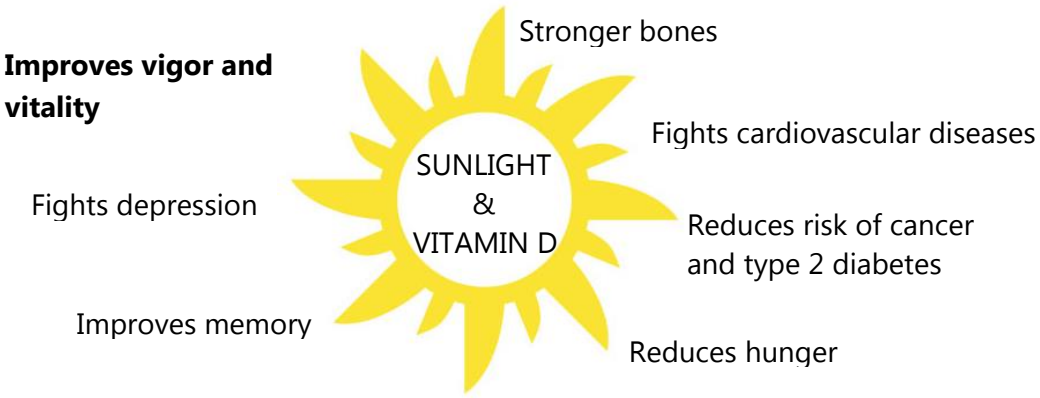


***Intermittent Fasting Schedules***

The plan terminology uses the fasting interval between the evening meal the previous day the next meal the following day. The total number of meals in a day may range from one to three based on the duration of the overnight fasting period.

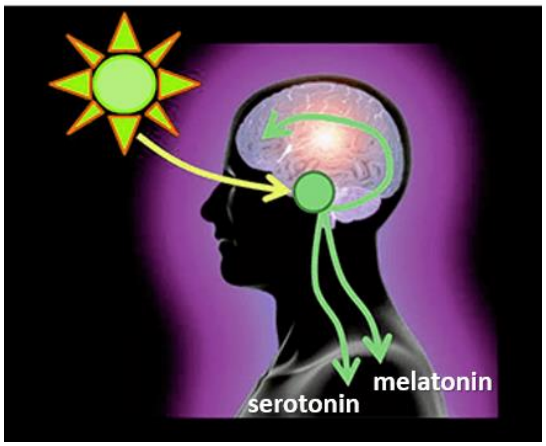
***Management Step #5: Regular exposure to sunlight and normalization of vitamin D levels.***

The energy of the sun impacts every aspect of human health directly or indirectly through vitamin D synthesis. The vitamin D is unique amongst all the vitamins in that it supports many physiological reactions in the body, working more like a hormone. Sunlight and vitamin D have several beneficial effects on health:



1. ***Hormonal balance***. The morning sunlight or bright light of the dawn enters via eyes to stimulate the hypothalamus area of the brain. The hypothalamus is the seat of managing several essential hormones such as growth hormone, insulin, thyroid hormone, cortisol, and the sleep hormone melatonin. Inadequate exposure to sunlight or bright daylight in the morning affects the secretion of these essential hormones vital to good health.

2. ***Improvement in mood and sleep***. Sunlight or bright daylight exposure in the morning enhances the synthesis of the sleep hormone melatonin and mood-elevating chemical serotonin in the brain. People living in the geographic areas of the world with weak sunlight have a higher incidence of depression.




***3. Bioenergy of the sun boosts the immune system.***

***4. Ultraviolet rays of the sun enhance bone health via vitamin D synthesis in the skin.***

5. ***Less hunger, less fat storage.*** During daylight hours, the body remains active and insulin-sensitive, so more glucose is used up for energy and less leftover for making reserve energy fat. At night hours, the body is inactive and insulin-resistant, so more glucose gets converted to fat. Late-night eating invariably leads to obesity even when one consumes holistic, healthy food.

***6. Normalizing Vitamin D levels improves insulin sensitivity.***

**There are all kinds of light for the sight!!**
**For Health, there is only one light, and that is the SUNLIGHT.**

***Management Step #6: Stress management***

Emotional stress, anxiety, and fear increase the level of cortisol hormone and adrenalin in the body. Cortisol and adrenalin increase blood sugar. It is a well-known fact that the stress of surgery or significant illness leads to very high blood glucose levels in a diabetic patient. Elevated cortisol levels over the long term from chronic stress lead to a persistent increase in blood glucose levels. Chronically elevated cortisol also leads to insulin resistance. Stress management is vital to effective diabetes management.

The cost of care and physical limitations imposed by Type 2 diabetes remains a significant cause of stress. However, the hope of disease reversal, becoming drug-free, and reclaiming health in itself is uplifting, reassuring, and inspiring. Nonetheless, the patient does require significant emotional support from family and caretakers to stay stress-free, motivated, and committed to the reversal plan.

Once signs of a reversal such as weight loss, feeling energetic, blood glucose control, and reduction in drug dose start showing, the motivational forces and enthusiasm take over. However, the medical team and family have to stay engaged to provide support and motivation for the entire reversal program and beyond.

The reversal programs conducted in a group or community setting with patients and families working together are more effective as the patient and families get the feeling that they are not alone in the game.