



Diabetes Reversal Strategy Guide



Diabetes



Diabetes Reversal Strategy Guide



Pre Diabetes

Contents

- 3 Introduction
- 7 Eat to Lower Insulin
- 9 Use Your Muscles
- 11 Be Kind to Your Liver
- 13 Restore Fat Burning
- 15 De-stress
- 17 Sleep

Normal
5.5 mmol/L

Phase 2

Decreased Insulin Secretion

Resistance



Insulin Levels



Introduction

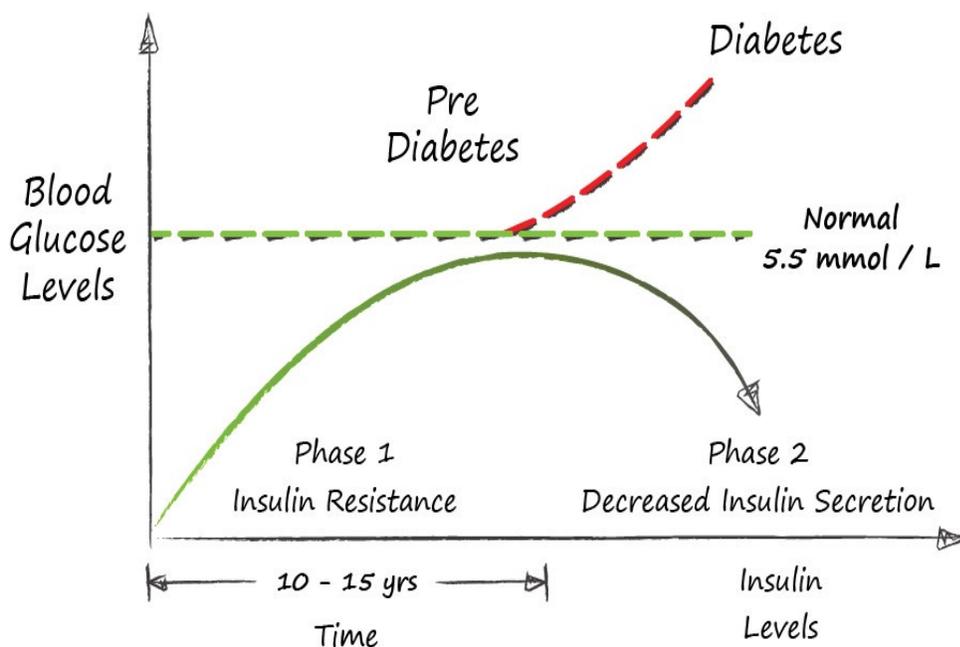
Diabetes is a disease of sustained energy overload.

Energy we get from food. Energy we store as fat.

The body's ability to store fat in healthy ways gets overwhelmed, and fat spills over to places it does not belong.

Unhealthy abdominal or belly fat grows, and throughout the body, fat enters cells and disrupts their function.

This ectopic fat significantly affects our muscle and liver cells reducing their ability to respond appropriately to insulin, our energy storage and building hormone.





Our pancreas then must release more insulin to compensate for this insulin resistance in the muscle and liver.

More insulin leads to more energy storage, and high insulin levels directly inhibit fat burning, making the problem worse.

This insulin resistance process sets up a 'vicious cycle' where energy once stored cannot be used, and the resulting hunger and increased appetite perpetuates energy overload.

Eventually, even the pancreas is affected by ectopic fat, decreasing its ability to synthesize insulin.

High insulin levels plateau and then begin to fall, and we lose our ability to maintain normal blood glucose.

When glucose levels are mildly abnormal (pre-diabetic), over half of the beta cells that produce insulin are dysfunctional. By the time diabetes is diagnosed, over 80% of these cells no longer work properly.

This metabolic 'vicious cycle' of energy overload leading to insulin resistance and eventually abnormal blood sugars on average takes 10 to 15 years to unfold.

Traditionally diabetes has been thought to be a chronic progressive disease that can be managed, slowed perhaps, but not reversed.

An emerging body of evidence suggests otherwise.

Reversing the energy overload and losing fat from the liver and of the pancreas breaks the cycle.

Understanding insulin resistance allows you to align your behaviours to maximize your ability to reverse diabetes or prevent it in the first place.

The 4+2 Diabetes Reversal Strategy leverages insights from Dr. Roy Taylor and others who have demonstrated that Type II Diabetes can be reversed.

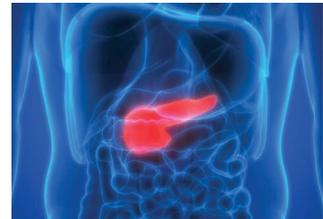
Applying these principles can help you break the metabolic 'vicious cycle' of insulin resistance.



4 Steps to Reverse Insulin Resistance

1 Eat to Lower Insulin

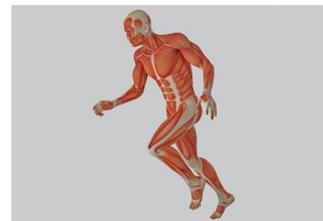
The simplest way to take the load off the pancreas is to decrease the fast carbs that trigger insulin. Choosing slow carbs with lots of fibre will lower insulin release and is the first step to breaking the metabolic 'vicious cycle' of insulin resistance.



Eat Real Food | Focus on Fibre | Think Sugar Equivalents

2 Use Your Muscles

Increased exercise helps to reverse insulin resistance, the process underlying Type II Diabetes, by improving the uptake of glucose and improving fat burning—even in the absence of weight loss. By using your muscles, you will restore a vital energy buffer—the "glucose sink."



150 Minutes of Exercise | Portfolio of Exercise | Move Every Hour

3 Be Kind to the Liver

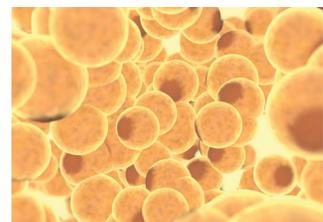
Fat in the liver is the biggest driver of insulin resistance and high insulin levels. As you seek to reverse insulin resistance, you need to be sure that you are not compounding the effect of energy overload by directly adding fat to the liver. Start by decreasing or eliminating alcohol and fructose. Then be sure to maintain gut health by eating whole foods with adequate fibre.



Stop Sugar | Improve Gut Health | Decrease Alcohol

4 Restore Fat Burning

The first three steps of the 4+2 Diabetes Reversal Strategy set the stage for fat burning. To reverse insulin resistance and Type II Diabetes, you have to get rid of the fat in your liver and pancreas—and to do this; you need to lose weight. Our preferred method for weight loss is time-restricted eating: limiting the number of hours we eat and extending the fasting period.



12 Hours Fasting | *Extend to 14 or 16 Hours | Aerobic Exercise in Fasted State

* If you are on medications, seek medical guidance first.



+2

Decrease Stress

Stress can worsen insulin resistance and impede the reversal of diabetes if you are unable to recover. High levels of cortisol, the stress hormone, counteract many of insulin's actions while also increasing appetite. Improving stress tolerance helps by decreasing your stress reactions and improving your recovery from stress.



[Nighttime Relaxation](#) | [Meditation](#) | [Hobbies](#)

Improve Sleep

Lack of sleep increases cortisol and appetite. Getting enough sleep is key to reversing insulin resistance and Type II Diabetes—start by setting yourself up for a good night's sleep, give yourself an 8-hour sleep window and develop a sleep ritual to improve your sleep. If there are any signs or symptoms of obstructive sleep apnea—get a sleep assessment and investigate.



[8 Hour Sleep Window](#) | [Investigate Warning Signs](#) | [Sleep Ritual](#)



Eat to Lower Insulin

With insulin resistance, insulin levels are much higher than normal. Insulin is a storage hormone, so these high insulin levels cause you to store more energy as fat and suppress your ability to burn fat as fuel, leading to weight gain that further aggravates insulin resistance.

Indeed this is a metabolic 'vicious cycle.'



The first step in breaking the cycle is to eat to lower insulin levels.

Insulin, triggered by glucose entering the bloodstream, seeks to maintain tight control of glucose levels in the blood.

At normal blood glucose levels, there is only a single teaspoon of glucose in your bloodstream.

Carbohydrates in your diet are broken down through digestion into sugar building blocks, with glucose being the most common.

Your pancreas releases insulin in proportion to the glucose absorbed from the carbohydrates that you eat.

Two factors control the resulting blood glucose after you eat:

1. The amount of glucose from the carbohydrate and
2. How quickly that carbohydrate is broken down and absorbed (fast carbs vs slow carbs)

The glycemic load of food provides a single measure of these two factors—we use a version of the glycemic load that converts food into a teaspoon of sugar equivalents—to represent multiples of the amount of glucose in your bloodstream.

So if you want to lower the amount of insulin and begin to break the metabolic 'vicious cycle' of insulin resistance, you will want to:

- 1. Lower the amount of carbohydrates we eat and
- 2. Especially lower the amount of fast carbs.

To understand fast vs slow carbs—consider the difference between 3/4 cup of white rice at 10.2 teaspoon equivalents and 3/4 cup of lentils at 1.9 teaspoons. It is obvious which will result in more insulin release.

Most vegetables, fruits, legumes, and whole grains, while containing carbs, also contain significant fibre that slow glucose absorption and blunt insulin release. Fibre also has substantial effects on your microbiome, the bacteria in your digestive tract. These effects decrease appetite, improve fat burning and improve insulin resistance.



Avoiding fast carbs that trigger insulin and choosing slow carbs with lots of fibre will lower your insulin release—this is your first step to break the metabolic 'vicious cycle' of insulin resistance.

101 BEHAVIOURS

Eat Real Food
Think Sugar Equivalents

NEXT STEPS

Focus in Fibre

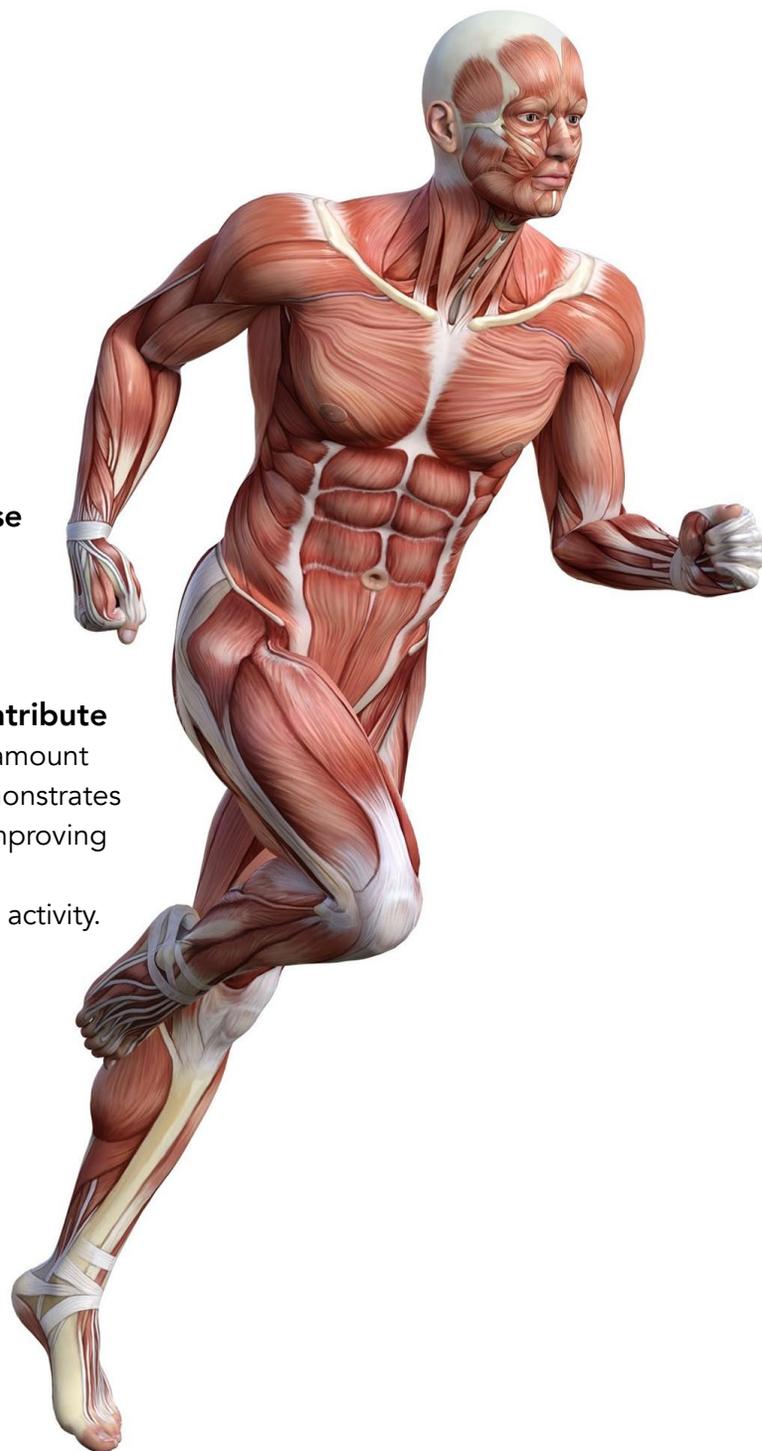
Use Your Muscles

Increased exercise helps to reverse insulin resistance, the process underlying Type II Diabetes, by improving the uptake of glucose and improving fat burning—even in the absence of weight loss.

Combined with the other 4+2 principles, exercise helps maintain weight loss and contribute to diabetes reversal. Research shows that the amount of exercise required is not extreme—research demonstrates that all of the following patterns are effective in improving diabetic metrics:

- 150 minutes per week of moderate to vigorous activity.
- 3 km of walking per day.
- 8 km of running per week.
- 20 minutes per day of moderate exercise.

Exercise on its own is not enough—research shows that 8 hours per day of sitting will negate the positive effects of exercise. Prolonged sitting increases the risk of death (from all causes) independent of exercise. This negative effect of sitting is consistent across all ages, genders, and activity levels—regardless of weight or other medical conditions. From an evolutionary perspective, humans are meant to move.





Consistently moving, being active and regularly exercising is the best strategy.

One way to be sure that you get up regularly is to use a tracker to prompt you to stand and move every hour (Apple Watch, Fitbit, Garmin and others have this feature).

Once you are regularly reaching your 150 minutes per week target (Level 1), develop your portfolio of exercise:

- **Aerobic** - most of your exercise should be done at a pace that you can easily maintain a conversation.
- **High Intensity Interval Training** - 1 or 2 times per week, with adequate preparation.
- **Resistance exercise with or without weights** - 2-3 times per week, with particular attention to form.
- **Functional Movement** - 1-2 times per week, with particular attention to flexibility and balance.

Above all, exercise should be fun, and you should feel good after doing it!

101 BEHAVIOURS

150 Minutes of Exercise
Move Every Hour

NEXT STEPS

Portfolio of Exercise



Be Kind to Your Liver

Diabetes is a disease of energy overload. Energy we get from food, when eaten in excess, is stored as fat. Our ability to store fat healthily—mainly under the skin—is limited. When our healthy fat storage depots get full, fat begins to be stored elsewhere—most notably in our abdomen as visceral fat. As we start to store fat in the abdomen, we also begin to accumulate fat in liver, muscle and pancreas cells. This fat affects the action of insulin in those cells resulting in insulin resistance.

Compounding this, any carbohydrate that we eat in excess of what our muscles and liver can store as glycogen gets converted to fat. The liver exports this as triglyceride, but some of this fat also backs up in the liver.

When we are not eating, our livers are responsible for maintaining blood glucose by either breaking down glycogen (stored glucose) or creating glucose from protein, lactate or glycerol (gluconeogenesis). These processes are regulated by the pancreas, releasing glucagon to increase glucose production or insulin to slow it down. When fat builds up in the liver, the liver becomes less sensitive to insulin, and the pancreas increases insulin levels.





Fat in the liver is the biggest driver of insulin resistance and high insulin levels.

When insulin levels are high, we lose our ability to burn fat, resulting in a situation where we can store fat but not lose it. Further fat storage increases fat build-up in the liver, worsening insulin resistance—resulting in a metabolic ‘vicious cycle.’

Anything that increases fat in the liver will throw fuel on the fire.

There are three major culprits that we need to be concerned about:

- 1. Alcohol** - in energy overload will directly increase liver fat.
- 2. Fructose** - the other half of sugar (sucrose is 50% glucose and 50% fructose). Fructose in high concentrations gets turned into fat in the liver.
- 3. Poor gut health** - leakage of bacteria from the gut into the bloodstream directly causes inflammation and fat build-up in the liver.

As we seek to reverse insulin resistance, we need to be sure that we are not compounding the effect of energy overload by directly adding fat to the liver—begin by decreasing or eliminating alcohol and fructose. Then be sure to maintain gut health by eating whole foods with adequate fibre. Finally, address any gut symptoms with a thorough nutrition assessment.

101 BEHAVIOURS

Stop Sugar
Decrease Alcohol

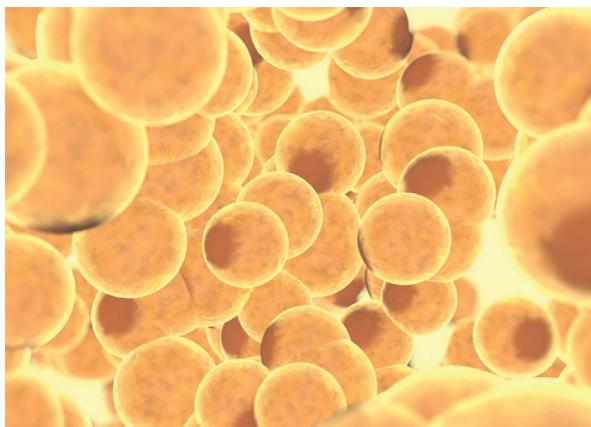
NEXT STEPS

Improve Gut Health



Restore Fat Burning

Diabetes is a disease of energy overload. Energy from food, stored as fat, gradually overwhelms the body's ability to buffer the excess. Fat initially stored in healthy depots begins to be stored ectopically (in places it shouldn't be)—in the abdominal area (visceral fat) as well as the cells of muscle, liver and pancreas. This ectopic fat, especially in the liver, impairs insulin action, resulting in the pancreas releasing more insulin to maintain blood sugars. Higher insulin levels inhibit fat burning, resulting in more fat storage, further compounding the vicious cycle.



How to break the cycle?

The first three steps of the 4+2 Diabetes Reversal Strategy set the stage for fat burning:

- 1. Eat to Lower Insulin** - lowers insulin levels to allow fat burning
- 2. Use Your Muscles** - improves insulin sensitivity in the muscles, further reducing insulin requirements
- 3. Be Kind to the Liver** - stops the addition of more fat to the liver

To reverse insulin resistance and diabetes, we have to get rid of the fat in the liver and pancreas—and to do this; we need to lose weight.

Weight loss requires that more fat is burned for fuel than is stored over time—and this requires restricting calories in some way.

Our preferred method for weight loss is time-restricted eating:

- Limiting the number of hours we eat and
- Extending the fasting period.



The most significant advantage to this is that insulin levels drop to very low levels after 6-8 hours of fasting, allowing the body to burn fat. Extending the fast expands the fat-burning window.

When burning fat, hunger hormones are low, decreasing hunger and craving, making the process relatively easy. Studies show that people on a 16:8 program (16 hr fast) consume fewer calories and rely on stored fat for fuel to a greater extent. Time-restricted eating also cuts out nighttime snacking, which is a significant contributor to excess energy intake.

When we restore fat burning, our hunger often decreases, and our satiation improves after meals.



When doing time-restricted eating, avoid the temptation to go so long that you trigger extreme appetite—as you will overeat. It really should not feel hard. Progress gradually once 12 hours feels easy.

101 BEHAVIOURS

12 Hours Fasting

NEXT STEPS

**Extend to 14-16 Hours
Aerobic Exercise
in Fasted State**



De-stress

Stress can worsen insulin resistance and impede the reversal of diabetes if we are unable to recover. A healthy response to a stressful situation has two phases:

Stress Phase - the immediate physiological response that allows us to better cope with the situation at hand.

Recovery Phase - the adaptation response that allows us to adapt and get stronger.

Many factors determine your response to a stressor:

- Environmental stressors.
- Major life events.
- Trauma, abuse.
- Individual differences.
- Behavioural responses.

ALL of which determine the extent of your physiological response.

Two systems mediate the stress phase:

- **The sympathetic nervous system** - which delivers the immediate response through adrenaline.
- **The hypothalamic-pituitary axis** - which delivers a more prolonged response through the hormone cortisol.

Cortisol is known as the stress hormone, it has many effects, but one of its major effects is to mobilize energy and maintain a steady supply of glucose for prolonged stress.





Cortisol does this by:

- Increasing production of glucose in the liver from the breakdown of glycogen.
- Promoting gluconeogenesis.
- A process that generates glucose from non-carbohydrate substrates—turning fats and proteins into glucose.
- Counteracting insulin’s effect.
- Increasing appetite.
- Increasing food-seeking behaviour.

From these effects, it is apparent that anything that chronically increases cortisol will worsen insulin resistance.

There are three strategies to avoid the adverse effects of stress and cortisol:

- 1. Decrease stressful situations** - this one is simple—avoid situations that add to your stress while offering limited value.
- 2. Change your perception of what situations are stressful** - this is more complex. Using techniques like cognitive behavioural therapy, mindfulness and meditation can help decrease or eliminate the stress response by framing the situation in a different way.
- 3. Enhance your ability to recover** - the other principles of the 4+2 Diabetes Reversal Strategy help. Whole food nutrition, exercise and adequate sleep are all essential to optimizing your recovery.

Improving stress tolerance takes time and does require practice—similar to exercise. An excellent place to start is with an evening relaxation routine before going to sleep and planning for healthy activities that you know will de-stress you, like exercise, yoga, reading, hobbies or anything that will put you into a flow state.

101 BEHAVIOURS

**Nighttime Relaxation
Hobbies**

NEXT STEPS

Meditation

Improve Sleep



Too much or too little sleep is associated with an increased risk for Type II Diabetes.

Research shows that short-term sleep restriction leads to increased appetite, food intake, weight gain and insulin resistance due to increased stress response and the associated high levels of cortisol.

Approximately one-third of adults either sleep too much or too little, while at least another 10% have moderate to severe obstructive sleep apnea (OSA).

OSA is characterized by the collapse of the upper airway during sleep resulting in:

- Intermittent hypoxia (low oxygen levels).
- Sleep fragmentation.

OSA is associated with the development of insulin resistance and Type II Diabetes.

This relationship may also be bi-directional—as diabetic nerve damage may also cause OSA—resulting in a ‘vicious cycle.’

OSA creates the perfect storm:

- Lack of sleep drives increased appetite and lack of satiation leading to weight gain—weight gain worsens OSA.

Sleep fragmentation and intermittent hypoxia both cause:

- Increased inflammation.
- Increased oxidative stress.
- Increased stress response.
- Increased cortisol levels.



In turn, these processes worsen insulin resistance and affect the pancreas' ability to release insulin, eventually causing Type II Diabetes.

These processes also trigger increased blood pressure and increase the risk of cardiovascular disease.

OSA is treatable and under-diagnosed, especially in people with insulin resistance and diabetes.

The key symptoms are:

- Loud snoring,
- Fatigue, and
- Daytime sleepiness.

Other symptoms may include one or more of the following:

- Restless sleep.
- Awakening with choking or gasping.
- Morning headaches, dry mouth, or sore throat.
- Waking up to urinate more than once per night.
- Feeling unrested and groggy in the morning—"brain fog."
- Fatigue, low energy, memory challenges with difficulty concentrating.

Getting enough sleep is key to reversing insulin resistance and Type II Diabetes—start by setting yourself up for a good night's sleep, give yourself an 8-hour sleep window and develop a sleep ritual to improve your sleep. If there are any signs or symptoms of OSA—get a sleep assessment and investigate.

101 BEHAVIOURS

8 Hour Sleep Window
Develop a Sleep Ritual

NEXT STEPS

Investigate Warning Signs

Diabetes

Pre
Diabetes



Normal

5.5 mmol/L

Learn More About Our
4+2 Diabetes Reversal Program



Click to Share

Phase 2

ance

Increased Insulin Sec



This work is licensed under a Creative Commons
Attribution-NonCommercial-NoDerivatives 4.0 International License.

15165 RUSSELL AVE, WHITE ROCK



604-535-7010



778-609-2200

wellnessgarage.ca