Insulin Resistance

Insulin, a hormone released by the pancreas, has many roles in the body. One of insulin's key roles is to transport glucose (the main source of fuel used by the body) from the bloodstream into cells to use as energy. Carbohydrate, a type of sugar, is found in grains, fruit, vegetables, dairy products, and drinks we consume that is broken down into glucose. Insulin acts like a key to open up the 'door' to the cell. Insulin Resistance (IR) is a condition in which the body's cells do not respond to the action of insulin. It is as if the insulin is trying to open the door but it will not open. The body makes high levels of insulin to overcome this resistance, which can lead to fatigue and an increase in appetite. High insulin levels also make it easier to put on extra weight, usually around the middle, which in turn makes the IR worse. It can be a vicious cvcle!

What Causes IR?

Although the exact cause of IR is unknown, we do know it is likely a combination of genetics and lifestyle factors. A diet that includes more processed foods and added sugars is associated with IR. Scientists also suggest that Trans and some saturated fats from animal products may interfere with insulin receptors, making them resistant. Other lifestyle factors that may be associated are smoking and poor quality of sleep.



IR Can Be Associated with:

- Prediabetes
- Low HDL ('healthy') cholesterol
- Polycystic Ovarian Syndrome (PCOS)
- Acanthosis Nigricans discolouration of the skin on the back of the neck, on the elbows or knees, or under the arms.
- Hirsutism- increased amounts of facial and/or body hair in women

Why Is It Important to Manage IR?

In addition to making you feel tired and hungry, high insulin levels can also put you at risk for developing many other conditions, such as heart disease, stroke, type 2 diabetes, fatty liver disease, and low grade or chronic inflammation.

Why Does It Matter to Me?

Newfoundland and Labrador has the highest incidence of type 2 diabetes, which IR is a precursor, in Canada.





For many Indigenous groups, the rates of type 2 diabetes and IR are higher.

- Indigenous people in Canada are among the highest-risk populations for developing type 2 diabetes.
- Type 2 diabetes rates are 3 to 5 times higher in the Indigenous population than in the general population.
- Indigenous people are diagnosed with type 2 diabetes at a younger age and develop higher rates of complications than the general population.
- Youth in Labrador have higher rates of IR than youth in the general population.

The cause of type 2 diabetes and IR are complex and are linked to a history of colonialism.

Understanding the ways that history has contributed to the rates of type 2 diabetes among Indigenous peoples is key to diabetes prevention. The most important factors in managing chronic disease is by making culture a priority in health care, through healthy behavior changes and by engaging in regular physical activity.

What Can You Do?

Lifestyle factors can have a HUGE impact on the degree of IR. Healthy eating, moving throughout the day, getting a good night's sleep and not smoking all have key roles. Sometimes, a medication is added that can help as well, though research has shown that lifestyle factors have the biggest benefit.





Steps to Help Manage Your Child's Insulin Resistance



1- Follow the Healthy Plate Model

Eating a variety of foods with the right balance of carbohydrates, fats, and protein can reduce the amount of insulin the body needs.

- Half of your plate should be filled with colourful fruits and vegetables
 - o Fresh, frozen, and canned are all nutritious options
 - When choosing canned, choose low sodium vegetables and fruit packed in water, when possible. Otherwise, drain and rinse with water.
- A quarter of your plate should have whole grains
- A quarter of your plate should have a healthy source of protein

2- Eat more 'slow carbs' than 'fast carbs'

The faster a carbohydrate is digested, the faster it enters the blood stream. A spike in blood sugar levels requires a lot of insulin all at once.

Slow Carbs (Higher in fibre)

- Bread, pasta and crackers made with 100% whole grain flour
- Oats, brown rice, barley, quinoa, other whole grains
- Berries
- Leafy greens, beans, legumes
- Fast Carbs (Higher in sugar and starch)
- Bread, bagels, pasta, crackers and pizza crust made with refined white flour
- Potatoes, corn, white rice, fruit
- Muffins, cakes, pastries, baked-goods



Try to consume mostly unrefined, minimally processed grains and food sources.





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3- Switch to healthy fats

Fats are an essential part of our diet, but it is important to eat the right ones. Fats take a long time to digest, so having a bit of fat with your meal helps slow down the release of sugar. Newer research has shown that saturated and Trans fats may actually increase your IR as the saturated fat makes insulin work less effectively.

Include a variety of fats and oils in your diet.

Healthy Fats

(unsaturated, non-hydrogenated, omega 3)

- Olive, canola, peanut, sunflower oil
- Fish: Salmon, shrimp, trout, halibut, mackerel
- Whale, seal fats
- Nuts and seeds
- Milk, yogurt (low fat)
- Sources of omega-3: avocado, salmon, herring, canola oil, ground flaxseed/flaxseed oil, walnuts

* Coconut oil and butter are actually saturated fats, but current research shows that some saturated fats may be healthier than others. Portions and frequency are what is important. **Unhealthy Fats**

(saturated, hydrogenated, Trans fats)

- Hydrogenated margarine
- Lard, shortening
- Hydrogenated peanut butter
- *Coconut, *butter (in moderation)
- Fat trimmings and marbling of red meat, and the skin of poultry
- Deep fried foods (chips, crackers)
- Baked goods and pastries

Omega-3 fats can reduce inflammation in the body and lower blood cholesterol. It also helps support brain and heart health, and protects against heart diseases. Unhealthy fats can increase the bad cholesterol in the bloodstream and clog arteries. This makes the heart have to work harder to pump blood. They also tend to be "pro-inflammatory".



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LIVE HEALTHY

Eating protein

slows down the

release of sugar

from

carbohydrates.

4- Pump Up the Protein

Most children need 1-2 servings of protein a day

- Benefits of protein:
 - Protein gives our bodies long lasting energy
 - o Protein is digested slowly, keeping us full for longer
 - Protein helps build and repair muscles
- **Include** plant based proteins in your diet. In addition to giving our bodies protein, they are also low in unhealthy fat and low in 'fast carbs'.
- Limit high-fat, processed, and salted meats.

Healthy Protein

(plant-based or lean protein)

- Beans and legumes
- Whale, seal, partridge, goose, caribou, moose, bear, rabbit
- Unsalted nuts, seeds
- Nut butters
- Eggs and dairy products
- Fish, poultry, lean meats

Unhealthy Protein

(high-fat, processed, salted meats)

- Pork chops, prime rib
- Bacon, bologna, salami, sausages, hot dogs
- Salt meat, salt cod, fried fish
- Fried chicken



Tips for choosing healthy meat:

- Choose lean or extra-lean meats when available
- Trim visible fat, drain off fatty drippings, and save gravy for special occasions
- Choose cooking methods that limit added fat:
 - o bake, boil, broil, grill, poach, steam, stew



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5- Hydration Station

Quench thirst with water. The average healthy school-aged child needs about 6-8 cups of fluid every day. Children are at greater risk of becoming dehydrated, especially those who:

- are very active and sweat a lot
- spend a lot of time in the sun
- are feeling sick (have a fever, are vomiting, or have diarrhea)



Well Hydrated Children:

- Go to the bathroom several times during the day
- Have urine that is clear or light yellow in colour

Dehydrated Children:

- Go to the bathroom infrequently
- Have dry skin and lips
- Have concentrated urine that is dark yellow in colour

Sugar sweetened drinks contain high amounts of sugar and often provide few other nutrients. This includes pop, juice, sweetened iced tea, sports drinks, and chocolate milk.

> Choose whole fruit over fruit juice and quench thirst with water. Even juices that say "100% fruit juice" or "no added sugar" still contain lots of sugar and are often stripped of the fibre and other nutrients found in whole fruit.

Milk is a great source healthy fat and protein for growing children, with lots of important vitamins and minerals. Chocolate milk still has all the same nutrients but with lots of extra sugar. Save chocolate milk for special occasions, or mix it half and half with regular milk.





LIVE HEALTHY

Can you guess how many sugar cubes are in these common drinks?

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Pepsi Can (355 mL)	Apple Juice (450 mL)	Gatorade (591 mL)	Chocolate Milk (500 mL)	Hot Chocolate Small (286 mL)
10 Cubes	12 Cubes	9 Cubes	13 Cubes	9 Cubes



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6- Probiotics

Probiotics are healthy bacteria found in some foods that contribute to gut health. Consuming probiotic yogurt may reduce your risk of developing type 2 diabetes.





Program

Health

7- Aerobic Activity

Aerobic activity challenges your heart and lungs to work hard, helping to improve your fitness level. This type of activity involves continuous movement of large muscle groups, such as muscles in the legs and back. Examples include: walking, swimming, and playing sports.

Aerobic activity helps reduce insulin resistance by:

Improving Glycemic Control	 Increases the amount of glucose taken from the blood and used by cells for energy
Improving Glucose Metabolism	 Improves the delivery of glucose to our cells to be used for energy Helps our body break down glucose more efficiently
Enhancing the Action of Insulin	• Improves the communication between insulin, insulin receptors, and muscles
Increasing Cardiorespiratory Fitness	• Enchanes the ability of the heart and lungs to supply the body with oxygen

How to Increase Aerobic Activity

- Sneak it in. You can do this by making your day harder. Take the stairs instead of the elevator. Walk to school instead of getting a drive.
- Encourage your friends to participate in an aerobic activity. Scooter or bike to a nearby park or go for a swim.
- Get your parents moving. Invite your parents to go for a walk with you.
- Stand whenever possible, such as when talking or texting on your phone.
- Reduce your screen time. This will naturally increase your physical activity level.

Research has not determined how long the changes seen with aerobic activity last.

To help manage IR, aerobic activity needs to be completed daily.





8- Resistance Activity

Resistance activity strengthens your muscles. This involves repetitive movements of the body against resistance. Resistance could be in the form of body weight, hand-held weights, or weight machines. Examples include: wall climbing, resistance training, and shoveling snow.

Resistance activity helps reduce insulin resistance by:

Improving Glycemic Control	 Increases the amount of glucose taken from the blood and used by muscles for energy 		
Improving Glucose Metabolism	 Improves the delivery of glucose to muscles to be used for energy Helps the body break down glucose more efficiently Increases the number of transporters (the vessels that carry glucose) in muscles 		
Enhancing the Action of Insulin	 Improves the communication between insulin, insulin receptors, and muscles 		
Changing the Struture of the Muscles	 Increases the number of muscle cells Alters muscle fibre type Enriches the function of blood vessels in muscles 		
Increasing Muscle Mass and Strength	• Increases the amount of glucose that muscles need		

How to Increase Resistance Activity

- Sneak it in. Again, you can do this by making your day harder. Volunteer to shovel snow or complete gardening work for your family or neighbors.
- Encourage your friends to participate in a resistance activity. Go rock wall climbing or boxing.
- Complete resistance training. This is when you set time in your schedule to complete exercises that help strengthen your muscles.
 - Join a gym or fitness centre in your community. Participating in a session with a personal trainer at the gym will help get you started.
 - Complete resistance training at home. There are some great free apps to give you ideas of resistance exercises (i.e.: Sworkit). To avoid injury, meet with a Physiotherapist prior to beginning a home program to ensure you are using proper technique.



Research has not determined how long the changes seen with resistance activity last. A new study showed that the decrease in IR following 10-weeks of resistance training lasted as long as 6 months.

To help manage IR, resistance activity needs to be completed 2-3 times per week.



LIVE HEALTHY

So Where Do We Start?

- 1- Fill half your plate with fruits and vegetables; the more colours the better!
- 2- Choose mostly 'slow carbs' that have a lot of fibre. A variety of whole grains is best!
- 3- Pair carbohydrates with healthy fats and lean proteins so that sugars are released more slowly.
- 4- Drink mostly water. Flavour water with lemon and lime. Sparkling water can be a fun alternative to pop!
- 5- Make your day harder by participating in aerobic or resistance activities.



