



La Dolce Vita

The sweet and lowdown on blood glucose levels **BY DOUG COOK**

As a dietitian in a medical clinic that serves many people with HIV/AIDS (PHAs), I get a lot of referrals for insulin resistance—a metabolic complication associated with HIV disease and its treatment. In fact, close to 50% of my referrals are for insulin resistance, among other metabolic disorders. Understanding metabolic disorders is important for PHAs because these complications may have a negative impact on quality of life, interfere with adherence to antiretroviral therapy and exacerbate long-term health problems.

THE GOODS ON GLUCOSE

The body requires sugar, or glucose, to provide energy for all of its functions. Glucose is one fuel that your body cannot do without. The glucose that enters your blood comes mainly from the digestion of carbohydrates in foods such as fruits, vegetables, bread, cereal, pasta, rice, milk and other dairy products. Normally, the hormone insulin helps glucose enter your cells, providing food energy.

Insulin resistance is a condition in which the body's cells do not respond properly to the hormone and cannot take up glucose, which then builds up in the bloodstream. The pancreas, which produces insulin, responds by producing extra insulin to help move the glucose into the cell. If the body cannot produce enough insulin or the cells do not respond to it efficiently, the result is hyperglycemia, or high blood sugar. Ultimately, this can lead to diabetes mellitus (type 2), a con-

dition characterized by persistent hyperglycemia.

KEEP YOUR EYES ON PIS

Before highly active antiretroviral therapy (HAART) became available, glucose abnormalities were uncommon among PHAs. But, ever since the introduction of protease inhibitors (Pis), insulin resistance and hyperglycemia continue to be reported in people on PI-containing drug regimens (the nucleoside analogue d4T is also emerging as a problem). It is estimated that some degree of insulin resistance affects about one half of people taking Pis.

Given that some degree of insulin resistance may occur when taking Pis,

the goal is to manage any blood glucose abnormalities that may develop while reducing your risk of diabetes. In many cases, blood glucose problems can be managed by lifestyle changes and diet modifications. Sometimes your doctor may switch your antiretrovirals and/or prescribe antidiabetic drugs to control blood glucose levels.

WEIGHING IN

Maintaining a healthy weight (and losing weight if necessary) is recommended to help prevent or manage insulin resistance. Having excess abdominal fat and a large waist is considered a risk factor for developing insulin resistance. A waist circumference greater than 102 cm (40 inches) for men and greater than 88 cm (34.5 inches) for women is considered high risk. The best way to lose or maintain your weight is with exercise and a healthy diet.

Exercise can help you lose weight by burning calories, but it also helps by clearing glucose from your blood without the help of insulin. Exercise also helps to maintain muscle, and muscle gives your body something to store the extra blood sugar in. A combination of cardio/aerobic and weight resistance training is best to help burn calories and build muscle. If carrying extra weight is not an issue for you, building muscle is still beneficial. (For more info on exercise, see "Let's Get Physical," page 18.)

DO OR DIET

The Canadian Diabetes Association (www.diabetes.ca) recommends a diet that includes a balance of protein, fat and carbohydrate. The type of carbohydrate may be more important than the amount. Starchy carbs (such as 100% whole wheat/grain breads and products, rice, pasta, yams, corn and beans) and carbs from dairy foods (such as milk, cheese and yogurt) are digested more slowly and stimulate less insulin production, so it's better to choose these carbs more often. Limit carbs that are typically added to food for flavour (such as sugars and syrups) as well as sweetened beverages and baked goods made with refined flour.



ILLUSTRATIONS: BEVERLY DEUTSCH

From Insulin Resistance to Type 2 Diabetes



Insulin resistance and diabetes develop over time, moving from normal insulin production and insulin use by the body to a point where insulin is no longer being made adequately or used properly.

Normal:

- Your body makes enough insulin and uses it well.
- A fasting blood glucose test result would be 4.0–6.0 mmol.

Impaired fasting glucose (IFG):

- Your body isn't using the insulin it produces well and insulin resistance is present, resulting in hyperglycemia, or high blood sugar.
- A fasting blood glucose test result would be slightly high at 6.1–6.9 mmol.

Diabetes mellitus:

- There isn't enough insulin being made by your body and you can't use glucose for energy.
- This is determined by a fasting blood glucose test with a result 7.0 mmol or higher, or a glucose result over 11.1 mmol after an OGTT.
- Diabetes can also be diagnosed with any blood glucose level over 11.1 mmol, if accompanied by diabetes symptoms such as frequent urination, unexplained weight loss, fatigue, and increased hunger and thirst.

The following nutrition recommendations can help you optimize your efforts in preventing and managing insulin resistance and have been consistently shown to be your best defense.

FIGURE OUT FATS

The quality of the fat in your diet can influence insulin resistance over the long term. Studies have shown a link between increased insulin resistance and a high intake of saturated and trans fats—while the healthier polyunsaturated, omega-3 and mono-unsaturated fats are associated with a lower risk of insulin resistance. Reduce saturated and trans fats by choosing lean meats, skinless chicken and low-fat dairy, and limiting baked, fried and breaded foods. Read food labels and try to limit foods with “hydrogenated” oils. Emphasize healthier, monounsaturated fats by using canola or olive oil in cooking and baking, and eating nuts and seeds and avocado. The best sources of omega-3 fats are found in ground flax, soy products and fish.

FILL UP ON FIBRE

Dietary fibre has been shown to improve both insulin sensitivity and blood glucose levels. There are two types of fibre—insoluble and soluble—which occur together in foods. Both are important for health, but soluble fibre has been shown to slow down the digestion of carbohydrate in food and, therefore, the rate at which digested carbohydrate (glucose) enters the bloodstream. Less insulin is released and the result is a lower post-meal blood glucose level, which helps to lessen the amount of insulin required and will help to lower your risk of insulin resistance and progression to diabetes. Aim for 5–10 grams per day of soluble fibre from oat bran, psyllium, guar gum and pectin. (To help you reach this goal, look for the soluble fibre content on food labels. If you're getting at least 5 servings of fruits and veggies and more than 5 servings of 100% whole grain breads and products per day, you'll easily get 5 grams of soluble fibre.) Good food sources of soluble fibre are barley, prunes, Metamucil, cold cereals (Quaker Oat Squares, Quaker Corn Bran, Bran Buds with Psyllium, Kashi), ground flax seed, low-fat popcorn, oat bran, oatmeal, apples, oranges and many other fruits and veggies.

DISH IT OUT

To help control the amount of glucose absorbed by the digestion of carbohydrate, it's important to manage the amount of carbohydrate you eat at each meal and distribute it evenly over the course of the day. Try to eat smaller, more frequent meals. Aim to have 3 meals and 2–3 snacks each day, eating a variety of foods, with 50% of your plate comprised of veggies, 25% starch/carbohydrate and 25% protein.

SUPPLEMENTS

Population studies (in which large groups of people are followed to see what kinds of foods they're eating and whether or not they develop certain diseases) have found associations between certain nutrients in food and a lower risk of insulin resistance and

diabetes. Studies that have used supplements have not obtained the same results. This may be because the nutrients found in food work together, and simply supplementing with a vitamin or mineral on its own doesn't work in the same way. It's always best to get your nutrients from minimally processed whole foods.

THE SWEET HEREAFTER

While the exact causes of insulin resistance are not known, making healthier lifestyle choices is still an important first step in preventing and managing this complication. For PHAS on HAART, regular blood glucose monitoring (every 3–4 months) as part of your blood work is important to detect any changes before they progress to a potentially worse condition. If left untreated, high blood sugar can lead to a wide range of long-term health problems, including kidney dysfunction, retina damage leading to blindness, nerve damage, erectile dysfunction and pregnancy complications. As well, chronic high blood sugar can contribute to blood vessel damage and cardiovascular disease, including heart attacks and stroke.

Diagnosing blood glucose abnormalities is usually done through the following tests:

- **fasting blood glucose**—blood sugar is measured after an 8-hour fast, with no food or beverages except water
- **oral glucose tolerance test (OGTT)**—blood sugar is measured after an 8-hour fast, then you drink a sugar solution and blood sugar is measured every 30 minutes for two hours to see if blood glucose levels rise and fall normally

By working with your health care providers and linking up with support resources for diet and exercise, you can take control in preventing and managing the development of long-term insulin-related complications. +

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