

A look at how Iiyiyu medicinal plants affect diabetes: part two*

Searching for diabetes treatments that are acceptable to Iiyiyuch

Diabetes rates are rising all over the world. They are especially high in First Nation people, including Iiyiyuch. But the usual ways of teaching people how to control their diabetes do not work well in Iiyiyu Aschii. This may be because they do not fit with Iiyiyu culture. As a result, many Iiyiyuch have health problems caused by their diabetes, like kidney disease. Health workers are looking for a better way. They think that treatments based on Iiyiyu healing plants might be easier for people to accept and follow.

In 2003, Elders in Iiyiyu Aschii and plant scientists started to look at healing plants together. The Elders told the scientists about 17 plants that could help with diabetes. The scientists began to test these plants in the lab, and the results for the first eight plants were good. (See the report “A first look at how eight Iiyiyu medicinal plants affect diabetes.”) This study looks at the results for the other nine plants. These were

- Creeping snowberry
- Ground juniper
- Sheep laurel
- Common clubmoss
- White spruce
- Balsam poplar
- Northern Labrador tea
- Tealeaf willow
- Mountain cranberry

Other people have also found that these nine plants are healing. In fact, five of them have already been looked at by other scientists to see if they might help with diabetes. This study takes a closer look.

* This is a plain-language summary of an article by Harbilas and others entitled “Evaluation of the anti-diabetic potential of selected medicinal plant extracts from the Canadian Boreal Forest used to treat symptoms of diabetes: Part II.” This summary was prepared for the Cree Health Board by Ellen Bobet in March 2008.

What the lab tests looked at

In these tests, the scientists looked at five ways that the plants might help fight diabetes.

1. Helping muscle and fat cells to store sugar

Most of the problems caused by diabetes come from having too much sugar in the blood. The sugar gets out of our blood by getting absorbed into our cells. Usually, this happens with the help of insulin. But when people have diabetes, their muscle and fat cells resist insulin. This means that less sugar gets stored. So the first question the scientists looked at was: Do the plants help cells to store sugar?

To test this they added sugar and water to cells in a lab dish, waited a while, and then broke open the cells and measured how much sugar went into them. Then they did the same thing again, but also adding plant extract. This showed if the cells absorbed more sugar when the plant extract was added. That is, it showed if the plants had some of the same effects as insulin.

In these lab tests, four of the plants helped cells to store sugar. The four were Creeping snowberry, Northern Labrador tea, Tealeaf willow, and Mountain cranberry. Of these, Mountain cranberry had the most effect: it was as strong as one of the standard diabetes drugs, Metformin.

2. Increasing how much insulin the body makes

Our pancreas makes insulin, which helps to store sugar in our cells. The scientists wanted to see if the plants help pancreas cells to make more insulin. To test this, they added sugar to pancreas cells and measured how much insulin they made. Then they did the same thing again, adding both sugar and plant extract, to see if the cells would make more insulin that way. However, it turned out that none of the nine plants helped the cells to make more insulin.

3. Acting on how the body stores fat

Our body takes the energy from sugar and stores it as fat so it can be used later. Some diabetes drugs seem to work by making cells store more fat. The scientists tested for this

by checking if cells absorbed more fat when the plant extracts were added. To check, they used a special kind of red dye that stains only fats but not other parts of the cell. Four of the plants – Sheep laurel, Common clubmoss, Northern Labrador tea, and Mountain cranberry – made cells store more fat. The plants did this about half as well as one of the usual diabetes drugs, called Avandia.

4. Protecting nerve cells against damage from sugar

Nerve cells die when there is either too much or too little sugar in the blood. When nerve cells die, people get effects like numb feet or vision problems. So the scientists tested the plants to see if they help protect nerve cells against damage. To do this, they added sugar to nerve-like cells in a lab dish, and counted how many cells died. Then they did the same thing again, but also adding plant extract, to see if fewer cells died when the plant was added. The tests showed that five of the plants helped protect cells against too much sugar. Four plants helped protect against too little sugar. White spruce had the greatest effect. It helped protect against both too much and too little sugar.

5. Protecting veins against damage from free radicals

Our bodies create tiny particles called “free radicals,” and people with diabetes have a lot of them. When we have too many, they damage our veins and make them clog up. Over time, clogged veins lead to heart disease. However, we know that many plants mop up free radicals and keep things in balance. They do this using things called “anti-oxidants.”

In these tests, the scientists looked at whether the Iiyiyiu plants help to destroy free radicals. They used a free radical called DPPH. When DPPH is killed by an anti-oxidant, it changes from purple to yellow. This means you can test whether a plant destroys DPPH: you add plant extract to a dish that contains DPPH, and then count how many particles turn yellow. By repeating this process with different plants, you can learn which plants kill the most free radicals.

The tests showed that five of the nine plants were very good at killing free radicals. This suggests that these plants might help to prevent heart disease. The five plants were Creeping snowberry, Sheep laurel, White spruce, Northern Labrador tea, and Tealeaf willow.

Next steps

The scientists have now done lab tests on all 17 of the plants on their list. But we know that some things that work in the lab don't work in real life, because digestion and other processes can change how a plant acts. So the next step is to test all of the plants that worked in the lab on live animals. Some of this work has already begun.

The scientists also hope to learn which of the many chemicals in the plants are the ones that have an effect and how they act. In the long term, this will help us to know how much plant extract a person should take to control their diabetes. It will also tell us

- Whether a person can safely use several plants at the same time for different problems
- Whether a person can safely combine traditional plants and some of the western medicines

Finally, this knowledge will help us find the best way to store traditional medicines so that they keep their power.