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A first look at how eight liiyiyu medicinal plants affect diabetes*

HOW DID THE STUDY BEGIN?

In 2003, Elders in liiyiu Aschii and a group of plant scientists started to work together to learn more about the plants that liiyiu use for healing. The Elders told the scientists which plants are used to treat the kinds of problems that people get when they have diabetes. Eight of the plants were mentioned by many different Elders, or were used to treat many different symptoms. So the team began by looking at these eight plants:

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- Balsam fir
 - Speckled alder
 - Tamarack
 - Black spruce
 - Jack pine
 - Labrador tea
 - Pitcher plant
 - Showy mountain ash

The plant scientists wanted to test these plants in the lab to find out more about how they work inside a person's body to make their diabetes better. For instance, do the plants work the same way as some of the "western" medicines used to treat diabetes? If they do, then maybe we should be careful about combining the western medicines and the liyiyu ones.

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d̄.Δ̄V̄a ·Δ̄R̄"ւ?
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σ̄"C̄D̄R̄"R̄b̄" گ Ր̄ Ե Ե Ր̄.Δ̄V̄"C̄d̄"ւ ՀԵ՞ Շ ◊σ̄c Հ"ւ
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◊σ̄τ̄ Ե ՞ Ր̄.d̄b̄Ḡ"Δ̄V̄<R̄"ւ Վ ՃՄ ◊d̄<ŪR̄"ւ? Վ
Վ>d̄ ◊σ̄τ̄ C̄.V̄"d̄ Δ̄b̄<ւ ՃՄ ◊d̄<ŪR̄"ւ
◊σ̄τ̄ σ̄"C̄D̄R̄"R̄b̄" .Ղ"ւ ◊d̄ Վ ՃՄ ◊d̄<ŪR̄"ւ
Ե ՞ Ր̄.d̄b̄Ḡ"Δ̄V̄<R̄"ւ?

They looked at two different kinds of questions. First, they looked at whether the plants could act to control diabetes itself. Second, they looked at whether the plants might help reduce some of the other health problems that diabetes causes (like numb feet or eye problems). At this stage, they were not looking for definite answers to these questions. Instead, they just wanted to identify which of the eight plants had the most promise and should be tested further.

DO ANY OF THE PLANTS ACT DIRECTLY ON DIABETES?

When we eat, the amount of sugar in our blood goes up. Then our bodies store this extra sugar in our cells so we can use it to produce energy later on. To do

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this, our bodies usually make insulin, which helps to store the sugar in the cells. When we have diabetes, either our bodies don't produce enough insulin or the cells do not accept the insulin very well. As a result, the sugar stays in our blood and does damage. So the first two questions the scientists looked at were:

1. Do any of the plants actually help people's bodies to produce more insulin?
 2. Even if they don't increase insulin levels, do these plants help the body to store sugar in the cells in some other way? That is, do the plants produce the *same effects* as insulin?

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ՃՄ ԼԿԵ.Ճ"Հ.Հ, ՇԺ Լ ճ ՇՎ.ՎՐ .Ճ"ՐՄ"Ճ.ՎՐ<Հ"Յ ՇԾՆՎ
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These first tests suggested that all eight plants that the Elders identified have some of the same effects as insulin. To a greater or lesser extent, they may all help the body to store sugar.

COULD ANY OF THE PLANTS HELP REDUCE THE COMPLICATIONS OF DIABETES?

Diabetes can damage the nerves that are far from the centre of the body. This happens because nerve cells die when a person's blood sugar is too high. Nerve cells also die when blood sugar is too low (for instance, if a person takes too much insulin by mistake). When the nerve cells die, people get effects like tingling, numbness, pain, or weakness in their feet and hands. If the nerves in the eye get damaged, people get vision problems and may even go blind.

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In the long run, the scientists want to know if any of the plants can reduce the nerve damage that diabetes causes. The tests they did were a first step in this direction, to see which plants seem to have some effects on nerves. First, they put nerve-like cells in a dish with a lot of sugar, and counted how many of them died. Then they did the same thing again, but also adding the plant extracts, to see if fewer nerve cells would die. It turned out that five of the plants helped to protect the nerve cells against being killed by high sugar levels.

Besides causing nerve damage, diabetes can affect the circulatory system—the heart and the way blood flows through the body. When this happens, people get heart disease. One of the things that

contributes to heart disease are tiny particles called “free radicals” that can damage the cells. We all have these particles, but our bodies continually mop them up using other particles called “anti-oxidants.” However, when a person has diabetes, their defences are not as strong, and they may need to get extra anti-oxidants from their food.

Most plants contain some anti-oxidants (this is one of the reasons vegetables are good for you). The scientists wanted to see if the eight plants in this study were especially high in anti-oxidants. They put them in a test tube with some "free radicals" to see how many they would mop up. Three of the plants turned out to be very high in anti-oxidants. They mopped up

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almost as many free radicals as Vitamin C, which is one of the strongest known anti-oxidants.

Our bodies can store sugar in fat cells, in muscle cells, or in the liver. Some types of anti-diabetic drugs (like Avandia) seem to work by helping people to store sugar mainly in their fat cells rather than elsewhere. When this happens, we notice that the fat cells grow quickly. So the scientists checked to see if any of the eight plants made fat cells grow faster than usual. Four of the plants did this. The scientists think this may mean that these four plants work in the same way as drugs like Avandia.

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SUMMARY

In sum, the plant scientists found that all eight plants had the potential to help with diabetes and are worth further study. Their attempts to come up with a "short list" of particularly promising plants failed, because all the plants had promise. The study showed that the different plants help in different ways. Many of them act the same way as insulin in lab tests, which may mean they can help with diabetes. (These plants will be tested on live animals next). Some of the plants help keep nerve cells in a test tube from being killed by too much sugar. Some are anti-oxidants, meaning that they help destroy particles that could damage the heart and veins. And some seem to encourage

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the body to store sugar in certain places rather than others, in the same way that some anti-diabetes drugs do.

* This is a plain-language summary of a report by D. Spoor, L. Martineau, C. Leduc and other members of the Anti-diabetic Plant Team that was published in the Journal of Physiological Pharmacology in 2006. The article was called "Selected plant species from the Cree pharmacopoeia of northern Quebec possess anti-diabetic potential".

