How mountain ash affects diabetes in live animals*

November 18, 2008

Purpose

Mountain ash has given good results in our lab tests. It seems to help muscle cells take up more sugar by acting the same way Metformin does. Now we are ready to test the plant on live animals. In this study, we looked at whether the inner bark from mountain ash would fight diabetes in three different situations, from mild problems to severe ones.

About how diabetes develops

The sugar that is in food enters the bloodstream to make its way to all our cells. To get into the cells, this sugar needs the help of insulin. If it cannot get into the cells, it stays in the blood and reaches levels that damage our bodies.

As people gain weight and stop exercising, their cells start to resist insulin. After every meal, it takes longer to get the sugar out of the blood. The pancreas reacts by making extra insulin, because the usual amounts are no longer doing the job. Unfortunately, having lots of insulin in the blood is also harmful. This stage is called pre-diabetes. At this stage, we notice that if the person drinks a big glass of sugar-water, it takes a long time for the sugar to get out of the blood. The person may still feel fine. But if nothing changes (like taking pills or doing more exercise), they are likely to get full-fledged diabetes in future.

When the pancreas has to work too hard, it eventually gets tired and makes less insulin than before. At this point, the sugar in the blood is high all the time, not

---

* This is a plain-language summary of an article by Rose Vianna, Antoine Brault, Louis Martineau, Réjean Couture, John Arnason, and Pierre Haddad, to be called "Anti-hyperglycemic and anti-hyperinsulinemic activities of Sorbus decora bark extract, a traditional medicine of Canadian native populations." (Draft of October 31, 2008.)

just after meals. This is Type 2 diabetes. Now the person has to take pills to help them absorb sugar normally. For instance, they might need to take Avandia or Glucophage.

In the long term, the pancreas may stop making any insulin at all. At this stage, the person needs to inject insulin after every meal. (The same thing happens with the small number of children who have Type 1 diabetes—the kind where there is something wrong with the pancreas so it can't make insulin.)

In this study, we tested mountain ash in mice and rats with all three stages of the disease: from pre-diabetes through to the point where the pancreas does not produce any insulin at all.

Effects in rats with pre-diabetes

First, we looked at whether mountain ash could help at the pre-diabetes stage. To test this, we fed rats sugar-water until they became pre-diabetic. (We knew they were pre-diabetic when they started to produce more insulin than normal. This is a sign that their cells were resisting insulin.) Then we gave them mountain ash extract to see if it would help their cells accept insulin better. Like Metformin, the plant seemed to do this. It seems to help insulin work better by doing the same thing as insulin—that is, by helping cells to store sugar.

This is exciting, because it means that besides treating diabetes, mountain ash might also help to *prevent* it. But to prevent it, people would have to start taking mountain ash regularly as soon as they become pre-diabetic. This could be long before they develop full-fledged diabetes. They'd need to think of the plant as just a part of their regular diet, rather than as a medicine they use to treat symptoms.

Effects in mice whose cells resist insulin

Next, we tried the plant in a more serious situation. We fed mice lots of lard until they became fat and their cells started to resist insulin. Their blood sugar went up, just as it does in humans who get Type 2 diabetes. Then we put mountain ash into their food for two weeks, and measured their blood sugars each day. The day-to-day change was small, but over the two weeks their blood sugar levels went steadily down. We think this is because the plant has long-term effects that gradually build up and help to control blood sugar.

Effects in rats that can't produce any insulin at all

In the final set of tests, we used rats that couldn't produce any insulin at all. This made their blood sugar levels extremely high—like what happens in people with Type 1 diabetes. First, we gave the rats just one dose of mountain ash and checked their blood sugars. Then we checked what happened when we gave the rats mountain ash every day for four days.

We found that the mountain ash had a fast, short-term effect on blood sugars. Besides this, it also produced changes in the animal starting a day later. That is, the plant had both a short-term effect and a longer-term "bonus" effect. (One of the common diabetes drugs, Metformin, also acts this way.) If you take the plant each day, you not only get the short term effect each time, but the bonus effects from each day add up. So you get more and more effect over time. (This is also what happened in the mice whose cells resisted insulin.) We gave the rats mountain ash for four days, and found that their blood sugar levels got steadily lower.

Conclusions

This study found that mountain ash works to reduce blood sugar in live animals. The plant produces the same kind of effects as insulin. So it would help people who are still making insulin, but whose cells have started to resist the insulin. And it could work a little for people whose bodies have stopped making insulin.

From our previous lab tests, we know the plant uses a different pathway than insulin. The insulin pathway can start to resist insulin; but the pathway the plant uses always works, even in very sick animals. This study with the animals supports this. In some of our other studies, we think we have found out how mountain ash works to lower blood sugar.[*] We think the plant works the same way as Metformin. That is, we think the plant tricks our cells into using up more energy (sugar) than they normally would.

In short, this plant shows a lot of promise for helping Iiyiyiuch to prevent and control diabetes. However, to get the most benefit, people will still need to do other things like watch their diet and stay active.

[*] See the summary called "How the healing plants work to lower blood sugar levels."