

## Lowbush Cranberries as a Way to Fight Weight and Diabetes Results from some studies on mice\*

### Background

This study continues our work on lowbush cranberry, by looking at how it works in live animals. We used lowbush cranberries collected from around Whapmagoostui.

Our previous studies<sup>†</sup> had told us

- That lowbush cranberries held promise for lowering blood sugar levels (based on lab tests).
- That the “active” ingredients in the berries are something called quercetin, and its spin-off products. (It helped to know this, because other scientists had already looked at quercetin. They had found that it has anti-diabetic effects in animals.)
- That lowbush cranberries seem to work by fooling our muscle cells into thinking they lack sugar. As a result, the muscle cells accept more sugar from our blood. This lowers the amount of sugar in the blood, and is good for diabetes.

This time, we wanted to do two things. First, we wanted to find out more about how lowbush cranberries lower blood sugar. We *thought* they did this by “fooling” our muscle cells into taking in more sugar than they otherwise would, but we were not sure. We wanted more details on exactly what happens.

Second, we wanted to see if lowbush cranberries have the same kinds of effects in live animals as they have in lab tests. We took mice with Type 2 diabetes, and gave some of them cranberry juice in their drinking water. Then we checked if those mice were healthier than the ones that didn’t get cranberries. (We also did some tests on non-diabetic mice, to find out what happens when you give cranberries to a healthy animal.)

### How do lowbush cranberries work?

Like last time, our lab tests showed that lowbush cranberries help muscle cells take in more sugar. In fact, the berries were as good as insulin at doing this. Next we wanted to know more about *how* the sugar was getting into the muscle cell. Here it will help if we think of a muscle cell as a large building like an arena, with some delivery trucks to move things around in it. The arena is heated with woodstoves, but most of the wood is stacked outside. The arena manager’s job is to make sure it never gets too cold:

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\* This is a plain-language summary of a more technical article by Hoda Eid, Antoine Brault, Farah Thong, Merieum Ouchfoun, Diane Vallerand, John Arnason, Gary Sweeney, and Pierre Haddad, called “*Vaccinium vitis-idaea*, a medicinal plant of the Eastern James Bay Cree, mobilizes L6 muscle Glut4 transporters and exerts anti-obesity and antidiabetic effects *in vivo*.” (Version of April 6, 2010.)

<sup>†</sup> See the summaries called “How lowbush cranberry works to lower blood sugar levels” and “How the healing plants work to lower blood sugar levels.”

if the stoves run low, he sends whatever trucks he has to bring in more wood. So how much wood the arena uses up depends on two things: whether the manager thinks the stoves are running low on fuel, and how many trucks he has available. If for some reason you *wanted* the arena to use more wood than usual, you could try to fool the manager into thinking the stoves were running low, or you could provide more trucks—or both.

Like the arena, a muscle cell also burns fuel—but in this case, it burns sugar, not wood. This gives us energy to live, stay warm, and move around. The sugar is mostly found outside the cell, in our blood. And like the arena, a muscle cell has a “manager” (called AMP Kinase) who can send for more sugar when needed. The “trucks” a muscle cell uses to move sugar around are called GLUT transporters.

Our earlier tests showed us clearly that lowbush cranberries somehow make a cell take in more sugar than usual. The tests we did in this study told us that the plant does this by supplying more trucks (GLUT4 transporters). We also think the plant might “fool” the manager into ordering more sugar to be brought in, but we are not yet sure about this part. Some of our tests indicated this was happening, and others didn’t.

### **Do lowbush cranberries work in live animals?**

The results from the mouse studies were really interesting. Recall that we compared two groups of diabetic mice—one group that got lowbush cranberry juice in its water, and the other that didn’t. The mice that got cranberries

- Immediately started to eat less—their appetites went down and stayed down, and they lost weight.
- Their blood sugar levels fell a lot.
- Their insulin levels went back closer to normal.
- They built up less fat in their livers, and as a result, their livers made less sugar than before.
- Their muscles seemed to become less insulin-resistant.
- They also drank less. Diabetic mice usually drink a lot more than usual; but these mice drank normal or almost-normal amounts. We think this is because their blood sugars had gone down. It might also be partly because cranberry juice makes water taste different.

All of these things are good for diabetes.

We think these good results are not so much because cranberries fight diabetes directly as because they fight weight, and lower weight is good for diabetes. To test this, we measured exactly how much the cranberry-eating mice ate each day. Then we took another group of diabetic mice, and only gave them as much food as the cranberry-eating mice had eaten. Like the cranberry-eating mice, these mice too lost weight and had better blood sugars and insulin levels than before. Interestingly, when we gave cranberries to mice that *didn’t* have diabetes, their appetites didn’t go down.

We don’t know exactly how the plant works to reduce appetite. (We tested one way, and that wasn’t it.) But we are sure the plant is not harmful, since people have been eating lowbush cranberries for

generations. Also, the mice that got the cranberry juice showed every sign of being healthy. In short, this plant seems to reduce appetite and weight without being bad for you. These findings are very exciting. It would definitely be worth testing lowbush cranberries on humans with diabetes. Iiyiyu Aschii would be a good place to start doing this.