

## Lowbush cranberry and AGEs

### Preventing some of the problems that go with diabetes\*

August 19, 2008

#### Purpose

This study looks at whether lowbush cranberries can prevent some of the problems that diabetes causes. It does this by seeing if cranberries help keep “AGEs” from forming in our bodies. AGEs are particles that play a role in the heart, nerve, kidney, and eye problems that often go with diabetes.

#### About plants and AGEs

Sugar can combine with other things in our bodies to form particles called “free radicals” and “AGEs.” Because people with diabetes have a lot of sugar in their blood, they have a lot of these particles. Some of them do no damage, but others are harmful. The harmful types can damage the lining of our veins and eventually make them clog up. They also fool some of our cells into reacting the way they would to a bad germ—that is, by heating up to kill it. This causes heat and swelling (inflammation).

Together, the vein-clogging effect and the heating effect damage our veins. In the long term, this contributes to some of the problems that go with diabetes like

- Heart disease
- Eye problems
- Kidney problems
- Tingling or loss of feeling in the hands and feet.

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\* This is a plain-language version of an article by Louis-Philippe Beaulieu, Cory Harris, Ammar Saleem, Alain Cuerrier, Pierre Haddad, Louis Martineau, Steffany Bennett, and John Arnason called “Inhibitory effects of the Cree traditional medicine wiishichimanaan (Vaccinium vitis-idaea) on Advanced Glycation Endproduct formation: identification of active principles.” (Draft of July 14, 2008.)

Further, once this process has started, it tends to feed on itself. By acting with the “bad” cholesterol in our bodies, the free radicals and AGEs multiply.<sup>†</sup> The result is more and more damage.

Within limits, our bodies repair this damage—and some of the plants we eat help us to do this. Plants contain ingredients called antioxidants that “mop up” free radicals. Some plants also have ingredients that keep AGEs from forming. This helps us avoid the health problems that AGEs cause.

In the past, scientists have tried to create drugs that would limit how many AGEs we produce. This approach did not work because the drugs had too many side effects. Instead, perhaps we should just eat lots of plants that have AGE-fighting ingredients. Some of the plants that Iiyiyiuch traditionally ate seem to be very high in these good ingredients. If people went back to eating these plants, they might get fewer problems with their diabetes.

### **Traditional uses of lowbush cranberries**

Scientists know that some of the ingredients in lowbush cranberries fight viruses and are good for the urinary system. Cree healers also know about these effects, and have long used lowbush cranberries to treat things like bladder infections. Across Canada, Cree peoples have traditionally used lowbush cranberry plants to treat

- Bladder infections, frequent urination
- Abscesses
- Sore eyes
- Snow blindness
- Thrush
- Stomach problems

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<sup>†</sup> For details on how this happens, see the summary called “Can Iiyiyiu healing plants help with heart disease caused by diabetes?”

- Problems after childbirth
- Toothache

(See the table at the end of this paper for a more complete list.)

### **Do lowbush cranberries fight AGEs?**

There are 40–50 different types of AGEs, and we cannot check if the plants fight every one of them. But we can test different types or groups of AGEs. In this study, the scientists ran tests on two different kinds of AGEs.

#### **Tests on AGEs that absorb fluorescent light**

About ten of the AGEs can be detected by the way they absorb fluorescent light. This allows us to check (in a lab dish) if fewer AGEs are formed when you add cranberries to the mix. It turns out that lowbush cranberries do limit how many of these AGEs are created. The more cranberries you add, the fewer AGEs you get. In fact, the scientists were able to estimate how much cranberry it would take to cut the number of AGEs in half.

Once they knew that the cranberries fight AGEs, the scientists looked in more detail at the ingredients in the berries. They found two specific ingredients that seem to play a big role in preventing AGEs, and one that plays a smaller role. These three ingredients are already known to be strong antioxidants (that is, good at fighting free radicals). The scientists were very interested in this result, because there is debate about exactly *how* certain chemicals prevent AGEs. The current theory is that free radicals are somehow involved in the process that creates AGEs. So when a plant mops up free radicals, it short-circuits the process and prevents AGEs from forming. The results in this study fit with that theory, because the ingredients in cranberry that were best at preventing AGEs were already known to be good at fighting free radicals.

### **Tests on a second type of AGE**

Do the cranberries also stop other kinds of AGEs from being formed? This second set of tests looked at a specific AGE called CML. This one is of interest because we know it is involved in diabetes. Also, the process that creates it is very similar to the one that forms other kinds of AGEs. So if a plant prevents CML from being formed, the odds are good that it will also work on other AGEs. The results on this test were even better than the first one: lowbush cranberries seem to be excellent at keeping CMLs from forming.

### **Conclusions**

This study suggests that lowbush cranberries could protect our veins and heart against damage in several different ways. First, they mop up more free radicals than some other berries and fruits. They stop the vicious circle in which free radicals and AGEs multiply. And they stop AGEs from being produced—at least in lab tests. Lab results don't always transfer to real life, so the next step is to do tests on live animals. However, studies have already shown that when people eat fresh cranberries, they absorb one of the ingredients that helped block AGEs in these tests. So we think that we will see some effects in real life.

The lab tests developed for this study will be useful in future. Now that we know that they work well, we can use them to check if other plants also help to keep AGEs from forming.

As diabetes rates go up around the world, more and more peoples will be looking for treatments that fit with their beliefs and traditions. This study suggests that lowbush cranberry could be one such treatment for the Cree. More broadly, these kinds of studies are a way for traditional and western healers to share their knowledge and help people to stay healthy.

## How Cree nations use lowbush cranberry for healing

<b>Uses mentioned by healers in Iiyiyiu Aschii</b>		
<b>Problem</b>	<b>Part of plant used</b>	<b>Community</b>
Sore eyes	Juice of berry	Whapmagoostui
Abscesses	Juice of berry	Whapmagoostui
Snow blindness	Juice of berry	Whapmagoostui
Toothache in babies	Branches and leaves	Whapmagoostui
Thrush *	Juice of berry	Whapmagoostui
Urinary problems	Boiled berries and drink	Whapmagoostui
Increased urination **	Berry — raw or in jam	Mistissini
<b>Uses described in past reports</b>		
Snow blindness	Berry	
Stomach problems	Berry	
Fever	Berry	
Bladder problems	Berry	
After childbirth	Root	

\* Iiyiyiu healers learned about this use from Inuit.

\*\* This use has already been published in another article from the Cree Anti-diabetic Plant Project. (See Charles Leduc and others, “Plants used by the Cree Nation of Eeyou Istchee (Quebec, Canada) for the treatment of diabetes: A novel approach in quantitative ethnobotany.”)