# Scientists study rare dinosaur skin fossil to determine skin colour for first time

April 29 2013

University of Regina physicist Mauricio Barbi and a rare hadrosaur skin sample.

One of the only well preserved dinosaur skin samples ever found is being tested at the Canadian Light Source (CLS) synchrotron to determine skin colour and to explain why the fossilized specimen remained intact after 70-million years.

University of Regina physicist Mauricio Barbi said the hadrosaur, a duck-

billed dinosaur from the Late Cretaceous period (100-65 million years ago), was found close to a river bed near Grande Prairie, Alberta.

The area has a robust "bone bed" but Barbi is not yet sure why the fossil preserved so well.

"As we excavated the fossil, I thought that we were looking at a skin impression. Then I noticed a piece came off and I realized this is not ordinary – this is real skin. Everyone involved with the excavation was incredibly excited and we started discussing research projects right away."

Barbi said this is only the third three-dimensional dinosaur skin specimen ever found worldwide.

"This fossil is fascinating because it can tell us so much about the life and the appearance of the dinosaurs in the area."

But there are almost more questions than answers, he said.

One question is whether the hadrosaur skin was green or grey, like most dinosaurs are portrayed, or was it a completely different colour. Barbi said he can use the CLS to look at unique structures called melanosomes, cellular organelles the contain pigments that control the color of an animal's skin.

Hadrosaur skin sample.

"If we are able to observe the melanosomes and their shape, it will be the first time pigments have been identified in the skin of a dinosaur," said Barbi. "We have no real idea what the skin looks like. Is it green, blue, orange…There has been research that proved the colour of some dinosaur feathers, but never skin."

Using light at the CLS mid-infrared (Mid-IR) beamline, Barbi and CLS scientists are also looking for traces of organic and inorganic elements that could help determine the hadrosaur's diet and why the skin sample was preserved almost intact.

For the experiment, the sample is placed in the path of the infrared beam and light reflects off of it. During the experiment, chemical bonds of certain compounds will create different vibrations. For example, proteins, sugars and fats still found in the skin will create unique vibrational frequencies that scientists can measure.

"It is astonishing that we can get information like this from such an old sample," said Tim May, CLS Mid-IR staff scientist. "Skin has fat and lots of dead cells along with many inorganic compounds. We can reflect the infrared beam off the sample and we can analyze the samples to give us very clear characteristics."

May said that infrared techniques are so accurate at determining chemical characteristics that it is known as the "fingerprint region" of the light spectrum.

But perhaps the greatest question Barbi is trying to answer at the CLS is how the fossil remained intact for around 70-million years.

"What's not clear is what happened to this dinosaur and how it died," he said. "There is something special about this fossil and the area where it was found, and I am going to find out what it is."

Provided by Canadian Light Source