Paleontologists deplume feathery dinosaur

If people can have their 15 minutes of fame, so can dinosaurs. Most recently, the international spotlight has focused on a chicken-size fossil from northeast China, its body apparently fringed with downy impressions. For paleontologists who believe that birds evolved from dinosaurs, this specimen seemed the ultimate feather in their cap.

An international team of researchers that examined the Chinese fossil now concludes that the fibrous structures are not feathers. Even more important for the future, however, the scientists report that the fossil site is awash with specimens—some showing remarkable features seen nowhere else.

"I think this represents a missing chapter in geologic time that has not been recognized until now," says paleontologist John H. Ostrom of Yale University, who led the team. "It is loaded with fossils of birdlike things, dinosaurs, mammal remains, insects, fish, and plants. I suspect that this site will be of major importance 100 years from now," he says.

Accompanying Ostrom were ornithologist Alan H. Brush of the University of Connecticut in Storrs, paleontologist Larry D. Martin of the University of Kansas in Lawrence, paleontologist Peter Wellnhofer of the Bavarian State Museum in Munich, and photographer David Bubier of the Academy of Natural Sciences in Philadelphia, which sponsored the expedition. The scientists described their findings in Philadelphia last week.

The fossil that launched this trip was uncovered last summer by a farmer in Liaoning Province. He split the fossil in two and sold one part to a museum in Beijing and the other to a museum in Nanjing (SN: 10/26/96, p. 260).

During their recent trip to China, Ostrom and his colleagues spent 2 weeks visiting the museums in Beijing and Nanjing and traveling to Liaoning to view the discovery site. After examining the famous fossil with microscopes and hand lenses, the scientists came to an indefinite conclusion. "We do agree: We cannot say. We don't understand exactly what the fibers are," says Ostrom, who has long supported the idea that birds evolved from feathered dinosaurs.

Martin, a steadfast opponent of the bird-dinosaur connection, goes further. "The whole group will agree there are no feathers. The big discussion is whether these fibers are under the skin or above the skin," he says.

If the fibers were within the skin, as Martin believes,, they could have been part of a ridge similar to the frill of an iguana. If the fibers sat above the skin, they would be more analogous to feathers or bristles. They could be protofeathers—a structure that preceded the evolution of true feathers, says Brush.

Beijing paleontologists have named their fossil sinosauropteryx. Ostrom and the international team, however, concluded that the Chinese dinosaur may fit into a rare genus called *Compsagnathus*, known previously from only two fossils in Europe.

While studying another specimen of the same dinosaur, also from the northeast China site, the scientists found the jawbone of a tiny mammal in the gut of the larger beast—the first evidence of a dinosaur preying on our early relatives. The same site has also yielded early bird fossils and possibly the first known flower, says paleontologist Don Wolberg, who organized the academy trip.

The age of the site remains an object of contention. Chinese and Western scientists have reported various dates ranging from 140 to 120 million years ago, a span that stretches from the end of the Jurassic period to the beginning of the Cretaceous. Ostrom and his colleagues collected specimens of volcanic rocks that should allow scientists to determine more exactly the age of the fossils. —*R. Monastersky*

Bubier/Acad. Nat. Sci., courtesy Chen Pei-Ji

Dinosaur with unusual fibers on its back.

Hormone may directly trim fat from cells

Leptin, a hormone secreted by fat cells, burst into the spotlight in 1995, when investigators found that injections of it could dramatically slim obese and even normal mice (SN: 7/29/95, p. 68).

The simple model proposed at the time was that leptin circulates into the brain and helps regulate food intake. If an animal put on too many pounds, the theory went, its fat cells simply secreted more leptin to reduce the appetite.

Simplicity rarely lasts long in biology.

Leptin is now seen as a versatile hormone that probably has roles both inside and outside the brain. This week, scientists report that leptin may govern mechanisms that prevent cells from storing fat. As a result, the hormone may offer protection against some forms of diabetes.

The new findings emerged from studies of rats with unusually high concentrations of leptin in their blood, explains Roger H. Unger of the University of Texas Southwestern Medical Center in Dallas. To create the animals, he and his colleagues added the human leptin gene to rats.

Like other scientists, Unger's team noticed that almost all fat disappeared from the animals. The slimming was so dramatic that the group suspected more than appetite suppression was involved.

Following up on that suspicion, Unger and his colleagues found that cellular concentrations of triglycerides, commonly known as fat, are significantly lower in rats with extra leptin than in normal rats. Most cells synthesize triglycerides for long-term energy storage.

The researchers then conducted test-tube studies in which they exposed rat pancreatic beta islet cells to leptin. The hormone significantly reduced the triglyceride content of these cells, they report in the April 29 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

Leptin seems to inhibit the conversion of free fatty acids to triglycerides, says Unger. The hormone also appears to trigger the breakdown of cells' existing triglycerides. "We want to know the mechanisms for this," says Unger.

These newly discovered actions of leptin may have implications for diabetes, particularly the adult forms that arise because of the body's increasing resistance to the action of insulin, the hormone that regulates glucose in the blood.

First, leptin's triglyceride trimming may improve the body's overall production of insulin by beta islet cells. Researchers have found that people with diabetes often have abnormally large amounts of triglycerides in such cells. "If you stuff an insulin-making beta cell with fat, it doesn't work as well," says Unger.

Second, if leptin keeps the triglyceride content of other cells low, it may increase insulin's impact. "When you reduce fat in tissues, you increase their sensitivity to insulin," notes Unger.

The new work shows convincingly that, in addition to leptin's indirect actions via the brain, the hormone has "direct effects, particularly on pancreatic islets, which is something that really hadn't been suspected," says Simeon I. Taylor of the National Institute of Diabetes and Digestive and Kidney Diseases in Bethesda, Md. —*J. Travis*