IV collagen reproduce rapidly for several weeks, also maintaining their adult functions. These cells resemble a liver regenerating after a portion has been surgically removed. Finally, cells on type I collagen resemble cells in a "wounded" liver, for example the liver of a hepatitis patient or a liver repeatedly exposed to alcohol. These cells lose their adult functions, reverting to a fetal form. Reid also observed a surprising "synergy." Cells growing on collagen required fewer hormones than those on plastic.

The same correlations between collagen type and cell characteristics have been determined by microscope examination of liver tissue. Tony Martinez of Hahnemann University in Philadelphia finds that hepatocytes are associated with each of these three types of collagen depending on the liver's condition. In a quiescent liver, the hepatocytes contribute type III collagen to the extracellular matrix. After part of the liver has been removed, the remaining hepatocytes produce type IV collagen. But in a wounded liver, the hepatocytes make predominantly type I collagen.

Other components of the extracellular matrix also influence the activity of liver cells, Reid reports. Among these components are long sugar chains, called glycosaminoglycans (GAGs). These are sometimes found attached to proteins, and then they are referred to as proteoglycans. GAGs or proteoglycans from liver extracellular matrix have dramatic effects on liver cells growing in tissue culture.

In the presence of either active GAGs or proteoglycans, the cells change shape and pack together tightly as in a normal liver. These matrix components also induce the cells to synthesize special membrane structures, called gap junctions, that allow electrical signals to pass from one cell to the next, a characteristic of normal liver cells.

The influence of the components of the extracellular matrix on regulation of liver cell growth and specialization involves the turning on of certain genes and the turning off of others. Some major problems in modern biology involve the underlying mechanisms of such developmental control. The liver cell studies demonstrate that in some cases this regulation relies on different rates of the first step in gene expression: the copying of a gene into messenger RNA. But in other instances the control comes later, via differences in the rates at which messenger RNA molecules are broken down in the cell. Differences in messenger RNA degradation are often cited as a possible mechanism for control of gene expression, but there have been few examples demonstrated. For both types of control, Reid and her colleagues observe differences in the regulation of the "common" genes, active in all cells, and of the genes that provide liver cells with their characteristic properties.

— J.A. Miller

Cretaceous creatures make a comeback

The camptosaurs have resurfaced. A large deposit of bones that belonged to these and other dinosaurs that lived more than 100 million years ago — a period that has yielded few fossil remains — has been uncovered about 75 miles southwest of Fort Worth, Tex. Scientists involved in the excavation say the find should provide new insights into plant and animal life at the time.

"In terms of both quality and abundance of fossils, this ranks among the most productive sites in the world," says paleontologist Louis Jacobs of Southern Methodist University (SMU) in Dallas, who supervised the dig with Phillip Murry of Tarleton State University in Stephenville, Tex., also a paleontologist. "We've probably removed about a half dozen fairly complete dinosaur skeletons, and there are a number of partial skeletons," Jacobs told SCIENCE NEWS. "A lot more are still in the ground."

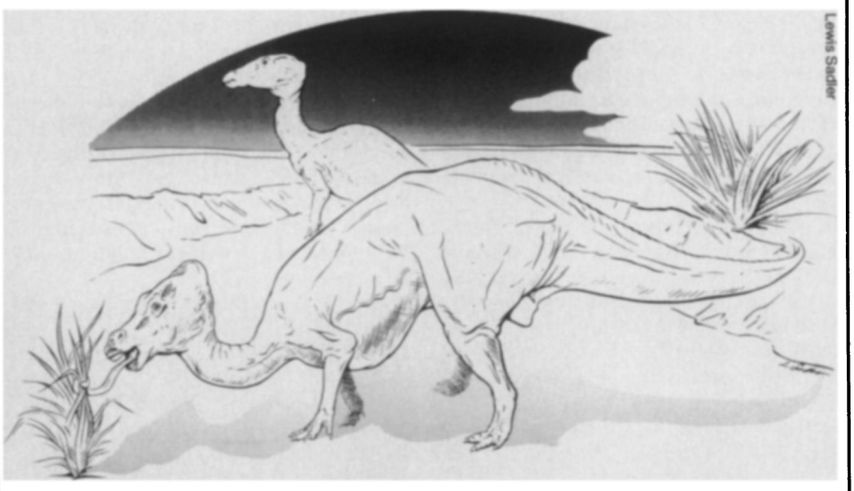
The skeletons appear to represent several previously unknown species, says Murry. "Certain skull bones are unlike any we've ever seen," he explains. Most of the uncovered dinosaurs were plant-eaters related to the camptosaurs, observe the scientists. These relatively small creatures walked on their hind legs most of the time. None of the skeletons is longer than about 10 feet. Murry notes that the new discoveries may flesh out the evolution of camptosaurs during the Cretaceous period, between 135 million and 65 million years ago.

Another skeleton at the site has the jaw and teeth of a meat-eater, he adds.

The dinosaur fossils were found in June by Tarleton State geology student Rusty Branch. He noticed bits of fossil bones exposed on the surface of ridges between gullies that had eroded near the shore of Proctor Lake in northern Texas. The team of scientists then removed the earth surrounding the fossils and encased each skeleton, or several partial skeletons, in a plaster cast for transport to laboratories at SMU.

Research associate Will Downs, director of the laboratory work, estimates it will take from six to eight months to remove each skeleton from its cast. After that, scientific analysis begins.

In addition, says Murry, there are an abundance of bones still to be excavated at the site. For now, however, the scientists will screen soil for bone fragments from other animals that existed in the early Cretaceous period of 100 million years ago.



Camptosaurs of 100 million years ago are depicted in an artist's drawing.

"The layers of earth below the animal bed should have pollen for analysis," adds Murry. "At that time it was early in the history of flowering plants."

The age of the dinosaurs unearthed so far was estimated by the known dates of marine fossils embedded in limestone just above the layers of earth containing the skeletons.

Early Cretaceous dinosaur fossils are scarce and have been found in only a few sites, points out Murry. Dinosaurs became extinct at the end of the Cretaceous period. The oldest known dinosaur was recently discovered in Arizona's Petrified Forest National Park by University of California at Berkeley paleontologists; it lived about 225 million years ago (SN: 5/25/85, p. 325).

The great number of fossils at the Texas site, located on federal land managed by the U.S. Army Corps of Engineers, has discouraged further fieldwork. "We won't remove more than we can handle," says Jacobs. Closer study of what has already been recovered, observes Murry, may reveal "how these fossils relate to their environment and how they fit into a geological time frame."

— B. Bower