

SCIENCE NEWS of the week

Blood Change Linked to Cancer

Cancer can cause a change in blood fats that can be detected with nuclear magnetic resonance (NMR) spectroscopy, report scientists from Beth Israel Hospital in Boston. This change may prove useful as a diagnostic screen, but it will take much further study to determine its ultimate value, according to the researchers and other scientists in the field.

NMR data, formulated into an image, can show the difference between normal tissue and a tumor. Previous attempts using NMR spectra to find identifying features in blood from tumor patients showed only some small differences. The Boston researchers decided to try tuning out the strong signal from water to see whether what remained – basically, the signal from the fat-containing lipoproteins – would show a clearer difference between people with cancer and people without.

Eric T. Fossel, Justine M. Carr and Jan McDonagh used NMR spectroscopy to examine blood plasma from 44 healthy controls, 56 people with benign tumors, 12 pregnant women, 60 sick people, 81 as-yet-untreated cancer patients and 58 people who were being or had been treated for cancer. They used a magnetic field to align the atomic spins of protons in the blood, perturbed the spins with radio waves and measured spectroscopically the way in which the spins realigned themselves.

The researchers found a distinct difference in the way plasma from cancer patients reacted. For reasons yet to be determined, the protons in the lipoproteins of people with cancer were held more “loosely” – they took a longer time to snap back into alignment than those of the other groups. The only noncancer blood that looked similar to the cancer blood came from pregnant women and from men with benign enlarged prostates.

A blood screen capable of picking up a malignancy before it becomes clinically apparent would enable earlier intervention. While several blood-based cancer detection methods are currently available, none is specific enough for use as a general screen; they are used primarily to follow the course of an established tumor and evaluate therapy.

These previously established blood tests, all of which at first appeared to be very promising, are based on measuring proteins sloughed off from tumors. The Beth Israel procedure, the researchers suggest, may be picking up not a product of tumor cells but a change that occurs in the tumor's host – some sort of alteration of normal lipid metabolism.

“It isn't that it's a different chemical or

a different amount or any of that,” says Fossel, but rather how the lipoproteins are arranged in people with cancer. “But why that is we don't know,” he says.

The lack of a precise physiological explanation – a specific lipoprotein change, and a reason for that change – is causing other researchers in the field to react with caution. Says Jack S. Cohen, an NMR spectroscopist with the National Cancer Institute, “The fat signals are really many overlapping peaks. My guess is you're going to find values all over the place, in fat people versus thin people, in different kinds of cancer.”

“It's basically an isolated phenomenon without an apparent explanation,” Philip

S. Schein of the University of Pennsylvania in Philadelphia, whose editorial accompanies the research report in the NOV. 27 NEW ENGLAND JOURNAL OF MEDICINE, told SCIENCE NEWS. “A great deal of work needs to be done to determine what is producing the alteration.”

Fossel says a long-term prospective study involving thousands of patients for many years will be necessary to determine whether the changes are useful in detecting a cancer before it is apparent. In the meantime, he says, the test may prove useful within a couple of years in monitoring therapy or diagnosing cancer in people with some signs of the disease.

—J. Silberner

Fossil claw unearths a new family tree

When Dr. Morbius's invisible creature attacks a spaceship crew in the film “The Forbidden Planet,” the first clue to its appearance comes from a plaster cast of a large, ominously curved claw. A similar claw found south of London three years ago by an amateur fossil hunter has sparked the first description of an intriguing family of dinosaurs, which were most likely fish-eaters despite their ferocious appearance.

The 12-inch claw, found by William J. Walker (SN: 7/30/83, p.70), directed scientists to a well-preserved skeleton of a large theropod (meat-eating) dinosaur, recently dubbed *Baryonyx walkeri* by paleontologists Alan J. Charig and Angela C. Milner at the British Museum of Natural History in London. They report the results in the Nov. 27 NATURE.

Thirty feet long, 15 feet tall on its hind legs and weighing nearly 2 tons, the clawed *B. walkeri* with its crocodile-like head must have been “fearsome,” Charig told SCIENCE NEWS. He says the dinosaur deserves its own family (Baryonychidea, meaning “strong claw”) on the basis of its “enormously elongated snout,” twice the usual theropod number of teeth, and powerful forelimbs with at least one large claw. The vicious *Tyrannosaurus rex* had tiny forelimbs and much shorter claws on its hindlimbs.

“As far as Europe and Britain go,” says Charig, “I would say it's the best find of the century. It is not a ‘missing link,’ but suggests a separate line of [dinosaur] evolution. One thing it demonstrates more than anything else is the incompleteness of the dinosaur fossil record. There must have been thousands or millions of them and this is the only one we've found.”



Fossils from the newly named dinosaur, *Baryonyx walkeri*: a “normal” digit (upper) and the distinctive large claw (lower).

Earlier this year, Charig met with other dinosaur experts, looking for someone with similar fossils. But no one had seen anything like the yet-to-be-named dinosaur. One of those experts, Michael Brett-Surman of the National Museum of Natural History in Washington, D.C., told SCIENCE NEWS that “if someone has just drawn a family tree of meat-eaters, they'll need to throw it in the trash. . . . [The dinosaur] is a hodgepodge of very advanced and very primitive characteristics at the same time.”

Charig says more recent evidence indicates the dinosaur is 115 million years old, rather than the reported 124 million. Nevertheless, he says, it is still the first large, “reasonably complete” theropod ever found in the Lower Cretaceous rock layer anywhere in the world. But it will be three to four years, he says, before the dinosaur – nicknamed “Claws” – will be totally reconstructed for museum viewing.

—D. D. Edwards