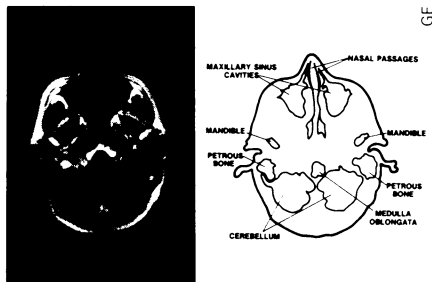


Dual NMR: Pix and peaks

The ability to take detailed diagnostic pictures of, as well as to monitor chemical reactions in, living organs and tissues — and to do so in a nondestructive fashion — long has been the stuff of dreams in the medical world. Now in research that may bring that dream closer to reality, Rowland W. Redington and colleagues of General Electric in Schenectady, N.Y., have produced cross-sectional images and chemical analyses of the head and torso of living subjects with one system: a nuclear magnetic resonance (NMR) setup.

Use of NMR technology — which, as its name implies, gathers information from atoms whose nuclei are magnetic — on humans is not new. Several groups already are testing the ability of NMR anatomical images to signal early stages of certain diseases; others are using NMR to watch the chemistry of living systems. What is unique about the GE work — which was presented at the recent meeting in Colorado Springs of the Society of Magnetic Resonance Imaging — is that one NMR system has, for the first time, been used to perform both the scan-producing (see the diagram) and chemical analysis tasks. (Some time this summer, Siemens Corp. in Erlangen, West Germany, is also expected to announce the development of such a dual-purpose NMR system.)

At the heart of the GE system is a 9-ton magnet capable of producing a magnetic field of 15,000 gauss — 20,000 times as strong as that of the earth — within its cylindrical bore. When a patient is placed within that bore, the body's naturally occurring magnetic atomic nuclei (those with a neutron that is not paired with



another particle in the same nucleus) align themselves in the magnetic field. Low-energy radio waves that are absorbed by the nuclei and knock them out of alignment then are applied. The types of energies absorbed are "fingerprint" data that can either be computer-reconstructed to form images or be recorded on a spectral printout as peaks that identify types and amounts of molecules present in the area examined.

Lower-field-strength machines are best for obtaining images (produced when hydrogen atoms absorb the radio waves), and higher-field ones are best for obtaining chemical spectra (produced when carbon-13 or phosphorus atoms absorb the radio waves). It is this conventional NMR wisdom that heretofore has discouraged researchers from pursuing a dual-purpose system.

The GE high-strength, dual-purpose system now is being used at the University of Pennsylvania to gather "baseline" images and chemical spectra of normal volunteers. The future of such a technique as a diagnostic tool still is unclear. But some researchers in the field believe NMR technology — because it uses presumably harmless magnetic fields rather than X-rays and because it is a better probe of soft tissues — eventually will replace computerized axial tomography (CT) scanning (SN: 7/12/80, p. 23). —L. Garmon

Black-footed ferret on the rebound

The black-footed ferret, a North American mammal long considered on the brink of extinction, seems to be making a slow comeback.

In the fall of 1981 Wyoming Fish and Wildlife Service biologists spotted their first wild black-footed ferret in nearly 10 years. Because the species was considered near extinction or actually extinct by many people, federal researchers radio-collared the animal and followed it closely. It helped them locate nine more black-footed ferrets within a few months (SN: 11/28/81, p. 340). By June 1982 Tim Clark, an Idaho State University biologist, had indirectly observed, through snow tracks, 10 more ferrets in the same area, potentially raising the known population to about 20 (SN: 6/5/82, p. 376). And now Clark reports in the June NATIONAL GEOGRAPHIC that by the end of last summer, he and his colleagues had sighted at least 38 young among the Wyoming ferret population,



bringing the estimated total to 60 or so. Recovery of the species to a healthy status would require about 500 animals, geneticists say. The Wyoming Game and Fish Department is coordinating government agencies, ranchers and wildlife groups in a continuing drive to give the species every chance to survive.

The black-footed ferret's major food source is the prairie dog (see picture). Its radical decline in numbers during the 20th century, scientists believe, resulted from the drastic elimination of prairie dogs during the same decades. —J. A. Treichel

New policies from a new EPA chief

William D. Ruckelshaus, new administrator of the Environmental Protection Agency, last week announced strict ethics guidelines for EPA officials. This was his first major action as EPA chief after the U.S. Senate unanimously confirmed his appointment and he was sworn in earlier in the week (SN: 3/26/83, p. 197).

In his memo to all EPA offices, Ruckelshaus pledged to operate the agency "in a fishbowl." He called for employees to place in the public record summaries of their contacts with industry and special interest groups. He also promised to make public weekly his own appointment calendars and those of his aides. In addition, Ruckelshaus urged employees to ensure full public participation in agency decisions.

At the swearing-in ceremony, President Reagan set forth four "areas of immediate concern." Reagan directed Ruckelshaus to improve management of the \$1.6 billion "Superfund" and to accelerate the cleanup of the most hazardous waste dumps in the country (SN: 2/26/83, p. 132). He also urged Ruckelshaus to focus on tackling the acid rain controversy, enforcing environmental laws and separating the proper roles of the federal and local governments in handling environmental questions.

Even before Ruckelshaus officially became EPA head, the agency outlined steps to improve its hazardous wastes program. Lee M. Thomas, acting deputy administrator, said the EPA would accelerate cleanup work at abandoned toxic-waste dumps by giving staff at regional offices greater decision-making authority. The agency would also eliminate the requirement for states to pay 10 percent of the cost of studies and designs for handling priority sites. Further, the EPA intends to emphasize recovering costs from liable parties after the government has taken action rather than waiting for guilty companies to do the cleanup. Thomas said EPA "needs to look forward to fulfilling the public trust and must apply the hard lessons that have been learned."

Ruckelshaus, who was also EPA's first administrator more than 10 years ago, is now the only Senate-confirmed EPA official. All other top officials have resigned during the past few months. One of Ruckelshaus's immediate tasks is selecting new people to run the agency's environmental programs.

One former EPA official, however, is still a center of attention. Last week, the House voted unanimously to cite Rita M. Lavelle, once "Superfund" administrator, for contempt of Congress. Lavelle refused to obey a subpoena that required her to appear before a House subcommittee investigating political manipulation of cleanup funds (SN: 5/7/83, p. 299). —I. Peterson