

tor Laboratory near Batavia, Ill. The two giant accelerators were proposed simultaneously, and planning for both of them began more than a decade ago. Delicate negotiations over siting and financing delayed construction of the European synchrotron.

In the last few years Fermilab has opened a new chapter in experimental physics. Especially intense excitement now surrounds studies of high-energy neutrino interactions, and neutrinos generated by the protons will be a feature of several of the experiments at the SPS. □

Chemistry tool probes muscle cells

A powerful analytical technique of chemists is being focused on the metabolism of animal cells. Nuclear magnetic resonance spectroscopy (NMR) can reveal chemical compounds in intact muscle and changes resulting from drug treatment or disease, researchers at the University of Illinois Medical Center report in the Jan. 14 SCIENCE.

In NMR spectroscopy, a large magnetic field and radio-frequency energy interact with the nuclei of atoms to give signals. The research group chose to analyze naturally occurring phosphorus (phosphorus 31) in biological samples. Compounds containing phosphorus play important roles in a tissue's economy and can serve to differentiate its metabolic states, they explain. Spectra can be obtained rapidly from large tissue specimens and, because the sampling is nondestructive, data can be gathered over a period of time.

C. Tyler Burt, Thomas Glonek and Michael Bárány examined muscle from several species of animal and from humans. The spectra display clear peaks for inorganic phosphate (I in diagram), sugar phosphates (S) and the energy-storing molecules, ATP (A) and phosphocreatine (P). The NMR analysis also produced evidence of a family of compounds

not previously identified in muscle. The newly discovered phosphate diesters were particularly abundant in toads and frogs and absent in abalones. The researchers observed differences in the distribution of these compounds between normal and diseased human and chicken muscle. "The detection of the four diester compounds by P-31 NMR in muscles opens the way for studying their possible physiological role and their connection with various disease states," they say.

Another difference the researchers found between normal and diseased muscle was the levels of energy-storing molecules. In spectra from chickens with a genetic muscular dystrophy, the peaks of ATP and phosphocreatine were clearly reduced. The researchers report lowered levels of phosphocreatine in biopsy muscle from a human patient with a neuromuscular disease. Furthermore, they found the enzyme activity in muscle samples removed from patients was altered in diseased muscle.

Burt, Glonek and Bárány were able to use extracts of muscle, as well as intact tissue, for obtaining P-31 spectra. This procedure allowed extracts to be prepared near the location of biopsy surgery at various Chicago hospitals and then transported to the medical center laboratory for analysis.

Burt believes that P-31 NMR spectroscopy will eventually be able to look at entire organs that have been isolated and perfused with fluid. In five to fifteen years, he predicts, the technique may be applied to tissues still in a living animal. □

Patients' rights in medical privacy

Before the Supreme Court ruling of 1973, the only way a woman could obtain a legal abortion in some states was to claim mental instability. Often, the documentation was no more than a ploy, but her "mental instability" would leave an indelible mark on her medical record.

Years later, that document could cause the woman problems. Her insurance company or employer might turn up the information, and her credit rating or job might be affected. Social work agencies use medical data for their decisions, and potentially stigmatizing information, such as drug treatments, sexual preferences or psychiatric help, might influence decision making.

While insurance companies and government agencies appear to have easy access to medical records, patients are often ignorant of the type and destination of their records. And with computerization of those records, the potential increases for even greater amounts of information to be released haphazardly.

Now, a report sponsored by the National Bureau of Standards (NBS) has rec-

ommended significant changes in medical-record policies, calling for more control over the dissemination of information and for patients' rights to full information about their health conditions.

The study, "Computers, Health Care and Citizen Rights," was directed by Alan F. Westin, a law professor from Columbia University and author of "Privacy and Freedom," a comprehensive analysis of privacy in a democratic society. The study was first conceived in a workshop on privacy held by the Institutes for Computer Sciences and Technology of the NBS.

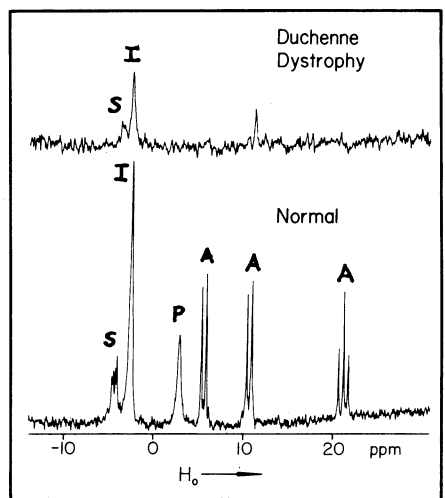
At a news conference announcing the study's release, Westin explained the problem. "Every time we visit a hospital or fill out health insurance forms," he said, "a record is generated, and information from these medical records now flows regularly out of the primary health care setting in ways that give us little control over how this information is used."

Although Westin feels that no single proposal or law can correct this potential infringement, his report recommends that patients should have an absolute right to inspect any information released from their records when the data are being used nonmedically. The report also calls for a clearly written account to be given to patients on how their records will be used. In addition, the report says a person has a right to all information about his or her health conditions including, in some situations, a doctor's working notes.

With so many hospitals computerizing their records, the aspects of information release are changed. The report found few actual abuses of computerized records, perhaps due to the fact that computers are more difficult to open than file drawers containing written records. But computers carry a great deal more information and present it more efficiently than written records, thereby exacerbating the problem.

Hoping to retain individual rights of privacy during the imminent computerization of most health records, the report outlines some basic principles for health care data systems, which Westin describes as "a code of citizen-rights practices." Besides calling for the patient's greater control over personal medical records, the principles advocate data-security measures to control access to records, special training for managers to respect citizen rights and the printing of patients'-rights handbooks.

The report also suggests some specific legislation to help strike a balance between privacy and public access, such as fair information practice laws already operating in five states and citizen-rights guarantees in any national health insurance law. It also proposes "privacy audits" by hospitals and medical centers to determine what kinds of information are going out and whether privacy rights are being violated. □



Spectra of extracts from human muscles.