SOJTHWESTERN NEWS

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UT SOUTHWESTERN RECEIVES \$2 MILLION GRANT TO PURCHASE 30-TON SUPERCONDUCTING MAGNET

DALLAS – Sept. 19, 2002 – The National Institutes of Health has awarded a \$2 million grant to UT Southwestern Medical Center at Dallas for the purchase of a 30-ton, 800 MHz nuclear magnetic resonance (NMR) spectrometer that will add strength to the Department of Biochemistry's research programs.

It is the first NIH grant given for a high-end instrumentation program in the area of macromolecular NMR spectroscopy. According to NIH officials, NMR spectroscopy has the potential to dramatically improve understanding of the structure and dynamics of proteins, nucleic acids and other biological macromolecules – large molecules composed of hundreds of thousands of atoms.

Co-principal investigators on the grant are Dr. Kevin Gardner, assistant professor of biochemistry; Dr. Jose Rizo-Rey, associate professor of biochemistry; Dr. Michael Rosen, associate professor of biochemistry; and Dr. Hongtao Yu, assistant professor of pharmacology.

NMR spectroscopy is used to study the three-dimensional structure of proteins as it relates to their function, said Rosen. "This instrument is at the top of the line and among the most powerful developed. It will allow us to work on much larger and much more complex systems," he said.

The addition also will mean researchers can stay in Dallas to do their work, Gardner added: "We previously have had to travel to sites that had this more powerful equipment. Having the ability to do these experiments here will make a tremendous difference."

The newest spectroscopic methods being developed can describe processes such as protein and RNA folding, protein-protein and protein-nucleic acid complex formation, and binding-induced conformational change in proteins. These processes are essential to normal biological function and regulation and are involved in the development of diseases and the body's response to drugs.

The equipment will increase the capabilities of researchers who already are highly respected for their achievements, said Dr. Steven McKnight, chairman of biochemistry.

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"The fact that our researchers were awarded substantial funds for the purchase of a sophisticated, high-field NMR spectrometer in an open national competition speaks incredibly highly for their stature in the broad field of biophysics. This accomplishment further solidifies UT Southwestern as one of the top institutions worldwide in the study of molecular biophysics," said McKnight, who holds the Distinguished Chair in Basic Biomedical Research and the Sam G. Winstead and F. Andrew Bell Distinguished Chair in Biochemistry.

Rizo-Rey said the new 800 MHz magnet will offer researchers more options in their experiments than the current 600 MHz unit.

"We won't have as much limitation in the molecular weight of the systems that can be studied. The higher the magnetic field, the better," he said. "Having the new system will enhance our understanding of many biochemical and biological processes."

The spectrometer will be about 15 feet high and 20 feet across. It initially will be housed at the Mary Nell and Ralph B. Rogers Magnetic Resonance Center on the UT Southwestern North Campus. The researchers expect it to be installed by summer 2003.

Rosen describes the device as a magnet that sits in a thermos of liquid nitrogen and liquid helium. It is encased in a steel shell to contain the magnetic field.

"When you drop solutions of proteins into the center of a strong magnetic field, it allows them to absorb radiofrequency energy, and that allows us to interpret their structure," he said. "The more powerful the magnet, the more you can do with the data."

Gardner said UT Southwestern's commitment to protein NMR spectroscopy helped in obtaining the grant. Among roughly 20 applications nationwide, the UT Southwestern team was the only group awarded funding for the instrument.

"The NIH saw that up until now, UT Southwestern had significantly built up its resources in macromolecular NMR with minimal federal support," said Gardner, a W.W. Caruth Jr. Scholar in Medical Research. "This started with assembling several groups that are advancing the frontiers of protein NMR, giving UT Southwestern a unique combination of research in this area. Equipment such as this 800MHz NMR spectrometer is essential for us to move our research on to progressively more difficult and interesting systems."

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