

New software helps confirm virus discovery

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How do some viruses—comparable to HIV—insert their genetic information into cells and permanently infect them? In a paper published in *Nature* in February, scientists showed the structure of a protein complex that enables this to occur.

To confirm the discovery, the team of scientists turned to a technology developed in the School of Medicine at The University of Texas Health Science Center at San Antonio.

UltraScan is a unique software system developed by Borries Demeler, Ph.D., professor of the Department of Biochemistry, that delivers sophisticated biological metrics derived from a time-honored scientific process called analytical ultracentrifugation.

Dr. Demeler is a co-author on the *Nature* paper authored by researchers from the Salk Institute and Harvard Medical School.

"We measure the size of molecules in a solution state, which mimics the natural conditions of the body much more closely," Dr. Demeler said. "In this case, what our collaborators needed was proof that this complex of the virus proteins with DNA (deoxyribonucleic acid) contained eight subunits of proteins and two subunits of DNA. They had observed this, but not in a solution state. We applied the technology we developed here in San Antonio."

"Dr. Demeler is a world leader in analytical ultracentrifugation," said Bruce Nicholson, Ph.D., professor and chairman of the Department of

Biochemistry. "While the technique has been around for a long time, new technologies for detection and processing of data on supercomputers have vastly increased its power. Dr. Demeler has worked with this technology throughout his career, and has developed the most advanced software package available today to extract information from these experiments."

The UltraScan software, a 25-year work in progress, incorporates more than 1.6 million lines of advanced coding. "We get the kind of data out of it that collaborators want and we are confident of the results," Dr. Demeler said.

UltraScan has been deployed worldwide on supercomputers, including those managed by the National Science Foundation, so that investigators around the world can analyze their data. "It is a unique international resource," Dr. Nicholson said. "Dr. Demeler receives collaboration requests from investigators the world over."

Provided by University of Texas Health Science Center at San Antonio

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