

# SOUTHWESTERN NEWS

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## UT SOUTHWESTERN SCIENTISTS DEVELOP METHOD OF SYNTHESIZING ANTIBODIES

DALLAS - December 29, 1999 - UT Southwestern Medical Center at Dallas researchers have discovered a method that may lead to the long-hoped-for efficient and inexpensive production of synthetic antibody substitutes for use in medical diagnostics, biotechnology and biomedical research.

Reporting in January's *Nature Biotechnology*, the investigators explained how they set up a selection system to find peptides that mimic antibodies by binding to specific peptide epitopes, amino-acid compounds that can combine with antibodies. The scientists were interested in finding relatively small molecules, such as peptides, that could substitute for antibodies, which are crucial proteins in biomedical science but are fragile, and time-consuming and expensive to make.

Antibodies recognize and bind tightly to foreign substances, or antigens, in the body setting up an immune response to fight illnesses. They also can be cloned to use as probes to diagnose illnesses or to study antigens in the laboratory.

"The core of this research is to devise a way to design relatively small molecules that aren't proteins but can recognize a particular run of amino acids, or an epitope," said Dr. Thomas Kodadek, professor of internal medicine and biochemistry and an investigator for UT Southwestern's Center for Biomedical Inventions. "This is important because antibodies are large and must be produced using animals, so they are difficult and expensive to make. They are also

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fragile, which limits their application outside of carefully controlled laboratory environments.

"But this research gives us the potential to make sensors to detect biowarfare agents, and a number of other things, that are more field-practical in places such as the Saudi Arabian desert, than are antibody-based sensors."

The scientists genetically engineered bacteria so if a cell contained the desired epitope-binding peptide, it would survive an otherwise lethal viral infection. This provided a method to rapidly and easily sort through a large collection of peptides for those few with the desired epitope-binding properties.

Kodadek said that they believe the antibody substitutes or peptides are already useful in some biomedical research for detecting or purifying certain proteins. But the peptides don't bind as tightly as antibodies do to epitopes, so one of the next goals for the investigators is to increase the affinity of the peptides for the epitopes.

Other researchers who contributed to this study were graduate student Zhiwen Zhang and postdoctoral fellow Dr. Weiguang Zhu.

The Welch Foundation and the Texas Advanced Research Program provided funding for this study.

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