

UM Team Reports Major Breakthrough In Protein Study

COLLEGE PARK, Md. — A team of researchers at the University of Maryland has observed for the first time how some proteins, the chains of amino acids that control every function in living cells, come together in a stepwise manner. What they saw may totally change the way scientists look at proteins.

As reported in the Dec. 13 issue of the journal *Science*, the Maryland team saw a protein take shape, a process called folding, in a series of steps, not one sudden motion, as had long been assumed to be the folding process.

"It's been thought that proteins had only two states, like an on-off switch," said Victor Munoz, the Maryland biochemistry professor who led the research. "Our discovery showed that there are proteins that act more like rheostats, gradually folding and unfolding."

The discovery could lead to a better understanding of how pro-

teins assemble and work with each other and even give scientists tools to predict how proteins will act. "We know proteins fold spontaneously, without help from anything else, but we don't know the rules of how they do it. We may now be able to learn what some of those rules are," Munoz said.

"Like fuzzy logic's gray areas, or the potential power of quantum computers, these molecular rheostats go beyond traditional protein binary switches and unravel a whole new set of communication tools between proteins that might be critical for the regulation of complex networks."

The study of proteins has taken on new importance since the sequencing of the human genome. "The genome sequence tells us only what the sequence of the proteins will be," said Munoz. "DNA stores that information, but proteins do all the work in the cell. They are the nanomachines that perform most of the

body's critical functions. They are the cell's policemen, firefighters, chemical factories, road builders and communication engineers.

"Proteins synchronize with each other into networks that result in complex cellular responses, like their response to hormones or other stimuli. It is in the way we understand how proteins talk to each other that our discovery may also have very important repercussions." The key to the Maryland team's discovery was their combination of theory, detailed experimentation and computer modeling. "The protein energy landscape theory predicted more than 10 years ago that some proteins could fold and unfold without crossing free energy barriers, the so-called 'downhill folding' process," said Munoz, "but it hadn't been confirmed experimentally because people didn't know how to look for this behavior."

Munoz and his team began by

realizing that downhill folding should occur by a gradual unfolding process in which the different pieces of protein structure melt bit by bit. They heated a small protein of the *Escherichia coli* bacteria to decrease its stability at each step of the process. They then tracked the process with a combination of biophysical techniques, each one sensitive to a different property of the structure of the protein, and analyzed the data with computer models.

"It is the difference between just being able to see scattered car parts jump all at once to being a complete car and seeing the car slowly come together in

each step of the assembly line," said Munoz. When the Munoz team began the research, they were actually examining a different aspect of proteins. "We were trying to create a catalog of simple proteins that could be considered as structural archetypes. This was something of a surprise," said Munoz.

Working with Munoz were Maria M. Garcia-Mira, until recently at the University of Maryland and now at the University Bayreuth, Bayreuth, Germany; Mourad Sadqi and Niels Fischer, University of Maryland; and Jose M. Sanchez-Ruiz, University of Granada, Granada, Spain.

FB Urges 'Immediate Action' On EU Biotech Ban

WASHINGTON, D.C. — The American Farm Bureau Federation urged President Bush "to take immediate action" to initiate a World Trade Organization case against the European Union's continuing moratorium against new approvals of biotech crops.

AFBF President Bob Stallman, in a letter to Bush signed by the presidents of all the state Farm Bureaus attending a meeting here, said, "It is imperative that U.S. agriculture and other countries around the world understand that your administration is committed to enforcing the terms of trade agreements."

Stallman said the EU's four-year moratorium "continues unabated" and that recent actions by the EU to enact new biotech regulations have not addressed U.S. agriculture's concerns. "The regulations as approved by the European Parliament and European Council are themselves not compliant with the WTO rules of international trade," he noted. "Replacing one non-WTO compliant action with another non-WTO compliant solution is not acceptable."

He said the EU has acknowledged that the moratorium is "not based on scientific evidence" and that EU regulatory and scientific agencies "have determined repeatedly" that biotech products withheld from the European market "are safe for human consumption and pose no risk to the environment."

Stallman said the moratorium "has resulted in lost export markets for U.S. agricultural producers valued at hundreds of millions of dollars annually."

Recently, Farm Bureau and 25 other agricultural groups urged U.S. Trade Representative Robert Zoellick to go ahead with a WTO dispute settlement case. "The EU's ongoing and illegal moratorium has resulted in lost export markets for U.S. producers and exporters, a slowdown in the adoption of new technologies in the United States and other countries, and increased production and testing costs for U.S. agricultural interests," the groups noted.

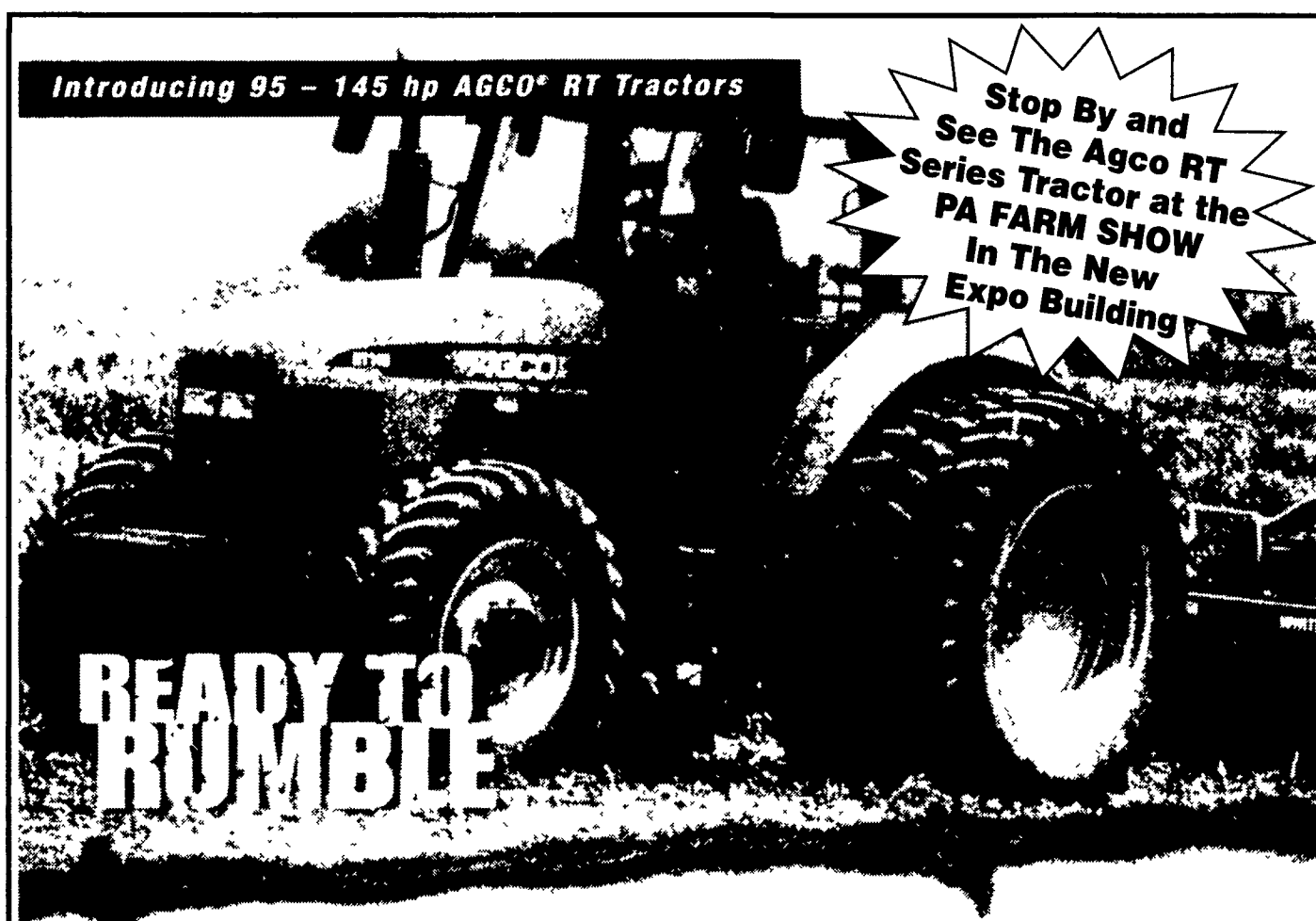
APHIS Declares Great Britain Free Of FMD, Rinderpest

WASHINGTON, D.C. — Great Britain is free of foot and mouth disease (FMD) and rinderpest, two diseases that have plagued the country's livestock population over the past two years, and is relieved of certain FMD-related trade restrictions, APHIS announced in a final rule published in the Federal Register.

Great Britain consists of England, Scotland, Wales, and the Isle of Man.

Great Britain has met the standards of the Office International des Epizooties (OIE) for being considered free of FMD and can be added to the list of regions considered free of FMD, APHIS stated in the final rule. The rule became effective on Dec. 17, 2002.

Great Britain and Northern Ireland have been moved to a list denoting that certain restriction must still apply because of the countries' proximity to or trading relationships with rinderpest- or FMD-affected regions. The change in status relieves certain restrictions on the importation of ruminants and swine, fresh (chilled or frozen) meat and other products of ruminants and swine into the U.S. from Great Britain.



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