



Journal of Biological Sciences

ISSN 1727-3048

science
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New Prion Discovery Reveals Drug Target for Mad Cow Disease and Related Illnesses

In a new research report in the December 2010 print issue of The FASEB Journal, scientists found that a protein our body uses to break up blood clots speeds up the progress of prion diseases. This substance, called plasminogen, is a new drug target for prion diseases in both humans and animals.

"I hope that our study will aid in developing therapy for prion diseases, which will ultimately improve the quality of life of patients suffering from prion diseases," said Chongsuk Ryou, Ph.D., a Researcher involved in the work from the University of Kentucky in Lexington. "Since prion diseases can lay undetected for decades, delaying the ability of the disease-associated prion protein to replicate by targeting the cofactor of the process could be a monumental implication for treatment."

To make this discovery, the researchers used simple test tube reactions to multiply disease-associated prion proteins. The reactions were conducted in the presence or absence of plasminogen. They found that the natural replication of the prions was stimulated by plasminogen in both human and animal cells.

"Rogue prions are one of nature's most interesting, deadly and least understood biological freakshows," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "They are neither virus nor bacteria, but they kill or harm you just the same. By showing how prions hijack our own clot-busting machinery, this work points to a new target for anti-prion therapy."

According to the U.S. National Institute of Allergy and

Infectious Diseases, prion diseases are a related group of rare, fatal brain diseases that affect animals and humans. The diseases are characterized by certain misshapen protein molecules that appear in brain tissue. Normal forms of these prion protein molecules reside on the surface of many types of cells, including brain cells, but scientists do not understand what normal prion protein does.

On the other hand, scientists believe that abnormal prion protein, which clumps together and accumulates in brain tissue, is the likely cause of the brain damage that occurs. Scientists do not have a good understanding of what causes the normal prion protein to take on the misshapen abnormal form. Prion diseases are also known as transmissible spongiform encephalopathies, and include bovine spongiform encephalopathy ("mad cow" disease) in cattle; Creutzfeldt-Jakob disease in humans; scrapie in sheep; and chronic wasting disease in deer and elk. These proteins may be spread through certain types of contact with infected tissue, body fluids, and possibly, contaminated medical instruments.

Journal Reference: 1. C. E. Mays, C. Ryou. Plasminogen stimulates propagation of protease-resistant prion protein in vitro. The FASEB Journal, 2010; DOI: 10.1096/fj.10-163600