

# West Nile virus studies show how star-shaped brain cells cope with infection

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A new study published as the cover article for the April 2009 issue of *The FASEB Journal* promises to give physicians new ways to reduce deadly responses to viral infections of the brain and spinal cord. In the report, scientists from Columbia University, NY, detail for the first time the chemical processes that star-shaped nerve cells, called astrocytes, use to handle invading viruses and to summon other immune cells to cause life-threatening inflammation.

"Studies such as this take us one step closer to understanding both the risk and benefit associated with antiviral immune response and may lead to new treatment strategies," said W. Ian Lipkin, the senior researcher involved in the study, who also is the director of Columbia's Center for Infection and Immunity, and led the team that first identified the presence of [West Nile Virus](#) in New York in 1999.

In this study, Lipkin and colleagues cultured astrocytes from the brains of newborn mice and exposed the cells to a West Nile virus-like molecule (called Poly I:C), either from outside or inside the brain cell membranes. After various laboratory experiments, the researchers identified the [cellular machinery](#) (such as a protein called MDA-5) that astrocytes use to "see" viral invaders. They also identified recognition molecules on the astrocytes that initiate and control the central nervous system's immune responses.

"Ironically, the cells we use to monitor and to protect our brain—the astrocytes—are among those we know the least about," said Gerald

Weissmann, M.D., editor-in-chief of The *FASEB Journal*. "We do know, however, that inflammation of the brain caused by the West Nile virus affects these star-shaped cells and makes the disease difficult to treat. We can use this new understanding of astrocytes not only to devise treatments for viral invaders from abroad, but also from deadly viruses closer to home.

More information: Joari De Miranda, Kavitha Yaddanapudi, Mady Hornig, and W. Ian Lipkin. Astrocytes recognize intracellular polyinosinic-polycytidylic acid via MDA-5. *FASEB J.* 2009 23: 1064-1071. [www.fasebj.org/cgi/content/abstract/23/4/1064](http://www.fasebj.org/cgi/content/abstract/23/4/1064)

Source: Federation of American Societies for Experimental Biology

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