

# Mystery solved: Scientists now know how smallpox kills

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A team of researchers working in a high containment laboratory at the Centers for Disease Control and Prevention in Atlanta, GA, have solved a fundamental mystery about smallpox that has puzzled scientists long after the natural disease was eradicated by vaccination: they know how it kills us.

In a new research report appearing online in *The [FASEB Journal](#)*, researchers describe how the virus cripples immune systems by attacking molecules made by our bodies to block [viral replication](#). This discovery fills a major gap in the scientific understanding of pox diseases and lays the foundation for the development of antiviral treatments, should [smallpox](#) or related viruses re-emerge through accident, viral evolution, or terrorist action.

"These studies demonstrate the production of an interferon binding protein by variola virus and monkeypox virus, and point at this viral anti-interferon protein as a target to develop new therapeutics and protect people from smallpox and related viruses," said Antonio Alcami, Ph.D., a collaborator on the study from Madrid, Spain. "A better understanding of how variola virus, one of the most virulent viruses known to humans, evades host defenses will help us to understand the molecular mechanisms that cause disease in other viral infections."

In a high containment laboratory at the Centers for Disease Control and Prevention in Atlanta, scientists produced the recombinant proteins from the variola virus and a similar virus that affects monkeys, causing

monkeypox. The researchers then showed that cells infected with variola and monkeypox produced a protein that blocks a wide range of human interferons, which are molecules produced by our immune systems meant to stop viral replication.

"The re-emergence of pox viruses has potentially devastating consequences for people worldwide, as increasing numbers of people lack immunity to smallpox," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "Understanding exactly how pox viruses disrupt our immune systems can help us develop defenses against natural and terror-borne pox viruses."

**More information:** María del Mar Fernández de Marco, Alí Alejo, Paul Hudson, Inger K. Damon, and Antonio Alcami. The highly virulent variola and monkeypox viruses express secreted inhibitors of type I interferon FASEB J. [doi:10.1096/fj.09-144733](https://doi.org/10.1096/fj.09-144733)

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