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Ancient viral DNA may help humans fight infections

At a Glance

- Researchers found that stretches of viral DNA long embedded in the human genome can produce proteins that help block infection by viruses.
- Further identification and study of these protective virus-based proteins could provide new insights for fighting viral infections.

Nearly one-tenth of the human genome contains snippets of viral DNA left over from ancient infections. These DNA fragments, called endogenous retroviruses (ERVs), have been passed along and modified over millions of years of evolution. Much of this viral DNA has eroded over time and is unlikely to have any function. But many embedded viral genes remain partly intact within the human genome. Some have evolved to become useful human genes.

The study suggests that viral DNA left over from ancient infections may still play a role protecting us from modern viruses. *SergioSH / Shutterstock*

Among the potentially useful DNA snippets from viruses are those encoding envelope proteins. Envelope proteins are normally found on the surface of viruses. They can latch onto cell-surface receptors, providing a gateway to viral entry. Earlier studies found that ERV-derived envelope proteins in the genomes of mice, cats, and sheep can block invasion by modern viruses. They do this by binding to cell-surface receptors and blocking entry by incoming viruses. But this had not been shown in humans.

To learn about the virus-fighting potential of human ERVs, a research team led by Dr. Cedric Feschotte of Cornell University scanned the human genome for sequences that might code for receptor-binding portions of envelope proteins. Results were reported in *Science* on October 28, 2022.

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