

VIEW ON NEWS

Human endogenous retroviruses — An ongoing evolutionary tango

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Evolution; Embryo; Gene regulation; HERV-K; Mutation

The interplay between virus and host has been an everlasting evolutionary dance, with some advantageous outcomes, and some not so advantageous outcomes, such as cancer and autoimmunity. It has been well recognized that the intertwinement of retroviral DNA regulatory elements, the remnants of retroviral infections, with the host genome is part of a lasting battle between pathogen replication/reinfection and the host defense. The high mutation rate of retro gene sequences has provided a means for viruses to escape suppression by the host, while also serving as a major driving force in host genome evolution. As an "unintended" consequence, the high mutation rate provides a vast retro-sequence repertoire for the host genome to domesticate to its own benefit, such as by regulating healthy biological processes, while also suppressing the harm.¹⁻³ Endogenous retroviruses (ERV) with their functional open reading frames are rare post-infection legacies within the host genome that are inheritable through the germline.¹ A recent article published in *Nature* highlighted a fresh example of the activities of a human endogenous retrovirus (HERV) in early embryonic development.⁴ The authors demonstrated that during certain stages of early human embryonic development, HERV-K is reactivated to generate infectious virions. However, this same retroviral

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http://dx.doi.org/10.1016/j.gendis.2015.05.002 2352-3042 replication rendered the early embryo resistant to re-infection by either endogenous or exogenous retrovirions through a series of intricate mechanisms. Further, one of the retroviral protein products, Rec, which acts to enhance the viral RNA transcription and translation, was found to actively participate in up-regulating the transcription and translation of host mRNA during normal embryonic development. Whether this is a novel case of nonharmful domestication by the host at the viral protein level or of viral hijacking of human machinery, regardless the outcome, the evolutionary tango continues.

Conflicts of interest

The author has no conflict of interest to declare.

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