Engineered human fusion protein inhibits HIV-1 replication

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In 2004, Jeremy Luban and colleagues from the University of Geneva, Switzerland, reported that New World owl monkeys (Aotus genus) make a fusion protein - AoT5Cyp - that potently blocks HIV-1 infection. The human genome encodes the equivalent of the 2 components of AoT5Cyp (i.e., TRIM5 and cyclophilin A), but humans unfortunately do not make the T5Cyp fusion protein.

In their new study in the Journal of Clinical Investigation, Luban et al. have engineered a human HIV-1 inhibitor modeled after AoT5Cyp, by fusing human cyclophilin A to human TRIM5 (hT5Cyp). The human fusion protein blocked HIV-1 infection of human macrophage and T cell lines, without disrupting normal cell function.

Mice engineered to lack B, T, and NK immune cells (to ensure that the animals do not reject grafts of human material) were then engrafted with human CD4+ T cells engineered to contain hT5Cyp. HIV-1 replication was potently inhibited in these animals. The authors concluded that hT5Cyp is a robust inhibitor of HIV-1 replication and a promising anti-HIV-1 gene therapy candidate.

More information: Potent inhibition of HIV-1 by TRIM5-cyclophilin fusion proteins engineered from human components, Journal of Clinical Investigation

Source: Journal of Clinical Investigation