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Leveraging the Chimp Genome for HIV Research

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BOSTON (08/13/03)—A major setback in AIDS research early on was the realization that chimpanzees can be infected with HIV but do not develop full-blown AIDS. That made the search for animal models of the disease more complicated. Now, scientists at Evolutionary Genomics hope to capitalize on that fact to find new anti-HIV treatments.

It is believed that SIV — HIV's cousin that infects apes — has been around for about 2 million years, which has given the animals time to adapt to it. "Chimps have some mechanism for dealing with the virus," says Walter Messier, chief technology officer at Evolutionary Genomics. According to Messier, nearly 1,000 chimpanzees have been infected with the virus, and a few seemed to progress to AIDS, but then all but one recovered. Messier and colleagues are studying blood samples from some of those chimps to try and find the proteins that enable the chimps to beat HIV. The company was recently awarded a National Science Foundation Phase I Small Business Innovation Research grant to support this project.

Evolutionary Genomics' Adapted Traits bioinformatics platform allows it to compare genes of closely related species and pick out those genes that have been highly "selected" — that is, they confer a strong survival advantage. For the HIV study, the company will start by looking for genes whose expression patterns change after infection with the virus. Using the platform, researchers can then cull those genes that seem to play important roles in protecting against progression, which Messier says "is a vanishingly small number."

Chimps and humans possess highly similar genetic codes and immune systems. The fact that chimps do not progress to AIDS is one of the rare differences.

"I look at the genome like a phonebook," Messier says. "There is a lot of information in it, but you have to use it correctly." Comparative genomics is widely applied to target identification and validation in the pharmaceutical industry, but the Evolutionary Genomics bioinformatics platform is unique. "It is a rigorous algorithm that takes into account many things," he says.

Ultimately, the company's work could lead to the design of small molecules that will mimic the chimps' natural defenses against AIDS.

