NEWS RELEASE

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EVOLUTIONARY GENOMICS DISCOVERS AIDS SUPPRESSION PROTEIN

Lafayette, Colo (April 9, 2008) – Evolutionary Genomics has discovered a protein that can dramatically suppress the amount of HIV virus produced by cultured cells. This discovery has application in the development of drugs to treat AIDS patients. The research was presented at a Keystone Conference held April 8-12, 2008 in Breckenridge, CO.

In the wild, chimpanzees maintain high viral loads of simian immunodeficiency virus (SIV), but never progress to AIDS. A protein called Intracellular Adhesion Molecule-1 (ICAM-1) is one of hundreds of proteins that have been implicated in promoting the infectivity of HIV (the human analogue of SIV). Evolutionary Genomics chose to investigate if this protein might play a role in chimpanzee resistance to disease by molecular evolution analysis. Our analysis demonstrated that the chimpanzee ICAM-1 protein has been subjected to strong positive selection. We hypothesize that this selective episode resulted in chimpanzee resistance to developing AIDS when they are infected with SIV.

To study this further, we developed a model using human cells (called U937 cells) co-cultured with a cell line, called ACH2, that is actively infected with HIV.

A gene encoding chimpanzee ICAM-1 was transferred into the U937 (human) cells and chimp ICAM-1 producing U937 cells were cloned. The U937 cells were then placed into culture with ACH2 cells in the presence of lipopolysaccharide. Remarkably, co-cultures of the U937 chimp-ICAM-1 producing human cells with ACH2 cells exhibited a decrease of up to 48% in the production of HIV after stimulation with LPS ($p<0.05$). To confirm that this was not a result unique to the U937 cells, THP1 human cells were also genetically modified with chimp ICAM-1. Under a similar experimental set up, co-cultures of chimp ICAM-1-transfected THP1 cells produced 38% less HIV than control THP1 co-cultures.

We theorize that the chimp ICAM-1 molecule suppresses HIV production. This has implications for developing drugs to treat human AIDS patients.