New Synthetic Proteins Block HIV

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Synthetic proteins dubbed “foldamers” effectively keep HIV from infecting cells in test tube studies and could point the way to future treatments, according to an announcement by researchers at the University of Wisconsin at Madison.

Cells have their own system of relating to each other. They can interact among themselves or with other types of cells in the body. Special strings of proteins, called peptides, facilitate this cellular connectivity. Interaction is also necessary between HIV and human immune cells.

While there has been interest in using altered naturally occurring peptides to disrupt the interaction between human cells and HIV, getting the altered peptides where they belong isn’t easy. The injected peptides are long and delicate and thus require large quantities of medication to be therapeutically effective; in addition, the peptides must be administered via injection to circumvent digestive enzymes that break down the strands.

Now, however, a group of researchers from the University of Wisconsin, the University of Pittsburgh and Weill Medical College at Cornell University in New York City, have developed synthetic peptides that are large enough to disrupt communication between HIV and cells, but sturdy enough that the body can’t break them down easily. The results of this initial collaborative work have been published online in the *Proceedings of the National Academy of Medicine*.

W. Seth Horne, PhD, from the University of Pittsburgh, and his colleagues developed a synthetic version of a peptide that typically connects with the HIV protein called gp41. The synthetic peptide, which they call a foldamer, was large enough to interact with the HIV protein, but engineered not to be broken down easily by enzymes. In the lab, several versions of the foldamer were quite effective at blocking HIV from infecting cells.

According to the head of the lab at the University of Wisconsin, chemistry professor Samuel Gellman, PhD, said the new foldamers offer new ways to design molecules to fight viruses and other infections. “There’s a huge potential here because the strategy we use is different from what the pharmaceutical and biotech industries now employ,” Gellman says.