Mapping HIV’s Mysteries

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Researchers have succeeded in charting—almost down to an atomic level of detail—the structure of a tool central to HIV’s effort to splice its genetic code into the DNA of a human cell.

Such new findings about this piece of viral machinery, known as the intasome, could help scientists develop improved antiretroviral (ARV) treatments.

The integrase strand transfer inhibitor (INSTI) class of ARVs targets the intasome. Drugs in this category include Isentress (raltegravir), Vitekta (elvitegravir) and Tivicay (dolutegravir). Tivicay is included in the single-tablet combination regimen Triumeq (dolutegravir/abacavir/lamivudine).

While these medications are highly potent, scientists still have a relatively limited understanding of how they work. And according to Dmitry Lyumkis, PhD, a fellow at the Salk Institute for Biological Studies in La Jolla, California, and the lead author of a new study on intasomes, “HIV can develop resistance to even the best drugs and therefore find ways to evade our best efforts to treat the viral infection.”

Using a cutting-edge, super high-tech microscope, Lyumkis and his team mapped the intasome with such precision that their discoveries are akin to finding the keyhole that guards one of HIV’s weaknesses. The next step is to develop a matching key in the form of a more advanced integrase inhibitor, one that would better ward off HIV’s resistance to treatment. Along the way, Lyumkis hopes scientists will gain more advanced insights into how HIV develops resistance to this class of drugs.