Gold Nanoparticles Revive HIV Drug's Prospects

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Adding minuscule bits of gold, called nanoparticles, to a failed HIV drug causes it to work much better without creating dangerous side effects, say the authors of a study published online on May 13 in the *Journal of the American Chemical Society* and reported by *ScienceDaily*.

Takeda Pharmaceuticals' TAK-779 is an entry inhibitor that was designed to bind to the CCR5 receptor on the surface of CD4 cells. HIV uses this receptor to enter and infect CD4 cells. For TAK-779 to work properly, it requires an aluminum salt molecule. This molecule, however, was found to cause side effects. Because the drug doesn't work without the molecule, its development was halted indefinitely.

Christian Melander, PhD, from the University of North Carolina, Chapel Hill, and his colleagues questioned whether adding gold nanoparticles in place of the salt molecule might allow TAK-779 to work without adding side effects. When Melander's team joined a fragment of the drug to a gold nanoparticle, they found that the combo was able to shut down HIV reproduction in test-tube studies.

Because the human body does not react negatively to gold, Melander's team believes that the new version of TAK-779 bound to gold nanoparticles shouldn't have significant side effects. "We've discovered a non-harmful way to improve the strength and efficacy of an important drug," Melander says. "There's no reason to think that this same process can't be used with similar effect on other existing drugs."

In fact, researchers from Tibotec and other companies are actively exploring ways to use nanoparticles to create versions of both approved and experimental HIV drugs that may only need to be taken once a month or even less often.

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