# A teacher, a spy, a shield—this nanoparticle wears many hats in the body

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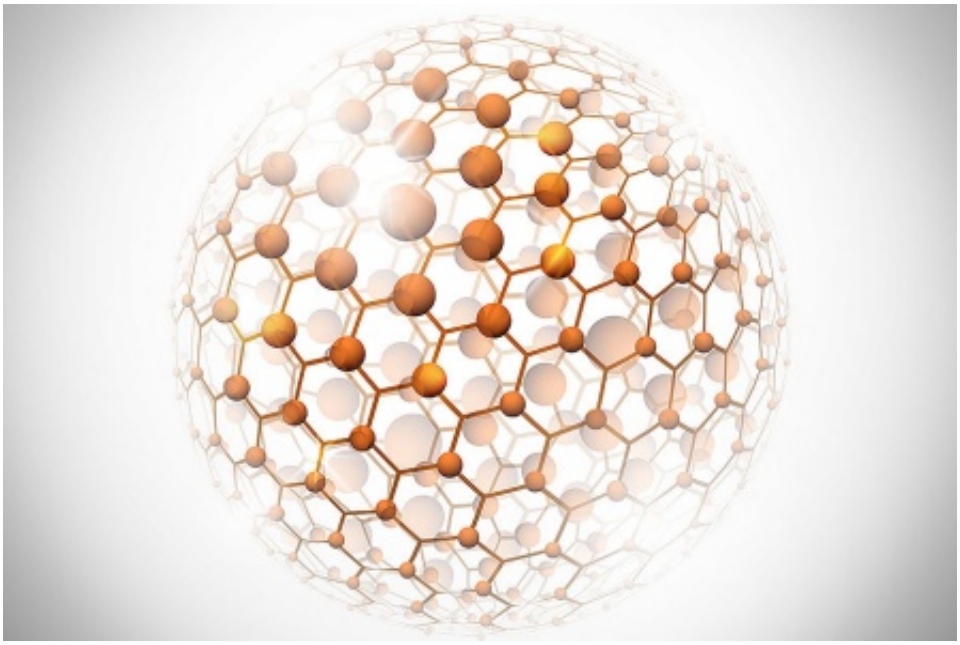

A spy. A teacher. A bodyguard. That, in a nutshell, describes the different functions of a nanoparticle invented at the University at Buffalo that can improve therapies for autoimmune diseases, genetic disorders and other ailments that are treated with biologic drugs.

Now, the technology is moving forward under a licensing agreement that the university inked with ZOETIC Pharmaceuticals, an early stage drug development company in Amherst, New York. ZOETIC plans to

commercialize the technology by partnering with pharmaceutical and biotechnology companies whose products can be enhanced by the nanoparticle.

"This technology can improve the performance and safety of biologic drugs, provide new treatments that correct the root cause of autoimmune diseases and significantly increase the success rates of gene therapy," said Sven Beushausen, chief scientific officer at ZOETIC.

The nanoparticle was invented in the laboratory of Sathy V. Balu-Iyer, PhD, professor of pharmaceutical science in the UB School of Pharmacy and Pharmaceutical Sciences.

ZOETIC sees the nanoparticle as a boon for biologic drugs, which are genetically-engineered proteins derived from human genes. When chronically administered, biologic drugs often elicit immune responses resulting in the production of antidrug antibodies. These antibodies reduce the effectiveness of the drug, which can exacerbate the disease, create the need for increased dosing or switching of drugs, and subject patients to potential life-threatening complications.

Doctors are increasingly prescribing biologic drugs to treat Type 1 diabetes, rheumatoid arthritis and other autoimmune diseases. The nanoparticle, which has been proven successful in preclinical research, could improve the treatment of these ailments by teaching the body not to mount an immune response to the antigens that provoke autoimmune responses.

The nanoparticle also has applications in gene therapy, which is the transplantation of normal genes into a patient to correct genetic disorders. Examples of gene therapy include coagulation factors FVIII and FIX for the treatment of hemophilia A and B, and lysosomal storage diseases like Pompe's Disease where patients have a deficiency in the

enzyme acid-alpha-glucosidase.

A limitation of gene therapy is that many patients mount immune responses that detect and eliminate the therapy soon after it enters the body. The nanoparticle can significantly reduce that response by acting as a spy (stealthily preventing the body from recognizing and neutralizing the therapy) and a shield (guarding the drugs from being metabolized in the body), which ultimately allows the body to accept the therapy.

While ZOETIC is seeking external partners, it will continue to work with UB, which is providing the company with startup support and a home at tenX, a co-working space operated by UB's Office of Science Technology Transfer and Economic Outreach at Baird Research Park.

"ZOETIC is an exciting new addition to Buffalo's fast-growing life sciences economy," said UB Vice Provost Robert J. Genco who serves as director of UB STOR. "We are looking forward to a long and fruitful relationship with the company as it works toward commercializing this very promising technology created by University at Buffalo researchers."

Provided by University at Buffalo