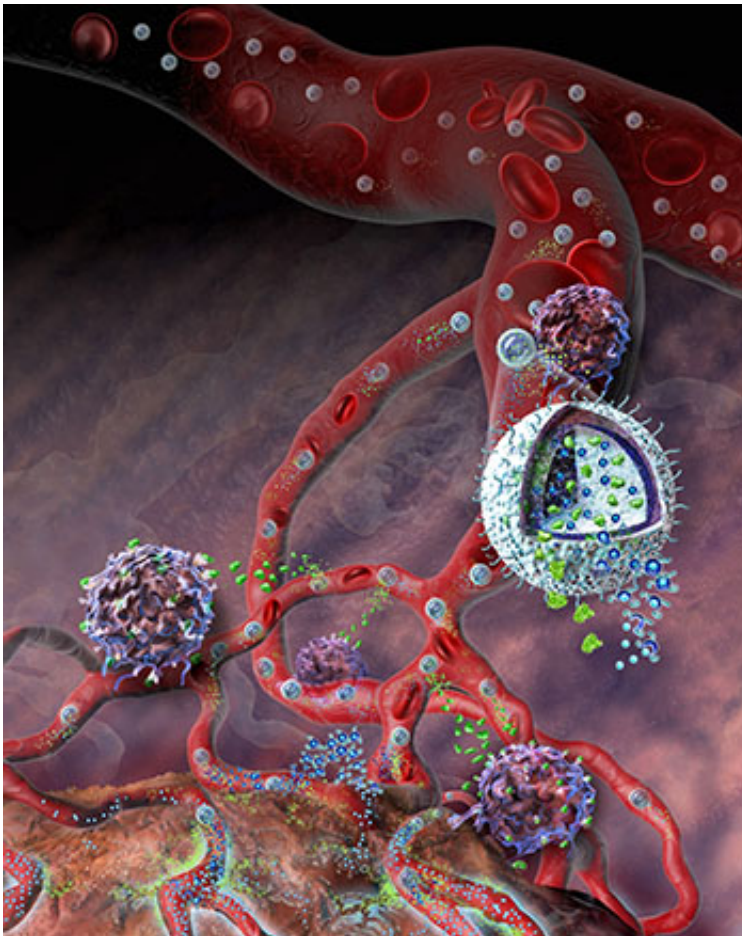


Nanogel that delivers one-two punch to cancer heads to clinical trial

April 6 2016, by William Weir



A cutaway illustration of the nanogel developed by professor Tarek Fahmy. The small particle can carry multiple drug agents to a specific target, such as the site of a tumor. Credit: Nicolle Rager Fuller, NSF

An immunotherapy drug delivery system created at Yale that can carry multiple drugs inside a tiny particle is heading toward its first phase of clinical trials for a possible new treatment for cancer.

The [delivery system](#), a nanogel developed in the lab of associate professor Tarek Fahmy, can be used for multiple combinations of drugs for many different cancers and some immune disorders. The platform is designed to deliver multiple drugs with different chemical properties. A single particle can carry hundreds of drug molecules that concentrate in the tumor, increasing the efficacy of the drug combination while decreasing its toxicity.

Fahmy describes the delivery system as a kind of "rational" therapy, in that it fuses established biological and clinical findings to the emerging field of nanotechnology.

"It creates a new solution that could potentially deal a significant blow to cancer and even autoimmune disease in future applications," said Fahmy, who teaches biomedical engineering and immunobiology.

The first use of this delivery system will be a drug known as IMM-01. A multi-pronged treatment for metastatic cancer, it contains two agents: Interleukin-2 (IL-2) and an inhibitor of tissue growth factor (TGF beta). IL-2 amplifies the body's immune system, while the TGF-beta inhibitor dampens the cancer cells' ability to hide from the immune system. Because their size and makeup differ greatly, the two agents would normally be incompatible. Fahmy, however, developed a novel biodegradable gel that can contain both drugs and then release them in the tumor.

TVM Life Science Ventures VII is providing funding to Modulate Therapeutics Inc. to develop the [drug](#) to clinical proof of concept. Modulate secured the rights to IMM-01 from Yale and the Yale start-up

company Immunova L.L.C., which was co-founded by Fahmy, Johns Hopkins University professor of oncology Ephraim Fuchs, and entrepreneur Bernard Friedman.

Friedman noted that the complexity of disease biology often hinders treatments. "Successful therapies must strike multiple targets," he said. "The technology developed by Dr. Fahmy provides an elegant solution."

"It's about leveraging the biology of the system, not fighting it," added Brian Horsburgh, CEO of Immunova and Modulate. "You want to wake up the [immune system](#) and harness that."

Yale's Office of Cooperative Research (OCR) helped launch Immunova in 2012 and develop Fahmy's [drug delivery technology](#). Fahmy is a member of the Yale Cancer Center.

"It's great to see this technology moving forward to the clinic, and we're hopeful that this will be the first of many life-saving drugs to use this technology," said Dr. John Puziss, director of technology licensing in OCR.

Provided by Yale University

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