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# Northwestern-born nanotech startup designing breakthrough cancer vaccine

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## CORRECTED

Researchers believe they may have found the key to curing cancers simply by manipulating the structure of previously less-than-effective cancer vaccines.

Flashpoint Therapeutics, a new startup from nanotech entrepreneur and Northwestern University International Institute for Nanotechnology Director Chad Mirkin, intends to leverage institute research to revolutionize the languishing but promising field of cancer vaccines. These immunotherapies work by stimulating T-cells to attack cancerous tumors.

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To do so, researchers will apply what Mirkin calls "rational vaccinology" to design the structure of vaccines, controlling the location of the two main components—adjuvants and

antigens—to increase effectiveness many times over.

By designing the proper structure, cancer vaccines can be transformed from ineffective to curative, which is pretty exciting, said Mirkin, who was on Crain's [2020 Tech 50](#) list and was a member of the [40 Under 40](#) Class of 2001.

"Historically, cancer vaccines have not been effective because structure had not been considered," he said, even though other pharmaceutical drugs are developed with painstaking attention to structure.

Instead, Mikrin noted, conventional vaccines have simply thrown together antigens, which target the immune system, and adjuvants, stimulators that increase the effectiveness of the antigen, and hope they work.

"Out of that blended mish-mosh, an immune cell might pick up 50 antigens and one adjuvant or one antigen and 50 adjuvants," Michelle Teplensky, a former Northwestern postdoctoral associate and co-founder of Flashpoint with Mirkin, said in a statement. "But there must be an optimum ratio of each that would maximize the vaccine's effectiveness."

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Spherical nucleic acids invented and developed by Mirkin allow scientists to pinpoint exactly how many antigens and adjuvants are being delivered to cells and enable tailoring of how the vaccine components are presented and the rate at which they are processed, Northwestern said in a statement.

In a study authored by Teplensky, now an assistant professor at Boston University, and published this morning in [Nature Biomedical Engineering](#), data shows Flashpoint Therapeutics' approach to creating a cancer vaccine structure has been more effective compared with vaccines built in a more conventional way.

Armed with the new study, several years of research and studies, and 10 patents for the approach, Mirkin said vaccines will be in clinical trials by next year.

Flashpoint announced its existence earlier this month, said CEO and co-founder Adam Margolin. He said the company established business operations with pre-seed financing and is currently raising a seed funding round to build a pipeline beginning with three cancer vaccines: first targeting cervical cancer, then determining two other kinds of cancer vaccines to pursue. Margolin said in an emailed statement that the company is not currently disclosing the amount of financing.

In addition, Flashpoint will pursue partnerships with other companies to co-develop cancer vaccines using rational vaccinology, Margolin said.

Margolin, currently based in Palo Alto, Calif., was CEO of NextVivo and for three years was chair of the Icahn School of Medicine at Mount Sinai's genetics department in New York City.

"The opportunity blew me away," he said of helping launch the company. "Because it's the best shot I've seen to make a really big impact on cancer."

The company said, based on in vivo mouse studies, the Flashpoint approach yields 35 times increased co-delivery of adjuvants and antigens to immune cells, 80 times stronger immune activation and 6.5 times greater tumor killing.

"While the notion of effective cancer vaccines was kind of a holy grail . . . they just haven't reached efficacy," Margolin said. Current vaccines are moving, slowly in the right direction, proving they're safe and well tolerated and producing some clinical response, he added.

"But with our approach, what if it's not incremental change but a step change? That'll break the market wide open," he said.

With co-founders based in California (Margolin), Boston (Teplensky) and Evanston (Mirkin), the company will draw experts from wherever they are found, Margolin said, pointing to a leadership team that also includes Mark Booth, former president of Takeda Pharmaceuticals North America and currently executive vice president at EVP TerSera Therapeutics; lawyer Raymond Nimrod, who won an important CRISPR patent lawsuit in 2022; Nick Manusos, previously leader of business development for Takeda; and Marta New, who helped build more than 35 preclinical biotech companies at Baxter Ventures and Agent Capital and will concentrate on drug development at Flashpoint.

*An earlier version of this story incorrectly stated the name of Flashpoint Therapeutics.*

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