Cancer affects millions of people in the United States and is among the leading causes of death worldwide. Current treatment options generally work by augmenting pre-existing anti-tumor immunity, so they only benefit a subset of patients. And current cancer vaccines are ineffective, as they fail to generate adequate immunity against tumor cells.

The Solution

University of Michigan team Anna Schwendeman, Ph.D., and James Moon, Ph.D., are targeting antigen delivery as an alternative, complementary approach to immunotherapy. By using a novel synthetic high-density lipoprotein (sHDL) nanodisc mixed with antigen peptides and adjuvants, they produced a potent cancer vaccine that is better able to stimulate the immune system than traditional vaccine approaches.

The team’s data has shown that the sHDL nanodiscs enhanced delivery of cancer antigens to draining lymph nodes by 28 fold (compared with the soluble vaccine group) and stimulated strong anti-tumor T-cell immunity. Importantly, the nanodiscs, in combination with immune checkpoint inhibitors, eliminated tumors in multiple mouse xenograph models.
**Potent nano-vaccine** delivery strategy targets tumors.

**Significant Need**
Limitations of current cancer vaccines and immunotherapy options leave a large number of patients without effective treatment.

**Compelling Science**
Nano-disc based vaccine technology targets antigen delivery to more strongly stimulate the immune system and elicit anti-tumor immunity.

**Competitive Advantage**
Novel vaccine delivery strategy effectively transports a potent vaccine that improves patients’ response rates and establishes long-term immunity against relapse, while current treatments and vaccines have been unsuccessful.

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**MTRAC Project Key Milestones**

- Complete preparation and in vitro optimization of nanodiscs and control vaccine nanoparticles
- Complete optimization of nanodisc composition and compare nanodisc vaccination against other nanoparticle vaccine delivery vehicles
- Complete in vivo comparison studies and initiate therapeutic studies
- Complete the evaluation of nanodiscs vaccination combined with immune checkpoint blockade
- Evaluate pharma company interest in nanodisc vaccine technology
- Finalize license agreement between EVOQ and U-M
- Sign MTA(s) with pharma company(ies) to evaluate utility of nanodiscs for cancer vaccination
- Submit SBIR grant application

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**Overall Commercialization**

**Commercialization Strategy**
Start-up company formed. Finalizing license agreement with U-M.

**Engage Investors**
Raising Angel Seed Round. Also plan to apply for non-dilutive Phase I/II SBIR.

**Regulatory Pathway**
Plan to move forward with Investigational New Drug application.

**Intellectual Property**
Multiple patents filed.

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MTRAC funds will help us ‘de-risk’ our technology. We plan to optimize the nanodisc formulation, benchmark the nanodiscs against other gold standards, and evaluate their potency to eradicate large, hard-to-treat tumors.