

Overview

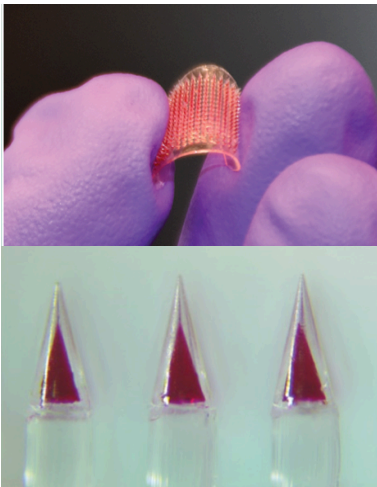
SingleTimeMicroneedles's mission is to democratize access to lifesaving veterinary and human pharmaceuticals.

STM has created a patented, painless, removable, transdermal microneedle patch that can deliver vaccines and therapeutics cheaper, quicker, and more effectively in humans and animals. STM's delivery technology is the only platform engineered to deliver single- or multi-dose medications in one application without needles or other equipment. With vaccines, by eliminating pain, refrigerated supply chains, and the need for specially trained health care personnel, STM's patch will reduce costs, improve patient access, enhance prophylactic outcomes, reduce personnel burdens, and resolve supply chain challenges.

Team

STM founders balance leadership in science and strategy:

- **Thanh Duc Nguyen, Ph.D.** – Dr. Nguyen is an associate professor of mechanical engineering at the University of Connecticut who is an innovator, nine-time patent holder, and research leader who has raised over \$5M in grant and private funding. Thanh founded two start-up companies and has an extensive pharmaceutical and private industry network.
- **Jasdeep Singh, Ed.D., MBA** – Dr. Singh has managed a variety of organizations, led a \$500K seed round at a \$3M valuation, and led schools with over 150 employees and multimillion dollar budgets. Jasdeep has also been a team leader in numerous negotiations, closed an international licensing agreement, and brings consulting experience and a VC and angel investor network.



Product

STM's core technology is a self-administered patch that can be painlessly applied on the skin to embed arrays of microneedles (MNs). Minutes after administration, the patch is removed and MNs are imperceptibly embedded in the superficial skin layer. The MNs are composed of a biodegradable polymer, such as those used in surgical sutures, and are engineered to release vaccines immediately, repeatedly, or over a period of time – all in a single application. This technology supports multiple types of vaccines and therapeutics, including subunit protein-based antigens, vector-based vaccines, mRNAs, or any compound that benefits from multiple or longitudinal dosing. Due to our construction, vaccines are stabilized against high temperatures, thus avoiding the need for a refrigerated supply chain and affirming the antigenicity while remaining in the skin. STM are being planned for medications, animal applications, and certain compounds in the nutraceutical market.

Revenue Model

STM will create multiple revenue streams through manufacturing, licensing, and contract research, depending on the pharma agent. With STM's ability to create cost savings of up to 40% throughout the medical supply chain, we are able to meet the needs of pharma companies, distributors, and doctors due to lowering research, inventory, transportation, application, and deployment costs. The STM patch is also vaccine-, drug-, and company-agnostic, allowing STM to either develop in-house products (such as with generic drugs) or work with a drug developer on a profitable licensing model for a variety of their products (such as vaccines).



Market Opportunity

Vaccines

The North American vaccine market is estimated to be \$16-35B with CAGRs ranging from 5.9-12.6%. We anticipate entering the market by targeting high frequency vaccines, such as influenza or pneumococcal, and rarer illnesses that require long inventory storage to prepare for quick deployment.

As an example, STM could provide unique value in flu vaccine deployment due to our ability to release multiple doses over time, as compared to current single-injection administration. Research has shown multiple doses of the same influenza vaccine can increase effectiveness, especially in children. The influenza vaccine is the most utilized vaccine in the U.S.: there were 193.8M doses of the influenza vaccine delivered in the U.S. in 2020-2021 with a value of nearly \$3B and a CAGR of 16.9%. Within that opportunity, our SAM would include groups required to receive the vaccine as part of the occupation or schooling.

Animal Applications

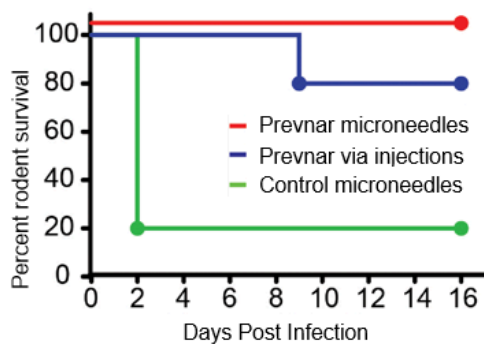
The global animal vaccine market is estimated to be \$11.8B with a CAGR of 9.3%. We anticipate entering the market by targeting high value animals that require multiple multi-dose vaccines per year, such as cattle and certain companion animals. We are also testing drug candidates, each with a large market opportunity, that require multiple doses over many years, such as anti-parasitics.

Competition

Of all the products under active research or clinical trials within the microneedle market, none has the unique advantage that STM brings: variable (instant, longitudinal, multiple separate dose) deployment of a pharmaceutical in a single application and mRNA temperature stabilization. However, there are additional players investigating MN technology for use in vaccines. Largely, these potential competitors fall into 3 categories: pharmaceutical companies, contract manufacturers, and academic institutions.

STM's Microneedles Are More Effective Than Injections

Improved Vaccine Effectiveness



Improved Bioavailability for Drugs

