



## TECHNOLOGY

# Vaccine Development using Functionalized Vesicles

## OVERVIEW

### Background

One of the greatest successes in public health in the last century has been the introduction of vaccines to prevent diseases. The mortality rate for many diseases, including smallpox, polio, diphtheria, and measles has been significantly reduced in the United States. However, the morbidity and mortality rates for some diseases including influenza and pneumonia remain high (50,003 deaths in 2010, CDC 2010). Overcoming the deficiencies associated with vaccine technologies is paramount to enhancing the efficacy of vaccines. Some of the challenges include, 1) identifying and purifying potential vaccine candidates or antigens, 2) synthesis of the potential vaccine candidates, 3) control of surface density of the antigen presentation and 4) long term storage of vaccines. Most of all, it is believed that improving the presentation of antigens to the immune system is the critical step in vaccine development.

### Innovative Technology

Researchers at the University of Maryland have developed a technology to extract surface antigens from pathogens using novel, robust functionalized vesicles. They have demonstrated the extraction of surface antigens from the surface of bacterial strains of *Neisseria* and *Francisella tularensis*. Inoculation of mice with these vaccines produced high antibody titers of protective antibodies. This technique may be applicable to extracting surface antigens to generate multiple vaccine candidates for a wide variety of bacterial pathogens.

## APPLICATIONS

1) Vaccine Production - generation of potential vaccine candidates against many pathogens.

## ADVANTAGES

- 1) Vesicles are easy to produce and form spontaneously in biological media
- 2) Vesicles are stable and can be easily stored at room temperature
- 3) Vesicles are inexpensive compared with the widely used liposomes
- 4) Antigens extracted using this process do not have to undergo extensive purification
- 5) This method enables control of antigen presentation and density
- 6) This method involves efficient and inexpensive sterilization techniques

## CONTACT INFO

UM Ventures  
0134 Lee Building  
7809 Regents Drive  
College Park, MD 20742  
Email: [umdtechtransfer@umd.edu](mailto:umdtechtransfer@umd.edu)  
Phone: (301) 405-3947 | Fax: (301) 314-9502

## Additional Information

## INSTITUTION

University of Maryland, College Park

**PATENT STATUS**

Patent(s) pending

**LICENSE STATUS**

Contact OTC for licensing information

**CATEGORIES**

- Vaccines
- Biomaterials

**EXTERNAL RESOURCES**

- [US Patent 10,017,545](#)

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