

# Breast Milk as a Source, Incubation/Storage Medium, and Delivery System for Infant Mucosal Immunity Bacteriophage

Tech ID: 28706 / UC Case 2014-569-0

## ABSTRACT

Researchers at the University of California, Davis have developed a method to harvest and enrich symbiotic bacteriophage to promote bacterial immunity.

## FULL DESCRIPTION

A human infant's gastrointestinal tract, specifically the mucosal surfaces and the mucus layer found within the gastrointestinal tract, act as major barriers against infection and are ideal environments for symbiotic microbial communities. Bacteriophage populations present in mammalian milk can transmit bacterial immunity from mother to infant. For bacteriophages to reach a critical layer, they must quickly pass through the acidic conditions of the stomach so as to not be destroyed. Infant milk formulas, however, do not have sufficient adherence of bacteriophage to mucus-producing epithelial cells, creating a need for a more reliable and easily incorporated methods of transmission, mucosal attachment, and maintenance of bacteriophage community in an infant's gastrointestinal tract.

Researchers at the University of California, Davis have developed a method to identify, maintain and selectively enrich bacteriophage to transmit bacterial immunity. Bacteriophage populations present in mammalian milk can transmit bacterial immunity from mother to infant. Milk, which is known to contain various glycoconjugates including Milk Fat Globules (MFG) covered in mucins, can act as a delivery system to overcome the conditions of the stomach while also acting as a bioreactor for the selective enrichment of bacteriophages. Milk-derived bacteriophage fed to infants provide a first line of mucosal defense and initiate the development and selection of healthy microbiota. In addition, it can also influence lifelong ecological dynamics of the microbiota and contribute to prophylactic prevention of intestinal pathogens within the gastrointestinal tract. This new method of delivery will help assist bacteriophage transit through the stomach, including the buffering of stomach acids, and improve bacteriophage adherence to MFG and other glycoconjugates.

## APPLICATIONS

- ▶ Method to identify, maintain and selectively enrich bacteriophage
- ▶ Transmit bacterial immunity to infant

## FEATURES/BENEFITS

- ▶ Selective bacteriophage enrichment
- ▶ Assist bacteriophage transit through the stomach
- ▶ Improves bacteriophage adherence to glycoconjugates

## PATENT STATUS

## CONTACT

Victor Haroldsen  
[haroldsen@ucdavis.edu](mailto:haroldsen@ucdavis.edu)  
 tel: 530-752-7717.



## INVENTORS

- ▶ German, Bruce

## OTHER INFORMATION

### KEYWORDS

milk fat globules, MFG,  
 infant, bacteria,  
 immunity, bacteriophage,  
 GI, gastrointeststinal  
 tract, milk, mammalian,  
 mammal, symbiotic,  
 bacterial immunity,  
 glycoconjugates

### CATEGORIZED AS

- ▶ **Agriculture & Animal Science**
  - ▶ Nutraceuticals
  - ▶ Other
- ▶ **Materials & Chemicals**
  - ▶ Biological
- ▶ **Medical**
  - ▶ Delivery Systems

| Country | Type | Number | Dated | Case |
|---------|------|--------|-------|------|
|---------|------|--------|-------|------|

|                          |                       |             |            |          |   |
|--------------------------|-----------------------|-------------|------------|----------|---|
| United States Of America | Issued Patent         | 11,260,089  | 03/01/2022 | 2014-569 | ► <a href="#">Disease: Digestive System</a> |
| United States Of America | Published Application | 20220160799 | 05/26/2022 | 2014-569 |   |

RELATED CASES

2014-569-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

► [Novel Compounds & Methods for Producing N-Glycans](#)

|   |   |   |  |
|---|---|---|--|
| <b>University of California, Davis</b><br><b>Technology Transfer Office</b><br>1 Shields Avenue, Mrak Hall 4th Floor,<br>Davis,CA 95616 | Tel:  | © 2017 - 2022, The Regents of the University of |  |
|   | 530.754.8649  | California                                      |  |
|   | <a href="mailto:techtransfer@ucdavis.edu">techtransfer@ucdavis.edu</a>  | <a href="#">Terms of use</a>                    |  |
|   | <a href="https://research.ucdavis.edu/technology-transfer/">https://research.ucdavis.edu/technology-transfer/</a> | <a href="#">Privacy Notice</a>                  |  |
|   | Fax:  |   |  |
|   | 530.754.7620  |   |  |