



Premature baby's hand with adult hand

Jun 09, 2025 09:51 BST

£1.2m grant extends research into the benefits of breast milk for premature babies

Northumbria University academics have been awarded £1.2m to further their research into how viruses carried naturally in breast milk can potentially be used to promote gut health in premature babies.

The researchers, who will work in collaboration with colleagues from the University of Liverpool and The Newcastle upon Tyne Hospitals NHS Foundation Trust, will explore how bacteriophages – viruses that can infect

and alter or destroy bacteria – can be bound with the naturally occurring fats in mother's breast milk.

Their hope is that they can then be given to premature babies to help the development of gut microbial communities that support health.

The gut microbiome contains helpful bacteria that supports digestion and immunity, but as it is not fully developed in pre-term infants, they can often face serious complications with their gut health and gastrointestinal tract.

Conditions such as necrotising enterocolitis and late onset sepsis can be life-threatening and are one of the most common causes of death in the first weeks of life for premature babies, yet their causes are still not fully understood.

The new project will explore how these bacteriophages and fats, known as lipids, in breast milk interact together and also with the human body that receives them. This will give researchers a better understanding of how bacteriophages can be given to premature babies to improve their gut health and reduce the risk of life-threatening illnesses.

The research builds on [an earlier study](#) with children's charity, Action Medical Research, in which 99 mothers of premature babies born at Newcastle's Royal Victoria Infirmary donated breast milk. These samples were analysed to identify the core bacteriophages and fats present in the mother's milk supply.

In this study, the researchers found that bacteriophages are abundant from the first week and throughout the first 100 days of lactation and can be associated with lipids in the milk.

The funding for the study was awarded by the [UKRI Biotechnology and Biological Sciences Research Council \(BBSRC\)](#), some of the work will be carried out in the [NU-OMICS](#) DNA Sequencing Research Facility at Northumbria University. NU-OMICS is a state-of-the-art research-led service that works with both academia and industry to provide DNA sequencing solutions on a wide range of projects.

Professor Darren Smith, Professor of Bacteriophage Biology in Northumbria

University's Department of Applied Sciences, is leading the study. He said: "We're extremely excited to have received this award from the BBSRC. This research could really make a difference in understanding how carriage of phages in mother's own milk and their relationship to infant health. Special thanks have to go to the supportive families and clinical teams that make this research possible.

"While this specific study focuses on the application in tackling complications in pre-term infant gut development, these approaches could have a much broader application with phage-lipid complexes helping to store and deliver phages in the treatment of infection in humans, animals and agriculture.

Professor Smith added: "The gut microbiome in preterm babies is less complex so it's a good model to study how phage-lipid complexes affect bacterial community structure and overall microbiome development more fully. It could also help us to better understand the impact of introducing phages on dampening or heightening immune responses and their potential application in mainstream treatment to engineer microbial systems."

The team will explore whether these lipids slow the release of phages in the preterm gut and modify their interaction with bacteria. This understanding could be used to regulate the microbiome by limiting the growth of harmful bacteria and promote others to thrive in a controlled way.

BBSRC's responsive mode award, which aims to provide simpler, more agile and dynamic targeting for funding of particular areas of timely strategic interest, opportunity or need, will see the Northumbria University team, which also includes project co-investigators [Dr Andrew Nelson](#) and Dr Wen Chyin Yew, work alongside Professor Janet Berrington, a consultant in neonatal medicine at the Royal Victoria Infirmary, The Newcastle upon Tyne Hospitals NHS Foundation Trust, and Professor of Pharmacology and Immunocompatibility, Neill Liptrott at the University of Liverpool.

Speaking on the project Professor Liptrott said: "Ensuring the safety of bacteriophages, especially concerning immune responses, is crucial for their practical clinical application. This project will benefit significantly from our research on complex medicines and materials, mainly as Liverpool is at the forefront of innovation in therapeutics, including lipid-immune interactions and developing relevant models.

“Supported by BBSRC, this research has the potential to revolutionise our approach to managing life-threatening infections, starting with protecting the most vulnerable groups—premature infants. Moreover, this project is the initial step in a larger collaborative initiative focused on bacteriophage-immune interactions with Prof. Smith and is already progressing well.”

Professor Anne Ferguson-Smith, BBSRC Executive Chair, said: “This pioneering research exemplifies the vital role bioscience plays in improving health outcomes from the very start of life. By investigating how natural components of breast milk can be harnessed to support the delicate gut microbiome of premature babies, this project has the potential to unlock life-saving interventions for some of our most vulnerable infants. BBSRC is proud to support this work, which brings together cutting-edge science and clinical collaboration to tackle complex challenges in neonatal health.”

NU-OMICS DNA sequencing research facility is based in the Department of [Applied Sciences](#) at Northumbria University. The department has an extensive portfolio of research subjects including biology, [biomedical sciences](#), chemistry, forensic science, food and nutritional sciences. Our academics are nationally and internationally renowned within their fields. Our research in this area is [ranked 8th in the UK for research power](#) (2021 Research Excellence Framework), with the highest possible rating for our research environment and the highest rating for research impact across the university.

UNIVERSITY OF THE YEAR 2022 (Times Higher Education Awards)

Northumbria is a research-intensive university that unlocks potential for all, changing lives regionally, nationally and internationally.

Two thirds of Northumbria's undergraduate students come from the North East region and go into employment in the region when they graduate, demonstrating Northumbria's significant contribution to social mobility and levelling up in the North East of England.

Find out more about us at www.northumbria.ac.uk

--- Please contact media.communications@northumbria.ac.uk with any media

enquiries or interview requests ---

Contacts



Rik Kendall

Press Contact

PR and Media Manager

Business and Law / Arts, Design & Social Sciences

rik.kendall@northumbria.ac.uk

07923 382339



Andrea Slowey

Press Contact

PR and Media Manager

Engineering and Environment / Health and Life Sciences

andrea.slowey@northumbria.ac.uk

07708 509436



Rachael Barwick

Press Contact

PR and Media Manager

rachael.barwick@northumbria.ac.uk

07377422415



James Fox

Press Contact

Student Communications Manager

james2.fox@northumbria.ac.uk



Kelly Elliott

Press Contact

PR and Media Officer

kelly2.elliott@northumbria.ac.uk



Gemma Brown

Press Contact

PR and Media Officer

gemma6.brown@northumbria.ac.uk