Endangered species' feces could help fight against diabetic ulcers

September 22 2023

Binturongs. Credit: Pixabay/CC0 Public Domain

Feces from endangered animals could be the source of a potential new treatment for the infectious bacteria that cause diabetic foot ulcers, researchers from the University of Sheffield have found.

Waste from animals including Guinea baboons, lemurs and Visayan pigs

has been shown to contain bacteriophages that could be used in the fight against hard-to-treat diabetic ulcers, saving the NHS an estimated £1 billion a year.

The Sheffield researchers discovered naturally occurring viruses in the poo, known as bacteriophage, kill bacterial species that are resistant to antibiotics and are the cause of foot ulcers that result in 7,000 amputations a year.

Phages, formally known as bacteriophages, are viruses that solely kill and selectively target bacteria. They are the most common biological entities in nature, and have been shown to effectively fight and destroy multi-drug resistant bacteria. Namely, when all antibiotics fail, phages often still succeed in killing the bacteria.

Once further research is undertaken, the naturally occurring viruses could potentially be included in dressings applied to previously untreatable diabetic foot ulcers.

Led by Professor Graham Stafford from the University of Sheffield, the team has been using the fecal matter from animals at Yorkshire Wildlife Park (YWP) to isolate several bacteriophage that could be used to successfully treat diabetic foot patients.

Professor Stafford, Chair in Molecular Microbiology at the University of Sheffield, said, "Despite the smell, it turns out that the fecal matter of endangered species could hold the key to killing infectious bacteria that are otherwise resistant to antibiotics.

"So far we have managed to find antibacterial viruses from Guinea baboon, giraffe, lemur, Visakan pigs, and our favorite, the cuddly binturongs and are working hard to develop these into viable treatments for patients whose next option is the loss of a toe, foot or leg.

Importantly, the treatment could also help reduce costs of about £1 billion per year to the NHS.

"We are very excited to continue the collaboration with the YWP to develop these into viable treatments for patients whose next option is the loss of a toe, foot or leg.

"The work is part of a wider drive in U.K. Bioscience to find new antimicrobials to combat the major global challenge of Antimicrobial Resistance (AMR), a problem that will increase in severity and affect millions of patients in the U.K. and worldwide."

He added, "We have been searching for new treatments for antibiotic resistance for a while and we are the first to look for such a virus in zoo poo. We look forward to the poo pick up, which the wonderful team at the zoo place in a cool box in a fridge for us.

"It's a delight that endangered species are contributing to such a positive and powerful purpose. It provides an ever stronger reason to conserve endangered animals. The biodiversity they harbor potentially includes new cures for a range of infectious diseases and we believe this is the tip of the iceberg in this area."

Phage therapy has been used in the U.K. a handful of times to treat sepsis and in a small number of diabetic foot infections, however this is the first time researchers have investigated unlocking the potential of environmentally occurring phage on a wider scale and from the waste of endangered species.

It is estimated that 25% of diabetic patients end up suffering with a foot ulcer, while the number of diabetics is ever-increasing. A recent report commissioned by Diabetes UK revealed that 60,000–75,000 people per week are being treated for diabetic foot ulcers (DFUs) in England alone.

Many of these do not respond to the normal antibiotic treatment due to resistant bacteria, resulting in around 7,000 amputations a year.

Dr. Dave Partridge, Consultant Microbiologist, Sheffield Teaching Hospitals NHS Foundation Trust, said, "Diabetic foot infections are often a challenge to treat and patients may need to have surgery to amputate part of the foot or leg, which can have a huge impact on their quality of life. If bacteriophage therapy proves successful, this could provide us with the ability to treat these infections in a different way, shortening courses of antibiotics and potentially avoiding the need for surgery."

Researchers have so far identified helpful bacteria in the fecal matter of Guinea baboons, giraffes, lemurs, Visayan pigs and binturongs, who are part of a collection of 450 animals from more than 70 rare and endangered species at the 260-acre park at Branton, near Doncaster.

Dr. Charlotte Macdonald, director of animals at Yorkshire Wildlife Park, said, "We are thrilled to be involved in such a ground-breaking project. It is remarkable to think that this exciting research could help those who would otherwise have to go through traumatic therapies and amputations.

"This highlights the One Health approach, and how intricately connected human health is to animal health and protecting biodiversity is critical for the ongoing well-being of the planet and all the creatures that live on it—including humans.

"It all emphasizes how interconnected the web of life is and the importance of protecting endangered species and their habitats, which is why here at Yorkshire Wildlife Park we place conservation of all these magnificent creatures at the heart of all our work."

Dr. Dinesh Selvarajah, Consultant Physician at Sheffield Teaching Hospitals NHS Foundation Trust, said, "Unfortunately, I see many patients with diabetic foot disease in my clinic. Treating infections more effectively will have a significant impact on lowering the risk of amputations. That is why we are pleased to be working with the University of Sheffield, and Yorkshire Wildlife Park on this important early stage research which has the potential to find new ways of treating diabetic foot infections."

Research is ongoing to discover phage from different sources. Currently clinical trials to determine the effectiveness of diabetic foot ulcer therapy with the bacteriophages have not yet been undertaken.

Provided by University of Sheffield

Citation: Endangered species' feces could help fight against diabetic ulcers (2023, September 22) retrieved 28 April 2024 from https://medicalxpress.com/news/2023-09-endangered-species-feces-diabetic-ulcers.html