**Bacteriophage cocktail shows significant promise for Clostridium difficile infections**

**Photographs of Professor Martha Clokie (credit to ‘University of Leicester’) available to download at:**[**https://www.dropbox.com/sh/ol7w5p8cqzeng3j/AAB1izgmmAB0pZ78\_oZuzx3Ja?dl=0**](https://www.dropbox.com/sh/ol7w5p8cqzeng3j/AAB1izgmmAB0pZ78_oZuzx3Ja?dl=0)

**Watch a video of Professor Clokie explaining her research into bacteriophages:**[**https://www.youtube.com/watch?v=wP1c7HJpeSU**](https://www.youtube.com/watch?v=wP1c7HJpeSU)

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* *Clostridium difficile* infections (CDI) are responsible for approximately 39% of antibiotic-associated diarrhoea in the Western world causing 10% of deaths
* Specific phage combinations caused complete destruction of *C. difficile* cells while in animal model dramatically reduced spread
* Phage therapy prevents microbiome imbalance caused by traditional antibiotic treatment

University of Leicester study uses phage-based therapy to address growing challenge of CDI

A new University of Leicester study has confirmed the therapeutic potential of bacteriophage combinations to treat highly infectious bacteria*C. difficile* infections (CDI) while retaining a healthy gut.

A team led by Martha Clokie, Professor of Microbiology at the University of Leicester’s Department of Infection, Immunity and Inflammation, demonstrated that bacteriophage combinations significantly reduce growth of *C. difficile*cells and proliferation in complex models, whilst retaining healthy gut by preventing destruction of beneficial bacteria caused by traditional antibiotic treatment.

The study, which was funded by AmpliPhi Biosciences, is published in the peer-reviewed publication *Antimicrobial Agents and Chemotherapy*.

CDI is responsible for approximately 39% of the cases of antibiotic-associated diarrhoea in the Western world. Ten percent of CDI patients die due to lack of effective therapies. The main obstacles to preventing CDI are the existence of diverse *C. difficile* strains that vary in their response to antibiotics and the impervious nature of the *C. difficile*spores.

Results from studies carried out by Dr Janet Nale in Professor Clokie’s laboratory demonstrated that specific phage combinations caused the complete destruction of *C. difficile* and prevented the appearance of resistant bacteria, while results of the complex models work showed that oral delivery of optimised phage combinations resulted in reduced *C. difficile* spread at 36 hours post-infection.

Additionally, the phage combination was able to kill 12 of the 13 *C. difficile*variants that are most prevalent in the UK, and were effective against the emerging variants that are increasingly causing concern in the UK, the US and more widely. The phage combination also reduced or completely prevented regrowth of *C. difficile* when compared to treatment with individual phages.

“Our data supports the therapeutic potential of phage combinations to treat *C. difficile* infections,” said Professor Clokie. “In particular, combinations of phages optimised in the laboratory setting were shown to be effective in the treatment of *C. difficile* in animals. Further refinements to our bacteriophage cocktails can be explored to maximise phage efficacy and to target the most dominant *C. difficile* variants.”

“Lab experiments, like this, allow us to see what effect specific phage combinations have on C. difficile in complex models. To see the effect of specific phage combinations in humans we would run an experimental trial with people.”

M. Scott Salka, CEO of AmpliPhi Biosciences, added: “The prevalence of*C. difficile*, the high costs of infection control and the challenge of finding alternative treatments, all contribute to the significant clinical and financial burden that CDI imposes on healthcare systems. The positive outcomes of these studies validate phage-based therapy as a promising approach that has the potential to address the growing challenge of CDI. We look forward to our continued collaboration with Professor Clokie to develop tailored and customised phage therapies for future clinical trials in humans.”

AmpliPhi Biosciences entered into its ongoing Collaboration and License Agreement with UK-based University of Leicester to develop a novel bacteriophage therapy targeting *C. difficile* in 2013.

* ‘Bacteriophage Combinations Significantly Reduce Clostridium difficile Growth In Vitro and Proliferation In Vivo’ is published in*Antimicrobial Agents and Chemotherapy*, [**doi:10.1128/AAC.01774-15**](http://dx.doi.org/10.1128/AAC.01774-15)

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