**////Title: Bacteriophage Hunting: Searching for the Tiny Viruses That Kill Harmful Bacteria**

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Shigellosis is a nasty infection of the *Shigella* bacteria with over 164 million cases each year leading to 1.1 million deaths. Sadly, many of these deaths are children, as those under the age of 5 are most likely to catch a *Shigella* infection.

There are four different species of *Shigella*: *S. boydii, S. dysenteriae, S. flexneri,* and *S. sonnei. S. flexneri* is the most common type and is often associated with low-income countries, however, cases of *S. sonnei,* which tends to be found in high-income countries, are increasing. This is due to the low dose of bacteria needed to cause illness and the ever-increasing antibiotic resistance of the bacteria.

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Antibiotic resistance is a huge and growing issue globally. The misuse of antibiotics in humans and animals has resulted in bacterial strains that are not killed by conventional antibiotics. Researchers are working to combat this global health threat by innovating alternatives, or supplements, to antibiotics.

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One of these approaches utilises bacteriophages, the tiny viruses that are harmless to humans but instead, infect and kill bacteria. They do this by attaching to a bacterium, injecting them with their genome, replicating and multiplying inside and then bursting out to destroy the bacteria and repeat the process.

Excitingly, bacteriophages have already successfully been used to treat some antibiotic-resistant strains of bacteria. However, different bacteriophages infect only specific bacteria, so specific bacteriophages need to be found to treat different bacterial infections.

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Dr Kristin Parent from Michigan State University is working on exciting, collaborative projects hunting for bacteriophages in their natural environment. She aims to discover and characterise *Shigella* bacteriophages so that they might be used in novel therapeutics.

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With an estimated 10^31 bacteriophages on the planet, there were many to be found. Dr Parent enlisted the help of microbiology graduate students at Michigan State University, who took samples from a variety of places in the local area, including from river sediment and water at the bottom of university bathroom hand dryers. Overall, the team discovered 16 new bacteriophages that infect *Shigella* and that six of these can infect more than one species of the bacteria.

In her next step, Dr Parent involved graduate students in addition to students at Lincoln Southwest High School in Nebraska and their instructors, Kevin Schrad, Charles Bittle and Peter Stone. Nebraska is located far from Michigan and is typically warmer and drier as well as having a different main water source and a unique salt marsh. As such, Nebraska gives rise to different environments for bacteriophages to live in and so, the possibility of unearthing even more new species.

Dr Parent was not disappointed. This work confirmed that *Shigella* bacteriophages are unexpectedly abundant in the Nebraskan environment. Subsequent molecular studies of the bacteriophages helped Dr Parent and the team to better understand their inner workings and structure.

Dr Parent’s exciting collaborations have opened exciting new avenues to explore in the world of bacteriophages and antibiotic resistance.