

# Treatment of bacterial infection is going viral

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*Antibiotic resistance in bacteria are causing many unnecessary deaths. One solution to this problem is to apply phage therapy, the use of bacteria-specific viruses in order to kill the infecting bacteria. Bacteriophages have virtually no side effects, and they can be used to treat nearly any bacterial infection.*

## Bacteriophage can infect and kill bacteria

A major hurdle in medical treatments today are antibiotic resistant bacteria. Antibiotics are chemical compounds that act as poisons to bacteria, which are single celled organisms that sometimes cause disease in humans and animals. That bacteria are becoming resistant means that the antibiotics no longer work as well as they used to, making the treatment of bacterial infections much harder. Some bacteria are even resistant to many different antibiotics, which makes it very difficult to get rid of them. One common example is MRSA, which people are sometimes infected by while staying in a hospital. So, what are we to do? Well, on a larger scale, if the mice stop eating the rat poison, you buy a cat. You introduce a predator to the system.

As it so happens, there is a readily available predator of bacteria: bacteriophage.

Bacteriophages, or phages, are viruses that only infect bacteria, and kill them in the process. They have started being used as an alternative to antibiotics since resistance started becoming an issue. Because phages cannot cause disease in humans they have virtually no side effects, and they are incredibly easy to get a hold of. Phage are everywhere bacteria are, so all you need to do is take a sample from a place with a lot of bacteria and purify it, and then you can see if there is a phage that will work by growing it on the right kind of bacteria.

Most viruses are specific to one or a few hosts. This is partly due to genetic factors, in that the viral genes cannot work with the cellular machinery of a non-viable host, but also because they often can't get inside in the first place. The first step of a virus infecting a cell, be it a phage or the common cold, is to adhere to receptors on the cell surface. If the cell surface is too different from those the phage needs it will be unable to even attach to the cell. It would be like trying to climb a tree using suction cups; the attachment and the receptor are simply incompatible. With the incredible diversity of living things very few organisms share the exact same surface molecules, and consequently, viruses that can infect their cells.

Phages are often very specific, so they only infect one type of bacteria. They are also very diverse, so there are usually multiple phages that can be used against the same bacterium. Phage therapy have even been shown to be able to reduce the number of bacteria like *Salmonella* in food products such as meat, fish and vegetables. Phage can be used on burn wounds, in the intestines and even to stop bacterial growth in industrial settings, such as submerged machinery and food processing. Phage therapy does seem to have many uses indeed.