'Alien'-type viruses to treat MRSA

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New methods that involve sticking thousands of bacteria-killing viruses to wound dressings are offering ways to prevent hospital operating theatres from spreading infections, scientists heard today at the Society for General Microbiology's 162nd meeting being held this week at the Edinburgh International Conference Centre.

Although they are too small to see with the naked eye, bacteria are also attacked by viruses, but specific ones that only infect bacteria, not human or animal cells. But for bacteria they present a threat like the alien life form in the Hollywood film Alien – growing inside the bacteria and then bursting out to attack other similar bacteria, continuing their life cycle. Now doctors are harnessing these little alien creatures to help prevent the spread of hospital superbugs by developing materials impregnated with thousands of tiny beads coated in bacteria-killing viruses.

"Some bacteria specific viruses – called bacteriophages – have been used in the past to help clear up infections caused by bacteria, but their use died out when antibiotics like penicillin and methicillin became widely available", says Janice Spencer from the University of Strathclyde in Glasgow, Scotland. "We are looking at them again now that multiple antibiotic resistant strains of bacteria have become such a problem in hospitals".

The researchers have developed a technique to keep the viruses active for more than 3 weeks, instead of having them die after a few hours, by chemically bonding them to polymers. The polymers, including nylon,

can be in various forms including microscopic beads and strips. Nylon beads can be incorporated into cleaning materials, to decontaminate operating theatres and prevent infections.

The nylon can also be in the form of sutures or wound dressings to decontaminate and prevent wound infection. This limits the risk of blood poisoning, which can be life threatening. Immobilising the bacteriophages onto sutures – the hospital thread used to stitch up patients during operations – immediately kills some of the bacteria that would otherwise infect the wound. This speeds up wound healing and reduces the likelihood of the patient developing a major infection.

Many of the most dangerous bacteria are carried harmlessly on the skin and inside the noses of most healthy people. It is only when a patient's immune system is weakened by illness or when the bacteria can get inside our bodies during an operation, bypassing the surface defences provided by our skin, that the bacteria develop into their most dangerous, virulent form. Once activated, some bacteria can cause such serious infections that people may die from them. If these bacteria have also acquired multiple antibiotic resistance, like MRSA, it becomes very difficult, time consuming and expensive to treat the infection.

"We've also developed a device to rapidly detect MRSA on contaminated surfaces. This will allow us to screen patients before surgery to limit the chances of passing on superbug infections by positively decontaminating patients and isolating them to avoid cross-contamination", says Janice Spencer.

"Simple and effective rapid detection of bacteria is important to limit the chance of infection occurring in the first place", says Janice Spencer. "Patients who are carriers for MRSA can be isolated and decontaminated by using standard methods or by using immobilised bacteriophages incorporated into creams or body washes".

The prototype bacteriophage devices for detection and decontamination have been shown to clear MRSA infected surfaces such as tiles and cotton, with the bacteriophages successfully killing 96% of the MRSA strains isolated from patients in 3 different hospitals in the UK and USA.

Source: Society for General Microbiology