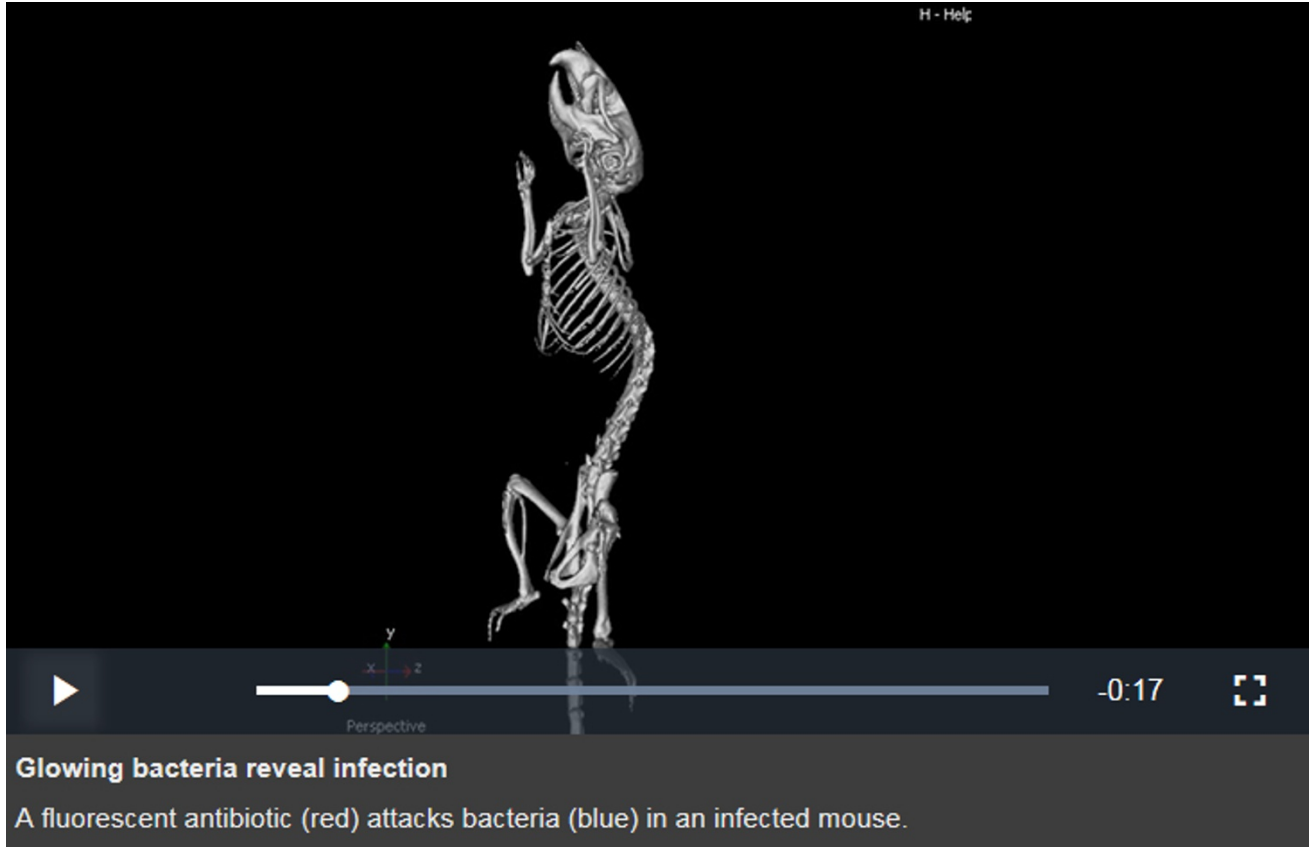


Glowing antibiotics reveal infections

Drug treated with special dye allows real-time imaging of bacterial growth.

Sara Reardon

15 October 2013



Despite surgeons' best efforts, bacteria often manage to sneak onto medical implants such as bone screws, where they can cause severe infections. Research published today in *Nature Communications* suggests that using fluorescent antibiotics could reveal such infections before they become too severe¹.

Lead author Marleen van Oosten, a microbiologist at the University of Groningen in the Netherlands, says that the only way to distinguish normal post-surgical swelling from an infection at an implant site is to perform a biopsy on the affected tissue, which is itself an invasive procedure. Sometimes such infections grow for years before being diagnosed correctly.

To better spot microbes in the body, van Oosten and her colleagues coloured the antibiotic vancomycin with a fluorescent dye to help identify infected tissues. The drug inserts itself into the thick cell walls of bacteria such as *Staphylococcus aureus*; the addition of the dye makes the cell walls glow.

The researchers injected *S. aureus*-infected mice with a very small amount of the antibiotic — enough to make the bacteria glow when viewed under a fluorescent microscope, but not enough to kill them. The team then implanted metal plates coated with the fluorescent antibiotic into the shin bone of a human cadaver, 8 millimetres below the skin. Some of the plates had been covered with *Staphylococcus epidermidis*, a bacterium that grows on human skin. When the researchers photographed the leg with a camera that detects fluorescence, they could see these plates glowing.

Fighting infections

Niren Murthy, a biomedical engineer at the University of California, Berkeley, says that the approach is interesting, and that a new way to detect infections is badly needed. Only some bacteria will bind to vancomycin, so physicians will be able to narrow down the cause an infection and thus how to fight it.

But Murthy says that it is not clear whether the fluorescent vancomycin molecules will be bright enough for a scanner to detect them deep in a living human body, especially if not many bacteria are present.

Van Oosten hopes that the technique can soon be used on people. Both vancomycin and the dye that her group used are already known to be safe in humans.

Nature | doi:10.1038/nature.2013.13943

References

1. van Oosten, M. *et al. Nature Commun.* **4**, 2584 (2013).