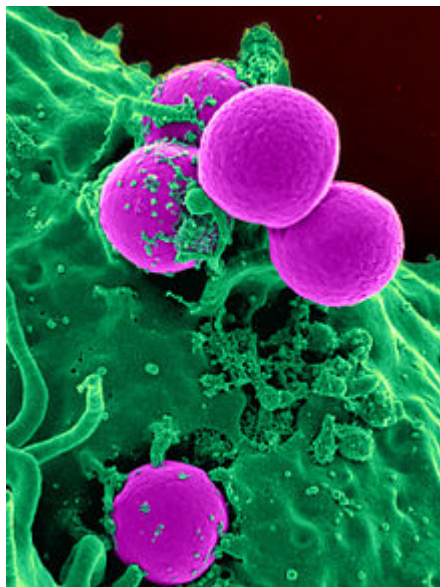




## Activity 4

### **What do we do when antibiotics stop working?**

Until recently every time resistance to an antibiotic emerged we just went to the pharmacy to find another antibiotic to use. In the last 30-40 years the development of new antibiotics by the pharmaceutical industry has slowed or stopped. The problem is that some bacteria are now what we call 'multi-drug resistant'; in other words we are beginning to see infections that are resistant to almost every type of antibiotic in our medical arsenal.



([https://en.wikipedia.org/wiki/Methicillin-](https://en.wikipedia.org/wiki/Methicillin-resistant_Staphylococcus_aureus#/media/File:Human_neutrophil_ingesting_MRSA.jpg)

[resistant\\_Staphylococcus\\_aureus#/media/File:Human\\_neutrophil\\_ingesting\\_MRSA.jpg](https://en.wikipedia.org/wiki/Methicillin-resistant_Staphylococcus_aureus#/media/File:Human_neutrophil_ingesting_MRSA.jpg))

Human neutrophil (green) ingesting (purple) methicillin-resistant *Staphylococcus aureus* bacteria (MRSA)

There are many complex reasons for the lack of development of new antibiotics but there is no doubt that this is part of the problem. The article below gives a summary of some of the medical and commercial factors involved.

<http://www.who.int/bulletin/volumes/89/2/11-030211/en/>

If a new antibiotic becomes available does it make sense to use it widely or should it be held in reserve and only used when existing antibiotics are not working? How will this affect the drug company's profits? Why might a drug company focus its efforts on anti-cancer drugs or treatments for heart problems rather than antibiotics? How might society find a way to provide incentives to the drug companies to do more antibiotic development work?

Reducing antibiotic use on farms can be achieved by reducing levels of disease. Nobody would wish to leave a sick animal to suffer untreated, but can we stop them getting ill in the first place? Improving standards of animal husbandry, using vaccines to boost immunity, and



breeding animals that are less prone to infection are all approaches that have been successfully used to reduce antibiotic use in agriculture.



([https://commons.wikimedia.org/wiki/File:Chicken\\_Farm\\_034.jpg](https://commons.wikimedia.org/wiki/File:Chicken_Farm_034.jpg))

Some other potential methods for developing antibacterial treatments are described here:

<http://www.nature.com/news/antibiotic-alternatives-rev-up-bacterial-arms-race-1.17621>

and here:

<http://www.pewtrusts.org/en/research-and-analysis/analysis/2016/12/15/5-alternatives-to-antibiotics-in-food-animals>

In what other ways do you think we could prevent or treat disease? Are the issues the same in the developing world as they are in the UK? Can we avoid getting infections in the first place?