

Antibiotic Resistance – causes and effects

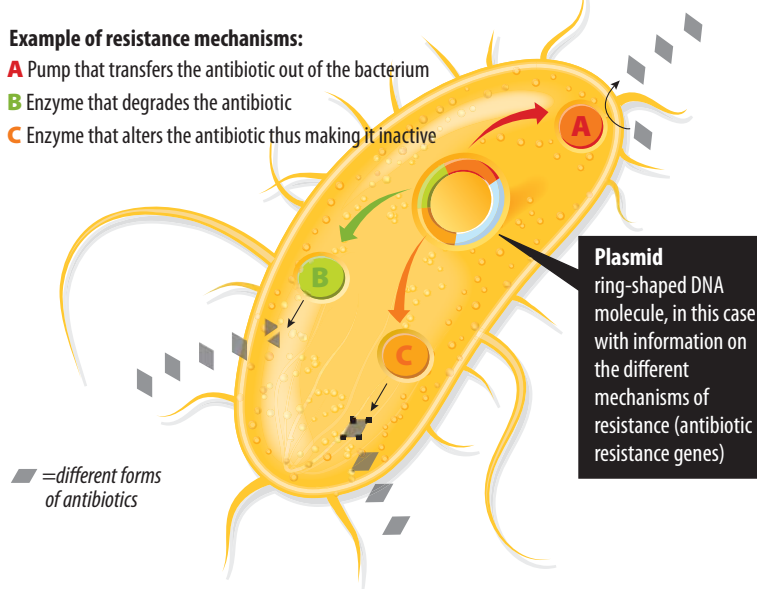
Antibiotics are medicines that attack bacteria in different ways to damage the structures and functions that distinguish bacterial cells from human cells, such as the cell walls of bacteria.

> Multiresistant bacteria

A bacterium that is resistant to several antibiotics is multidrug resistant. The genes coding for different resistance mechanisms can reside on a plasmid, and be transferred together from one bacterium to another.

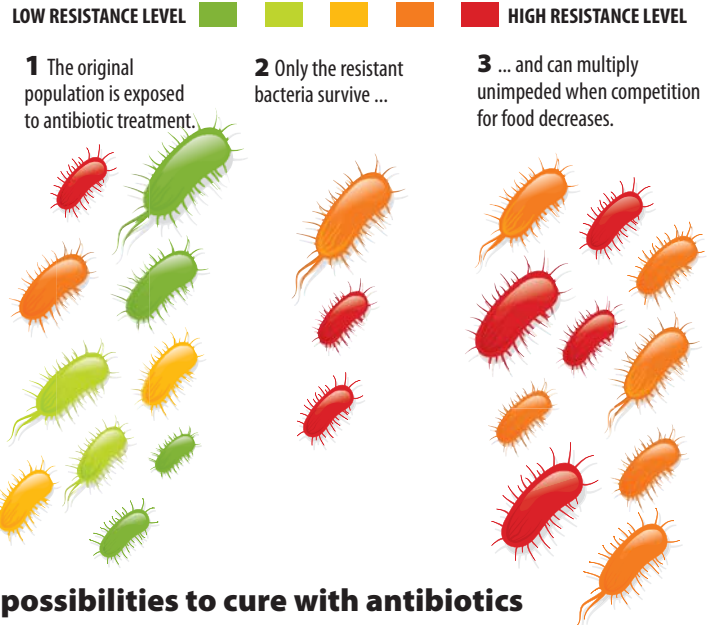
Example of resistance mechanisms:

- A** Pump that transfers the antibiotic out of the bacterium
- B** Enzyme that degrades the antibiotic
- C** Enzyme that alters the antibiotic thus making it inactive



> Selection of resistant bacteria

Resistance to antibiotics often occurs gradually in a bacterium through random mutations or through transfer of a piece of DNA from another resistant bacterium.



> The situation today - five factors that threaten our possibilities to cure with antibiotics



Overuse

Antibiotics are generally seen as cheap and free from side-effects and the overuse around the world is immense.



Dissemination

People are travelling more and resistant bacteria are spreading faster than ever between countries.



Hygiene

Poor hygiene in combination with crowding accelerates the spread of resistance in hospitals.



Responsibility and Control

In 2005, the WHO adopted a resolution to manage the problems with antibiotic resistance but little has happened at the global level since then. Monitoring and diagnostic tools are not available or insufficient.

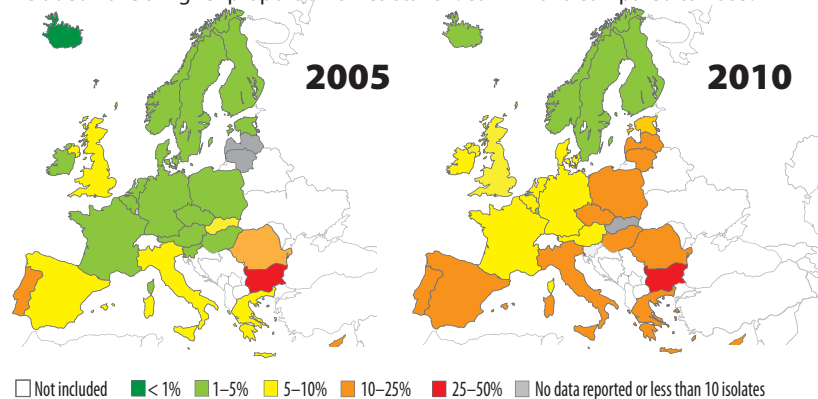


Few new antibiotics

The pharmaceutical industry struggle to develop new antibiotics since it is scientifically difficult, antibiotic courses are short and there is a high risk of resistance development. Only one new class of antibiotics has originated during the last 30 years and resistance mechanisms have evolved against all antibiotics available today.

> The development of resistance is increasing rapidly

The maps show the proportion of patient samples in which *E. coli* bacteria are no longer sensitive to 3rd generation cephalosporin antibiotics. Almost all European countries included have a higher proportion of resistant *E. coli* in 2010 compared to 2005.



INCREASED USE INCREASES RESISTANCE

Antibiotic use is the main cause of the alarming development of resistance we are seeing in healthcare today. Each course of treatment enhances the risk of increasingly resistant bacteria taking hold of the body and thus complicating the treatment of future bacterial infections - both in the individual and in others that can be infected by resistant bacteria. Modern health care as we know it today is threatened when antibiotics lose their effect with higher costs for drugs, longer hospital stays, increased need for isolation care and increased mortality as a result.