

# Project description: Antibiotic Resistance

## Brief description of proposed treatment of subject

**An interdisciplinary working group of experts will convene in workshops and produce a plan of action suggesting a series of initiatives to counter the problem of antibiotic resistance.**

### 1. Background

An antibiotic is a medical drug that serves to kill or inhibit the growth of bacteria. Antibiotics are used to fight potentially terminal infectious diseases and this makes antibiotics an indispensable form of medical treatment. Antibiotics are used extensively within the fields of human and veterinary medicine. There has been a tendency, however, to view antibiotics as a panacea and this has resulted in an increased and partly unwarranted use. Antibiotics have been used, for instance, in the treatment of viral infections – even though antibiotics are completely ineffectual against viruses. Such erroneous medication is caused, among other things, by the insufficiency of the available diagnostic methods. Since these methods are slow and inefficient, antibiotics are often prescribed 'just in case'. Agriculture has witnessed a similar tendency to use antibiotics excessively, e.g. the use of antibiotic growth promotants in animal feed.

The extensive use of antibiotics has proven to have negative health consequences in that it causes anti-microbial resistance (pathogenic bacteria becoming immune to antibiotics). Antibiotic resistance is produced in a series of biological processes: Genetic traits of resistance are transmitted between bacteria (inter- or cross-species) and evolutionary selection processes will favour the new resistant variants of bacteria. By this kind of adaptation to an antibiotic environment, pathogenic bacteria will be able to resist medical treatment.

As a general rule, an increased use of a certain antibiotic will mean an increased risk of resistance to this particular antibiotic. Today we know of several pathogenic bacteria that have become resistant to antibiotics. This goes for certain staphylococci and tuberculosis bacteria, for example. Most feared is the emergence of bacteria that are resistant to all antibiotics and not just to one particular drug. This kind of multiple resistance may lead to global epidemics. Already several bacteria have developed multiple resistance, Salmonella DT 104 for one.

Antibiotic resistance is not exclusively related to the excessive use of antibiotics in the medical treatment of humans. Bacterial resistance may also be transmitted from animals to humans, since anti-microbial resistant bacteria in meat will affect the bacterial environment in the human body. Furthermore, if the antibiotics meant for animals and the antibiotics meant for humans are increasingly similar, there will be an increased risk of resistance among the bacterial species that are transmissible between humans and animals.

### 2. State of research and feasibility of TA-study

The problem of antibiotic resistance has become increasingly distressing since the 1980's. The diminished effectiveness and reduced reliability of the old antibiotics has made it necessary to develop new antibiotic drugs. In the last couple of decades, however, the development of new antibiotics has been significantly slower than the emergence of resistant bacteria.

The development of new antibiotics is insufficient, because research in antibiotics is largely left to the pharmaceutical industry that does not have the necessary economical incentive to undertake this kind of research. It is an expensive endeavour indeed to research a new drug. Moreover, it will only be possible to make money on this particular drug for as long as the bacteria in question are not yet resistant to it – which they may become after only a short period of time. In order to ensure a certain turnover, the pharmaceutical industry is forced to focus on broad-spectrum antibiotics that may be used in the treatment of a variety of diseases. This, however, may contribute to the problem, since broad-spectrum antibiotics are quite vulnerable to resistance. It is necessary, therefore, to research and develop more specific antibiotics. And so the problem of antibiotic resistance is very much a question of economy.

National as well as international authorities are aware of the problem of antibiotic resistance and several initiatives have been launched within the framework of the EU. In 2001, for instance, the European Commission resolved on a joint strategy against anti-microbial resistance.

The latest initiative from the EU is a total ban on the use of antibiotic growth promotants in livestock farming as of January 2006. Another initiative is the EARSS-programme (The European Anti-microbial Resistance Surveillance System) that monitors the development of resistance within the entire EU. This programme is accompanied by ESAC (European Surveillance of Anti-microbial Consumption), which is also a network of surveillance systems supported by the European Commission. The purpose of the ESAC is to monitor the consumption of antibiotics in the entire EU. In addition, several EU-countries also participate in various other international projects such as the ARBAO II (Antibiotic Resistance in Bacteria of Animal Origin – II), which is a collaboration between laboratories in eighteen European countries.

The knowledge about the problem of antibiotic resistance is broadly distributed and accepted. Therefore, it is feasible to aim directly at developing suggestions for action.

### 3. Structure and objectives of suggested project

The problem of antibiotic resistance involves many actors. Hence it is necessary to conceive a strategy that encompasses several areas, including:

- reduction by regulating the use of antibiotics
- research in new antibiotics
- testing alternatives to antibiotic forms of treatment

The project will take its cue from the following questions:

- Which regulations are necessary to reduce the unwarranted use of antibiotics for humans as well as for animals?
- Which initiatives, aside from regulations, may contribute to a reduction in the use of antibiotics?
- How is it possible to ensure research in new, narrow-spectrum antibiotics or other technologies for anti-bacterial treatment?

The project will result in political options in the form of a plan of action, suggesting a set of policy options, on how to establish a coordinated effort to redress the problem of antibiotic resistance. The method proposed is based on a fast working, interdisciplinary workgroup, consisting of four or five experts who are to compose a draft version of the plan of action. They will then discuss this version with additional five or six experts in a workshop. The final version of the plan of action will include concrete suggestions of initiatives to counter the problem of antibiotic resistance.