

In recent years there is much more awareness about antimicrobial resistance (AMR) in human and veterinary medicine. Bacteria became more resistant to existing antibiotics. Various initiatives are being applied to reduce this global resistance formation. The WHO, FAO, OIE and local authorities have developed national action plans for management of antibiotic use (AMU) and control of antibiotic resistance (AMR).

At Kela, we strongly promote the concept of “ONE HEALTH”. We want to contribute to sustainable farming, consumer health & safety and care for the environment around the world. We are one planet and we need to work together to protect it. That is why we support worldwide the responsible and sustainable use of our human and veterinary medicines. We set up a platform called KelAcademy to promote responsible use and to distribute knowledge about sustainable and productive farming. The main theme for KelAcademy is the “Responsible use of medicines” in all its aspects.

In this article, we will describe in general the **correct use of antibiotics** based on several practical tips. This article is part 1 and in the next edition we will write part 2 about which antibiotics to use for the various bacterial swine diseases.

Responsible use of antibiotics starts first of all with a thorough analysis of different parameters such as ventilation, nutrition, water use, housing, hygiene, management and biosecurity. By adopting these, the effectiveness of an antibiotic treatment can be greatly improved or appear not to be necessary.

Prevention is paramount to prevent diseases.

A general applicable rule in the use of antibiotics is the following:

***“For each diagnosed bacterial condition, use the correct product in the right dosage for the necessary duration of treatment on the prescribed treatment method by the vet and with respect of the withdrawal period.”***

## Diagnosis and examination

It's important to start with a thorough diagnosis carried out by a veterinarian. The veterinarian can give the appropriate treatment advice through his knowledge and applied research methods.



The detection of the bacterium is carried out by a bacteriological examination on specific agars in a laboratory (see fig. 1). You can make an antibiogram of the isolated bacterium by determination of MIC values. MIC stands for Minimum Inhibitory Concentration and indicates the lowest concentration of an antibiotic, which prevents visible growth of the bacterium or bacteria. A lower MIC value indicates that less antibiotic is required for inhibiting growth of the bacterium. Therefore, antibiotics with lower MIC scores are more effective against that bacterium.

Fig. 1



## Choosing the right antibiotic

### GMP origin

We recommend to always use an official, registered drug produced in a **GMP** (=Good Manufacturing Practices) environment. These drugs are produced with high quality raw materials and are tested regularly by the manufacturer to ensure a good quality and efficiency throughout the entire shelf life of the drug.

### Mechanism of action

Antibiotics can be classified in different ways.

The first classification is based on their spectrum: **narrow or broad**. Narrow spectrum antibiotics target a specific group of bacteria and give less side effects. Broad spectrum antibiotics target many types of bacteria at the same time and can therefore also destroy benign bacteria. Therefore, it is recommended to choose a narrow spectrum antibiotic.

Another classification is based on the activity: **bacteriostatic or bactericidal**. This depends mainly on the drug concentration at the site of infection and the microorganism involved. Bacteriostatic drugs limit the growth of organisms at the MIC but require a higher concentration to kill these organisms: e.g. tetracyclines, phenicols, sulfonamides, lincosamides and macrolides. Bactericidal drugs kill the micro-organism: e.g. penicillins, cephalosporins, aminoglycosides and fluoroquinolones.

Antibiotics can also be classified as **time dependent or concentration dependent** or both. With a time dependent antibiotic, the effect comes from the duration of antimicrobial exposure (=time). With a concentration dependent antibiotic, the effect comes from the maximum plasma concentration and/or area under the plasma concentration-time curve that correlates with the effect. With a co-dependent antibiotic, the effect is determined by both the concentration achieved and the duration of exposure.

Each antibiotic class has its own specific mechanism of action against a bacterium. (See Fig. 2)

They cause damage to

- the bacterial cell wall: e.g. Beta-lactams (penicillins, cephalosporins)
- the bacterial cell membrane: e.g. Polymyxines (colistin)

They can inhibit:

- the bacterial protein synthesis: e.g. phenicols, tetracyclines, aminoglycosides, lincosamides, macrolides
- the bacterial DNA synthesis: e.g. fluoroquinolones
- the bacterial enzymatic activity: e.g. sulfonamides, trimethoprim

Antibiotics are only effective against bacteria and not against viruses. Viral infections (e.g. Flu, PRRS, PCV2) should not be treated with antibiotics. Only use antimicrobials for viral infections if there is a bacterial co-infection. Always ask the vet for more advice in these situations.

## The right dosage

To determine the right dosage, follow the instructions stated on the label and/or package leaflet and the advice from the veterinary professional. To determine the exact dosage, you can use a zoometric tape (Fig. 3) or weigh the animals with scales.

Fig. 3



Under- and overdosage lead in most cases to poor results and more resistance development.

## Duration of treatment

Respect the duration of the treatment to get a good treatment result. This is mentioned on the package leaflet and the label of the product. A golden rule is “Neither too short nor too long”. Limit the consumption of antibiotics to the minimum numbers of animals. Early isolation of animals with clinical symptoms to another place (e.g. infirmary) may prevent the other healthy animals from needing treatment. If the animals do not respond to the antibiotic treatment, it is necessary to thoroughly examine everything again in consultation with the veterinary professional.

## Method of administration

In addition to the dosage and duration of treatment, the method of

administration is very crucial. Oral and parenteral methods of administration are usually used on pig farms. Every treatment method had its advantages and disadvantages. Always carry out the administration in a safe and hygienic manner with attention to humans and animals. Monitor the antimicrobial consumption on a pig farm by means of a conclusive registration protocol. Mark the treated animals very carefully with different color markers or earmarks. Prepare a farm-specific health plan with the vet. This plan describes various measures for the different animal categories present. Review and adapt it when needed on a regular basis (e.g. 4 times/year).

## Withdrawal period

Finally, always respect the stated withdrawal period. They are determined so that no residues of the antibiotic remain in the meat, organs or milk. Drug residues can lead to allergy, cancer, antibiotic resistance and other negative health effects.

## Conclusion

AMR has been recognised as a major health threat for animals and humans worldwide. With the increased awareness on AMR and the “ONE HEALTH” concept in mind, we recommend to always carry out a thorough diagnosis before selecting and administering any drug. When choosing the drug, please take care of antimicrobial resistance by using antibiotics in a responsible way.

For more information, Kela’s technical support team is available for you at the following e-mail address: [info@kela.health](mailto:info@kela.health)

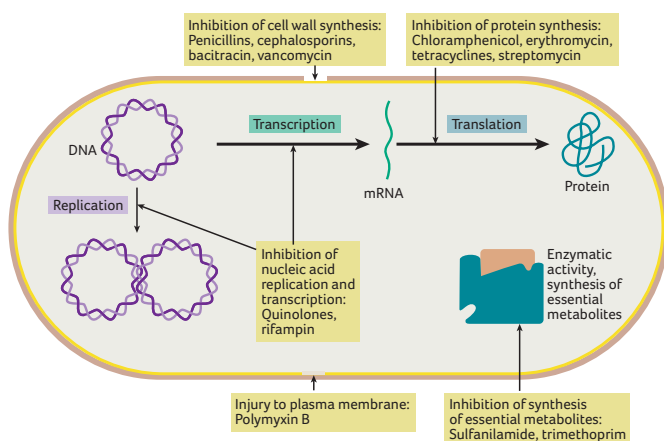


Fig. 2

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