Antimicrobial resistances (AMR) in animal husbandry

Projects

MEDICow • Individualized mastitis risk assessment in dairy farming using sensors, digitization and artificial intelligence (Funding: BMEL / BLE)

ENVIRE • Combating the spread of antimicrobial resistance in broiler chickens via the environment to humans (Coordination: FU Berlin; Funding: BMBF / DLR)

AMR-Pig • Spread of AMR in fattening pigs - mechanisms and possible interventions (Funding: Leibniz Association)

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Requirements for modern livestock farming have increased considerably. Animal husbandry systems are to be designed in line with sustainability to take into account considerations and requirements relating to the health of humans, animals and the environment (OneHealth).

At the same time, it is the aim to achieve a high level of animal welfare and the lowest possible emissions of greenhouse gases. This requires a comprehensive understanding of the interrelationships between animals and the environment. To promote this understanding, the Leibniz Institute of Agricultural Engineering and Bioeconomics in Potsdam is investigating antimicrobial resistance (AMR) in the field of farm animal husbandry from a OneHealth perspective.

Antimicrobial resistance, which is transmissible between humans, animals and the environment, is a major economic and public health burden worldwide.

Antimicrobial resistances (AMR)

Infectious diseases are among the 15 leading causes of death worldwide (WHO). According to the Leopoldina study „Infectious Diseases and Antimicrobial Resistance: Risks and Required Actions", infectious diseases and AMR pose a serious threat to global health, development and food security.

To interrupt the chains of infection and AMR spread, it is necessary to identify potential hazards and to understand and characterize the transmission pathways.

We therefore investigate the occurrence, transmission routes and reduction measures of infections, zoonoses and AMR within livestock farming (cattle, pigs, poultry) and their environments.

Target: Feasible prevention and mitigation measures

Based on these findings, effective and practically implementable prevention and reduction measures are defined. In the long term, these measures are intended to reduce the use of antibiotics in livestock farming, increase animal welfare and animal health, and reduce the threat to humans and the environment from pathogens of animal origin (zoonoses).
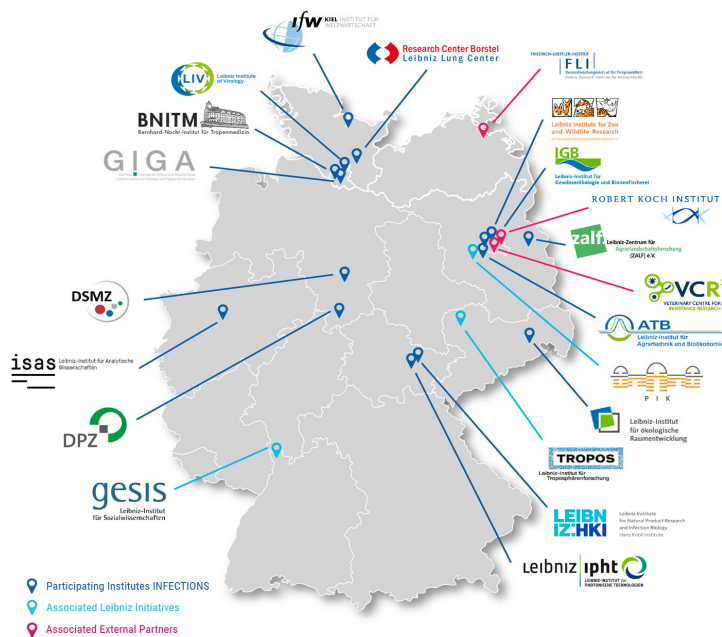
Info flyer as PDF:

Photo above: Sampling of piglet manure.
Below: Fine dust release during the application of chicken manure
(Photos: Stollberg/ATB).

ATB's AMR research is decisively supported and advanced by the cooperation within the Leibniz research alliance INFECTIONS (www.leibnizinfections.de). INFECTIONS is coordinated by the Research Center Borstel - Leibniz Lung Center.

Founded in 2015, the research alliance is an interdisciplinary co-operation of 18 Leibniz institutes and three external partners. The common goal of all partners is to reduce the spread of antimicrobial resistance (AMR) in an increasingly urbanized society. Joint research projects involving a wide variety of scientific disciplines (social, economic, ecological, agricultural, microbiological, etc.) enable an unprecedented multidisciplinary approach to AMR problems.

Participating Institutes

Participating Institutes INFECTIONS
Associated Leibniz Initiatives
Associated External Partners

In the focus of research: Udder health (Photo: Foltan/ATB)

Mastitis (udder infections) in dairy cows

Mastitis is the most common and most costly disease in dairy production and also the most common reason for antibiotic use in dairy cows.

The German-Irish joint project **MEDICow** is creating an improved model for the detection of mastitis risk by using innovative multisensory approaches, digitization and artificial intelligence. This will enable animal-specific and highly sensitive detection of mastitis risk along with a reduction in the time interval between mastitis infection and treatment. MEDICow thus contributes to more sustainable and profitable milk production, improved animal welfare and health, as well as to a reduction in the use of antibiotics and the risk of AMR development.

Chicken manure (Photo: Stollberg/ATB)

Within the framework of INFECTIONS, ATB coordinates one subproject investigating the occurrence, transmission and mitigation of antimicrobial resistance in fattening pigs.

AMR in fattening pig production

In the **AMR-Pig** project, we are investigating mechanisms and transmission pathways leading to the spread of AMR in pig farms. Barn dust and especially barn flies seem to be a very important vector for AMR spread, even beyond the boundaries of the barn.

We investigate to what extent different feed additives and hygiene improvements can reduce the occurrence and spread of AMR. The results are expected to help design interventions and strategies to minimize emerging antimicrobial resistance and its spread in commercial fattening pigs.

AMR in chicken manure

The frequency of AMR occurrence in livestock is a major aspect for their spread in the environment and for the exposure of humans and other animals. The **ENVIRE** project focuses on reducing the spread of AMR in broiler chickens and the transmission to the environment and ultimately to humans.

We are investigating the treatment and storage of chicken manure to reduce antimicrobial resistance. In this research, we are investigating the effectiveness of composting, storage, and anaerobic digestion against AMR microbes in poultry manure.

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