2.17 Significance of environmental contaminations on the development of bacterial resistance to antibacterial agents in indicator animals

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The general aim of this project was to investigate which factors select for resistant bacteria in humans and farm animals, respectively. The results obtained so far in RESET I have demonstrated that animals exposed to antimicrobials in subtherapeutic concentrations pose an enhanced risk for the development of bacterial resistances. It was demonstrated that, during animal treatment (especially oral administration), antibiotic contaminations can be found in the direct environment of the animals, as well as in manure.

Therefore, the hypothesis that a low-level intake of drugs resulting from the ingestion of contaminated feed takes place and may result in the development of bacterial resistance was confirmed by our studies.

Based on the observations of RESET I that antibiotic residues in manured soil can be incorporated into crop plants, in particular enrofloxacin, the ingestion of contaminated plants by farm animals or humans constitutes a potential risk for the development of bacterial resistance.

Therefore, white cabbage plants were grown in nutrient solution and exposed to different concentrations of enrofloxacin. The plants were placed in a climate controlled growth cabinet for several days until the plant material was collected and freeze-dried. An *in vitro* setup was used to characterise the antibacterial effect and potential risk of bacterial resistance development of plant material enriched with antibiotic traces.

Furthermore, the freeze-dried plants were used for the *in vivo* study in poultry to gain information about the impact of antibiotic-containing plant material on the MIC of commensal E. coli during digestion. Furthermore, faecal samples of the animals were used and analysed for their content of enrofloxacin after cabbage feeding to obtain knowledge on enrofloxacin bioavailability after ingestion of plants.

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