Bundesinstitut für Risikobewertung

Project PAC-CAMPY: Strategies to combat *Campylobacter* in a practical test setting

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The bacterium *Campylobacter jejuni* remains the most common bacterial pathogen of intestinal infections in humans. New strategies for the prevention, control and treatment of *Campylobacter* infections are needed. This is the focus of the research project “Preventing and Combating *Campylobacter* Infections: a One Health Approach” (PAC-CAMPY), in which the German Federal Institute for Risk Assessment (BfR) participates. The second funding phase of the project, which is even more practice-oriented, has already begun. It follows on from the previous phase, in which the colonisation and adaptability of the pathogen and possible reduction strategies were investigated from 2017 to 2020. In the second phase, these findings will be verified by the end of 2022 and partially tested *in vivo*, i.e. in the living organism.

PAC-CAMPY pursues the overarching goal of reducing the exposure to *Campylobacter* and thus the number of infections in humans by applying measures along the poultry production chain. The particular focus is on limiting the colonisation and spread of *Campylobacter* in animal flocks and during slaughter and thus mitigating the consequences of an infection in humans. For this purpose, possible reduction strategies are examined and the resistance of the bacterium, including its survival in the environment, is characterised. In addition, mouse and chicken models are used, the bacterium’s host specificities are analysed by whole genome sequencing and the effect of substances on the immune response triggered by *C. jejuni* is examined. This holistic “One Health” approach is intended to make an important contribution to a better understanding of this food-borne pathogen and its occurrence in animals, in the environment and in humans.

The project funded by the German Federal Ministry of Education and Research (BMBF) follows an interdisciplinary approach. The various project partners take on work packages containing different tasks. The BfR scientists are investigating the influence of gene transfer on the genetic diversity of *Campylobacter*. They develop strategies to reduce this genetic diversity and thus the survival of the bacterium. The knowledge gained from this could serve to reduce antibiotic resistance. Furthermore, important insights into the consequences of the ability of the microorganism to adapt to diagnostic procedures are communicated to standardisation bodies. This is important so that *Campylobacter*, with its increasing genetic variability, can also be reliably fine-typed in the future in the National Reference Laboratory for *Campylobacter* and in other laboratories.

During the practical funding phase of PAC-CAMPY, the identified colonisation reduction strategies of *Campylobacter* in chickens will be tested. This requires testing of persistent and potentially infectious, but no longer cultivable microorganisms for their ability to colonise within a chicken model. The experts from the cooperating institutes are also examining to what extent antimicrobial substances and bacteriophages can minimise the *Campylobacter* colonisation.

In addition to the BfR, the project partners include the Free University of Berlin, the Charité University Medicine Berlin, the University of Veterinary Medicine Hannover, the Friedrich-Alexander University Erlangen-Nuremberg, the Robert Koch Institute and the Bavarian Health and Food Safety Authority.

In parallel to the research project, the PAC-CAMPY consortium has compiled the current state of knowledge on survival of the bacterium, the emergence and development of the disease in humans and possible strategies for combating *Campylobacter* in a book. The work recently published by Springer Nature is entitled: “Fighting *Campylobacter* Infections — Towards a One Health Approach”. Additional Information:
https://www.springer.com/gp/book/9783030654801

Further information about *Campylobacter*

On the trail of pathogens in meat, eggs and raw milk (BfR, 2019):
https://www.bfr.bund.de/en/press_information/2019/41/on_the_trail_of_pathogens_in_meat__eggs_and_raw_milk-242962.html

Campylobacter – the germ on chicken eggs (BfR, 2018):
https://www.bfr.bund.de/en/press_information/2018/18/campylobacter___the_germ_on_chicken_eggs-204476.html

Campylobacter information page (BfR website):
https://www.bfr.bund.de/en/campylobacter-54347.html

Video on the hygienic preparation of fresh chicken meat (BfR website):
https://www.bfr.bund.de/de/dem_keim_auf_der_spur-202987.html?current_page=1

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. The BfR advises the Federal Government and the States (“Laender”) on questions of food, chemical and product safety. The BfR conducts its own research on topics that are closely linked to its assessment tasks.

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