



ID der Kurzfassung : 501

Dual-Species Interactions with Intestinal Bacteria Drive Multi-Drug Resistance in Campylobacter

Inhalt

Campylobacter is a major foodborne pathogen. We investigated multidrug resistance (MDR) in clinical isolates from Germany (2010–2022) within the national surveillance program. A total of 6,950 single-colony isolates were phenotypically tested; 2,912 were genome sequenced and screened for antimicrobial resistance genes. MDR cultures were further analyzed for contaminating DNA and by scanning electron microscopy (SEM). We identified 451 (6.5%) isolates resistant to fluoroquinolones and macrolides; two *C. jejuni* isolates exhibited resistance to up to ten antibiotic classes. Unexpectedly, genome analysis revealed >10% Enterococcus DNA in these single-colony-derived samples. SEM confirmed coccoid bacteria interspersed with spiral Campylobacter. Subsequent purification separated fluoroquinolone-resistant but not macrolide-resistant Campylobacter from multidrug-resistant Enterococcus. Mixed-culture experiments demonstrated protection of Campylobacter against ribosome-targeting antimicrobials in the presence of Enterococcus. These findings indicate that apparent MDR in Campylobacter can arise from interspecies interactions rather than intrinsic resistance, highlighting the importance of a One Health perspective integrating microbial ecology into antimicrobial resistance surveillance.

Keywords

Campylobacter, antimicrobial resistance, microcolony, mixed-species

Registration ID

OHS26-0186

Professional Status of the Speaker

Senior Scientist

Junior Scientist Status

No, I am not a Junior Scientist.

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Track Klassifizierung: AMR

Typ des Beitrags: Both options possible

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