

## ESBL-producing Enterobacterales at the foodchain-human-environment interface - elucidating the molecular epidemiology

### Background:

One of the currently most important antibiotic resistance mechanisms in Enterobacterales is based on the production of ESBL enzymes that inactivate  $\beta$ -lactam antibiotics including cephalosporins and monobactams by hydrolyzing their  $\beta$ -lactam ring. Plasmids, which can be grouped in different plasmid incompatibility types, play a key role in the horizontal spread of these multidrug resistance genes.

### WP1: Farm animals as a potential reservoir of extended-spectrum $\beta$ -lactamase-producing Enterobacteriaceae

Fecal carriage of extended-spectrum  $\beta$ -lactamase-producing Enterobacteriaceae in swine and cattle at slaughter in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/21375882/>

Antimicrobial resistance profiles of *Escherichia coli* and prevalence of extended-spectrum beta-lactamase-producing Enterobacteriaceae in calves from organic and conventional dairy farms in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/35478290/>

Vertical transmission of highly similar *bla* CTX-M-1-harboring IncI1 plasmids in *Escherichia coli* with different MLST types in the poultry production pyramid

<https://pubmed.ncbi.nlm.nih.gov/25324838/>

ESBL-producing Enterobacteriaceae: occurrence, risk factors for fecal carriage and strain traits in the Swiss slaughter cattle population younger than 2 years sampled at abattoir level

<https://pubmed.ncbi.nlm.nih.gov/23977126/>

Complete genome sequence of the extensively drug-resistant ESBL-producing *Proteus mirabilis* isolate HK294 obtained from poultry feces in Hong Kong

<https://pubmed.ncbi.nlm.nih.gov/37212705/>

Emergence of *bla*<sub>SHV-12</sub> and *qnrS1* encoded on IncX3 plasmids: changing epidemiology of extended-spectrum  $\beta$ -lactamases among Enterobacterales isolated from broilers

<https://pubmed.ncbi.nlm.nih.gov/36972753/>

### WP2: Potential spread of extended-spectrum $\beta$ -lactamase-producing Enterobacteriaceae along the food and feed chain

Occurrence and characteristics of extended-spectrum  $\beta$ -lactamase (ESBL) producing Enterobacteriaceae in food producing animals, minced meat and raw milk

<https://pubmed.ncbi.nlm.nih.gov/22397509/>

Characteristics of ESBL-producing Enterobacteriaceae and Methicillin-resistant *Staphylococcus aureus* (MRSA) isolated from Swiss and imported raw poultry meat collected at retail level

<https://pubmed.ncbi.nlm.nih.gov/27504840/>

Extended-spectrum  $\beta$ -lactamase (ESBL)-producing Enterobacteriaceae: a threat from the kitchen

<https://pubmed.ncbi.nlm.nih.gov/24709730/>

*Salmonella enterica* serovar Infantis from Food and Human Infections, Switzerland, 2010-2015: Poultry-Related Multidrug Resistant Clones and an Emerging ESBL Producing Clonal Lineage  
<https://pubmed.ncbi.nlm.nih.gov/28751886/>

Assessment of the Prevalence of Extended-Spectrum  $\beta$ -Lactamase-Producing Enterobacteriaceae in Ready-to-Eat Salads, Fresh-Cut Fruit, and Sprouts from the Swiss Market  
<https://pubmed.ncbi.nlm.nih.gov/26038909/>

Extended-spectrum- $\beta$ -lactamase-producing Enterobacteriaceae isolated from vegetables imported from the Dominican Republic, India, Thailand, and Vietnam  
<https://pubmed.ncbi.nlm.nih.gov/25724954/>

ESBL-producing Enterobacterales in wild game meat originating from several European countries: predominance of *Moellerella wisconsensis* producing CTX-M-1.  
<https://doi.org/10.2807/1560-7917.ES.2022.27.49.2200343>

Raw meat-based diets for companion animals: a potential source of transmission of pathogenic and antimicrobial-resistant Enterobacteriaceae  
<https://pubmed.ncbi.nlm.nih.gov/31824726/>

### **WP3: Faecal carriage of extended-spectrum $\beta$ -lactamase-producing Enterobacteriaceae in the community**

Molecular identification of extended-spectrum- $\beta$ -lactamase genes from Enterobacteriaceae isolated from healthy human carriers in Switzerland  
<https://pubmed.ncbi.nlm.nih.gov/22155836/>

### **WP4: Pets as a potential reservoir of extended-spectrum $\beta$ -lactamase-producing Enterobacteriaceae**

High prevalence of extended-spectrum  $\beta$ -Lactamase producing Enterobacteriaceae among clinical isolates from cats and dogs admitted to a veterinary hospital in Switzerland  
<https://pubmed.ncbi.nlm.nih.gov/29662886/>

Transmission chains of Extended-Spectrum Beta-Lactamase-producing Enterobacteriaceae at the companion animal veterinary clinic – household interface.  
<https://pubmed.ncbi.nlm.nih.gov/33572066/>

### **WP5: Petting zoos as reservoir of extended-spectrum $\beta$ -lactamase (ESBL)-producing Enterobacteriaceae**

Animal petting zoos as sources of Shiga toxin-producing *Escherichia coli*, *Salmonella* and extended-spectrum  $\beta$ -lactamase (ESBL)-producing Enterobacteriaceae  
<https://pubmed.ncbi.nlm.nih.gov/33382208/>

### **WP6: Dissemination of extended-spectrum $\beta$ -lactamase-producing Enterobacteriaceae in the environment**

Higher-generation cephalosporin-resistant *Escherichia coli* in feral birds in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/23305658/>

Antimicrobial resistant and extended-spectrum  $\beta$ -lactamase producing *Escherichia coli* in common wild bird species in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/31006991/>

Discovery of extended-spectrum beta-lactamase producing *Escherichia coli* among hunted deer, chamois and ibex

<https://pubmed.ncbi.nlm.nih.gov/23117989/>

Characteristics of extended-spectrum  $\beta$ -lactamase- and carbapenemase-producing Enterobacteriaceae isolates from rivers and lakes in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/23455339/>

Enterobacteriaceae with extended-spectrum- and pAmpC-type  $\beta$ -lactamase-encoding genes isolated from freshwater fish from two lakes in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/24449774/>

Dissemination of ESBL-producing *E. coli* ST131 through wastewater and environmental water in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/37659628/>

### **WP7: Further characteristics of ESBL producing Enterobacteriaceae from a One Health perspective**

Distribution of virulence factors in ESBL-producing *Escherichia coli* isolated from the environment, livestock, food and humans

<https://pubmed.ncbi.nlm.nih.gov/26437344/>

Nucleotide sequences of 16 transmissible plasmids identified in nine multidrug-resistant *Escherichia coli* isolates expressing an ESBL phenotype isolated from food-producing animals and healthy humans

<https://pubmed.ncbi.nlm.nih.gov/24920651/>

Replicon typing of plasmids carrying blaCTX-M-15 among Enterobacteriaceae isolated at the environment, livestock and human interface

<https://pubmed.ncbi.nlm.nih.gov/25828415/>

Molecular characterization of *bla* ESBL-harboring conjugative plasmids identified in multi-drug resistant *Escherichia coli* isolated from food-producing animals and healthy humans

<https://pubmed.ncbi.nlm.nih.gov/23874325/>