

Carbapenemase-producing Enterobacterales at the foodchain-human-environment interface

Background:

Carbapenemases are a diverse group of β -lactamases belonging to the Ambler classes A, B and D or Bush groups 2f, 3 and 2d, accordingly. Class A carbapenemases (Bush group 2f) include the serine β -lactamases NmcA, Sme, IMI-1 and SFC-1 which are chromosomally encoded, as well as the clinically common plasmid encoded KPC enzymes. Carbapenemases of this class are inhibited by clavulanic acid. Class B carbapenemases (Bush group 3) comprise the integron-encoded VIM-types, the IMP-, GIM-1, SPM-1-and SIM-types of enzymes, and the plasmid encoded NDM-1 carbapenemase. These metallo- β -lactamases are inhibited by EDTA but not by clavulanic acid. Class D (Bush group 2d) consists of OXA-48 type carbapenemases, which are plasmid encoded, and not inhibited by EDTA and not or only weakly inhibited by clavulanic acid.

WP1: Farm animals as a potential reservoir of Carbapenemase-producing Enterobacterales

Lack of evidence so far for carbapenemase-producing Enterobacteriaceae in food-producing animals in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/23823747/>

WP2: Potential spread of Carbapenemase-producing Enterobacterales along the food and feed chain

First detection of *Klebsiella variicola* producing OXA-181 carbapenemase in fresh vegetable imported from Asia to Switzerland

<https://pubmed.ncbi.nlm.nih.gov/26448862/>

WP3: Faecal carriage of Carbapenemase-producing Enterobacterales in the community

No evidence so far for the dissemination of carbapenemase-producing Enterobacteriaceae in the community in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/24139304/>

Emergence of *Escherichia coli* producing OXA-48 β -lactamase in the community in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/25834728/>

WP4: Dissemination of Carbapenemase-producing Enterobacterales in the environment

Wastewater is a reservoir for clinically relevant carbapenemase- and 16s rRNA methylase-producing Enterobacteriaceae

<https://pubmed.ncbi.nlm.nih.gov/28668692/>

Environmental dissemination of carbapenemase-producing Enterobacteriaceae in rivers in Switzerland

<https://pubmed.ncbi.nlm.nih.gov/32806462/>

WP5: Emergence of specific Carbapenemase-producing Enterobacterales

Cross-Border Emergence of *Escherichia coli* Producing the Carbapenemase NDM-5 in Switzerland and Germany
<https://pubmed.ncbi.nlm.nih.gov/33361340/>

Wide dissemination of Gram-negative bacteria producing the taniborbactam-resistant NDM-9 variant - a One-Health concern.
<https://pubmed.ncbi.nlm.nih.gov/37394537/>