

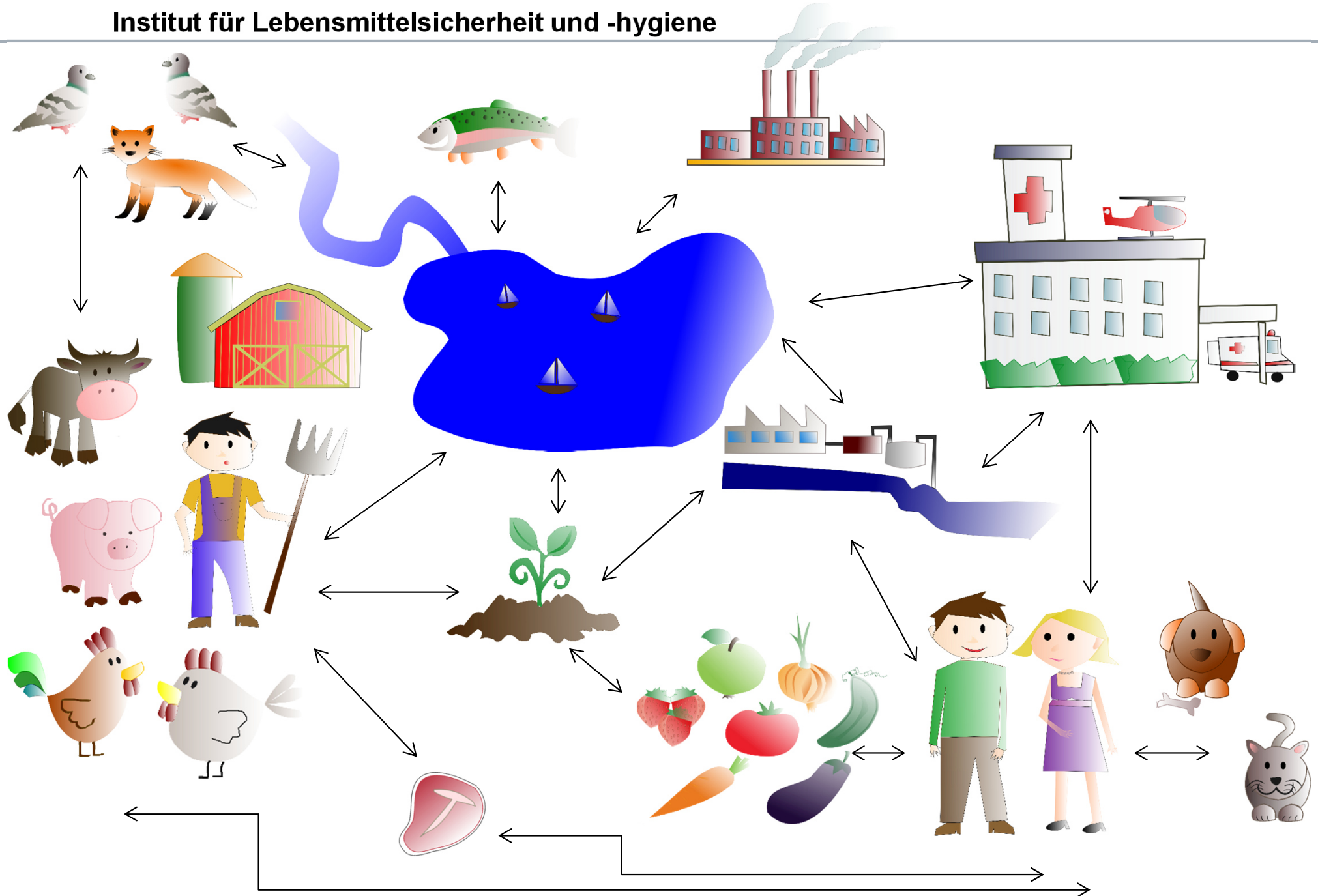


Pflanzliche Lebensmittel als Vektoren für ESBL- und Carbapenemase bildende *Enterobacteriaceae*

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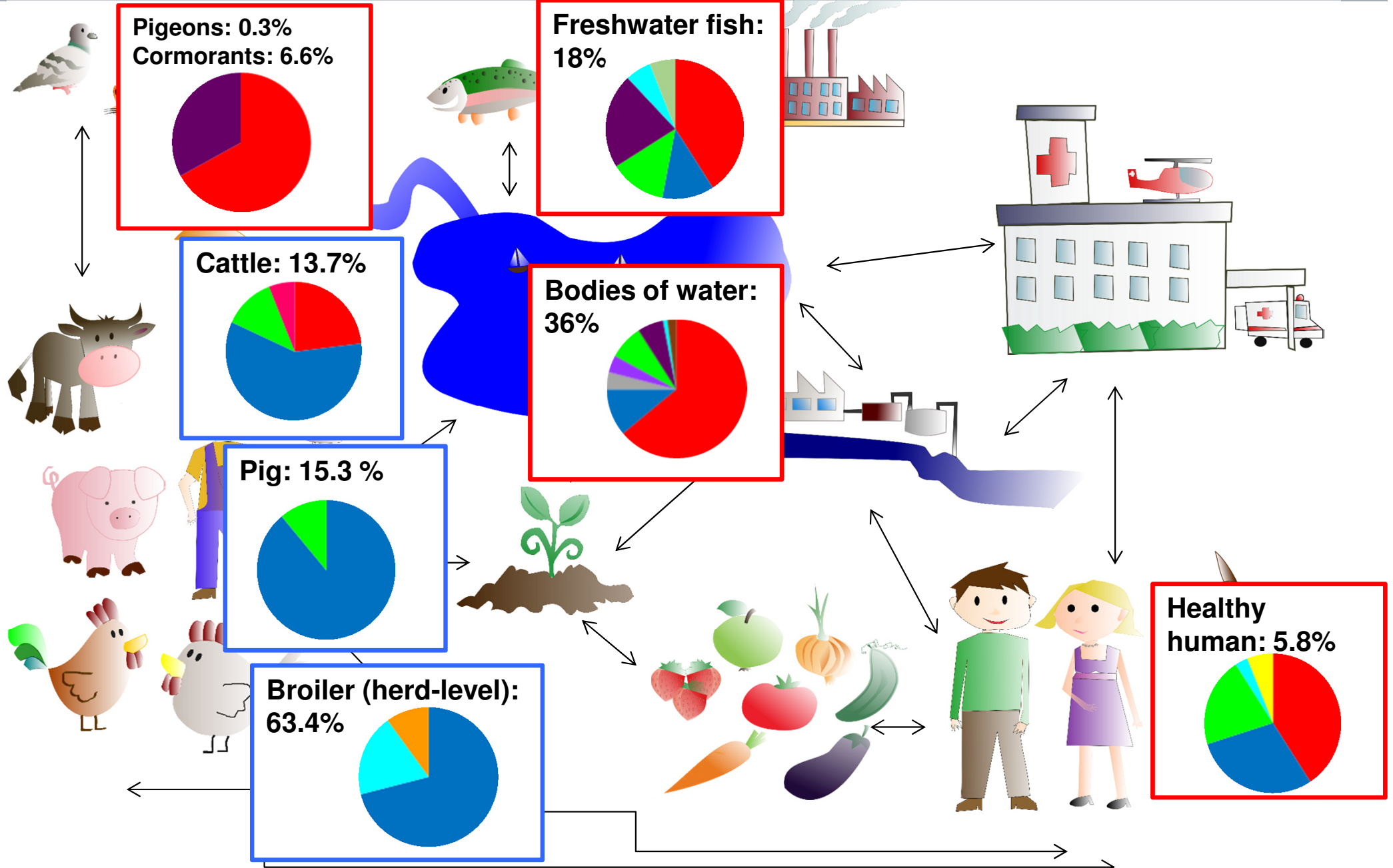






- CTX-M-15 ■ CTX-M-1 ■ CTX-M-3 ■ CTX-M-55 ■ CTX-M-14 ■ CTX-M-27
- SHV-12 ■ SHV-2 ■ SHV-2a ■ CTX-M-79 ■ CTX-M-2 ■ TEM-52
- CTX-M-117 ■ CTX-M-65 ■ CTX-M-63 ■ CTX-M-24

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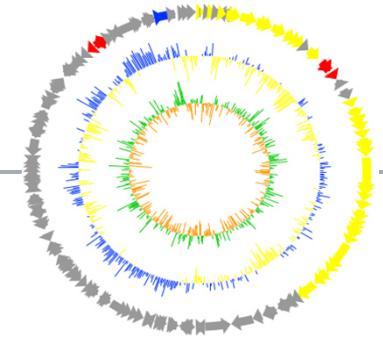


Importgemüse (Dominican Republic, India, Thailand and Vietnam)



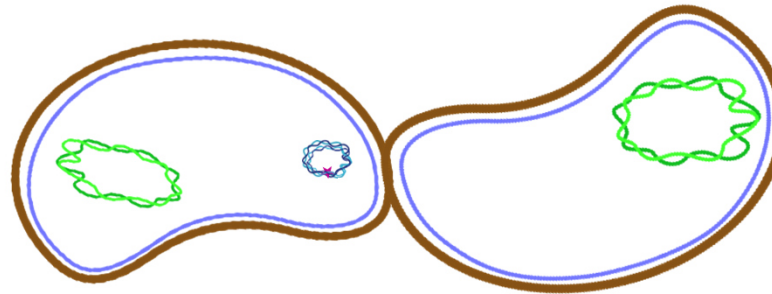
169 Proben (25.4% positiv)





Plasmids-Typen – Konjugations-Experimente

Donor strain:
ESBL-producing Isolates



Acceptor strain:
E. coli HK225 (Strep^R, Rif^R)

Strain ID	Replicon type(s) ¹	ESBL	Species	Country of origin
ESBL DR06	F	CTX-M-15	<i>E. coli</i>	Dominican Republic
ESBL DR28	F, FIB	CTX-M-65	<i>E. coli</i>	Dominican Republic
ESBL DR09	FIA	CTX-M-15	<i>K. pneumoniae</i>	Dominican Republic
ESBL DR47T	N	CTX-M-15	<i>K. pneumoniae</i>	Dominican Republic
E37SK2	II	CTX-M-1	<i>E. coli</i>	India
46SK1	-	CTX-M-15	<i>K. pneumoniae</i>	India
C49b	R	CTX-M-15	<i>E. aerogenes</i>	India
33SK1	-	CTX-M-14	<i>E. coli</i>	Thailand
ESBL H226L	HI1B	CTX-M-55	<i>E. coli</i>	Thailand
ESBL H241B	F	CTX-M-55	<i>E. coli</i>	Thailand
23SK2	F, R	CTX-M-55	<i>E. coli</i>	Thailand
ESBL H227	-	CTX-M-15	<i>K. pneumoniae</i>	Thailand
25SK1	-	CTX-M-14	<i>K. pneumoniae</i>	Thailand
33SK2	X2	CTX-M-27	<i>K. pneumoniae</i>	Thailand
ESBL H239T	-	CTX-M-63	<i>K. pneumoniae</i>	Thailand
ESBL H226T	-	SHV-12	<i>K. pneumoniae</i>	Thailand
E26SK1	HI2	CTX-M-55	<i>E. coli</i>	Vietnam
E25	N	CTX-M-14	<i>K. pneumoniae</i>	Vietnam
13SK1	R	CTX-M-15	<i>E. cloacae</i>	Vietnam

-: not assignable to any of the tested replicon types



Situation Produktion in der Schweiz (RTE Salate)

238 Proben (5 % positiv)

TABLE 1. *ESBL-producing Enterobacteriaceae isolated from ready-to-eat produce and wash water from the production plant^a*

Sample ID	Source	Species ^b	ESBL	Antibiotic resistance profile
Raw vegetables				
SP27	Diced tomato	<i>Kluyvera ascorbata</i>	Group 2 CTX-M	AM, CF, CTX
SP85	Spinach	<i>Serratia fonticola</i>	FONA-2	AM, CF
Salads				
SP64	Mixed salad	<i>S. fonticola</i>	FONA-5-like ^c	AM, CF, CTX
SP86	Mixed salad	<i>S. fonticola</i>	FONA-2	AM, AMC, CF,
SP87	Mixed salad	<i>S. fonticola</i>	FONA-4-like ^d	AM, CF, CTX
SP116	Mixed salad ^e	<i>S. fonticola</i>	FONA-2	AM, CF, CTX
SP117	Mixed salad ^e	<i>S. fonticola</i>	FONA-2	AM, CF, CTX
SP141	Mixed salad ^f	<i>S. fonticola</i>	FONA-2-like ^g	AM, CF, CTX
SP183	Mixed salad	<i>S. fonticola</i>	FONA-2	AM, CF, CTX
SP202	Mixed niçoise salad	<i>Serratia</i> spp.	FONA-5-like ^h	AM, AMC, CF, CTX
SP219	Mixed salad	<i>S. fonticola</i>	FONA-4-like ⁱ	AM, AMC, CF, CTX

➔ *S. fonticola*
K. ascorbata

➔ *bla*_{ESBL}
chromosomal codiert

➔ Normalflora Pflanze

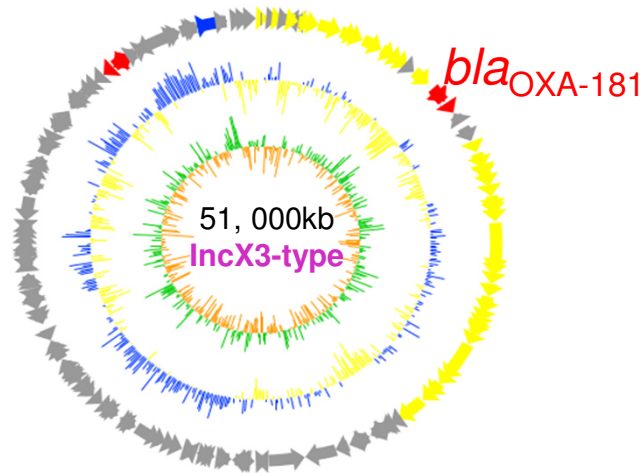
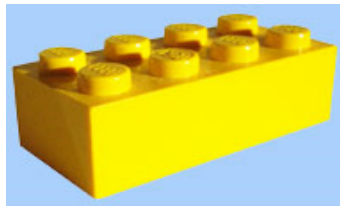


Importgemüse (Thailand and Vietnam)

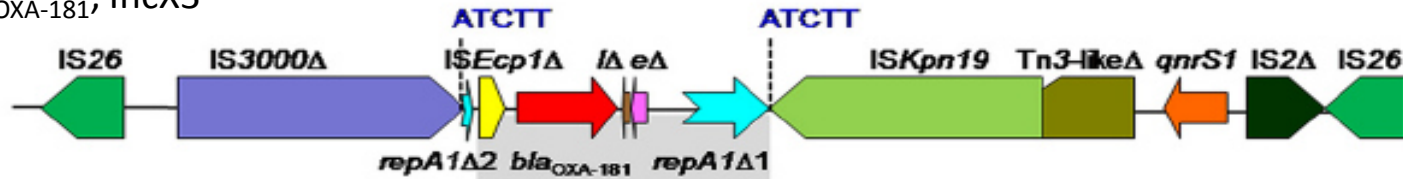




Fakten zu pKS22::*bla*_{OXA-181}



pKS22::*bla*_{OXA-181}, IncX3



pKP3-A, ColE2, KP, JN205800



Adapted from Liu *et al.* 2015



Take home messages

- Nicht nur als Vektor für „foodborne pathogens“, sondern auch zunehmend als Vektor für antibiotikaresistente Bakterien (internationaler Handel, good agriculture practice!)

- Import: mehrheitlich *E. coli* und *Klebsiella pneumoniae*

CH: *Serratia fonticola* und *Kluyvera ascorbata*

- ESBL und Carbapenemase Gene sind oft auf Plasmiden, oder anderen mobilen Element lokalisiert
- Nicht nur kommensalen sondern auch multiresistente Pathogene (Bsp EAEC)



**Universität
Zürich^{UZH}**

Institut für Lebensmittelsicherheit und -hygiene

**Herzlichen Dank für Ihre
Aufmerksamkeit!**

