



Caractérisation des Entérobactéries Productrices de Carbapénémases en ex-LR

Réseau PH Occitanie – 02/04/2021

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Laboratoires de Microbiologie

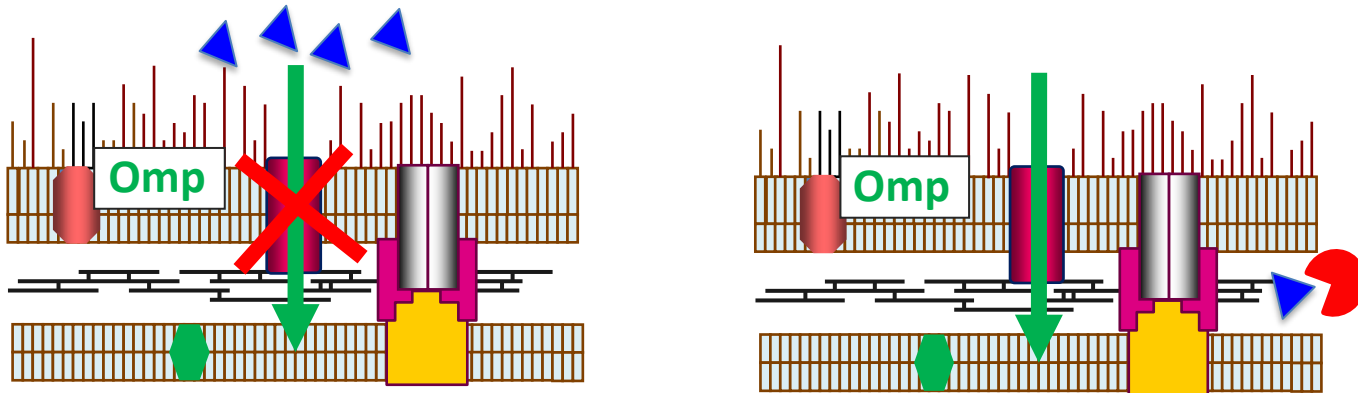
CHRU Nîmes



Circulaire du 6 Décembre 2010

Contrôle des cas importés + Prévention de la transmission croisée des EPC

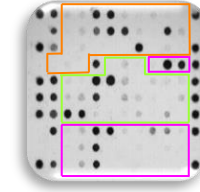
- **Identification des patients à risque de portage**
 - ⇒ Patients rapatriés d'un établissement de santé étranger
 - ⇒ Patients ayant un ATCD d'hospitalisation à l'étranger dans l'année
- **Isolement prophylactique et dépistage systématique / écouvillonnage rectal**
- **Analyse moléculaire des ERC par 1 «laboratoire expert»**



01/02/2011: Laboratoire de Bactériologie du CHU de Nîmes =
Laboratoire « expert » en Languedoc-Roussillon

Missions

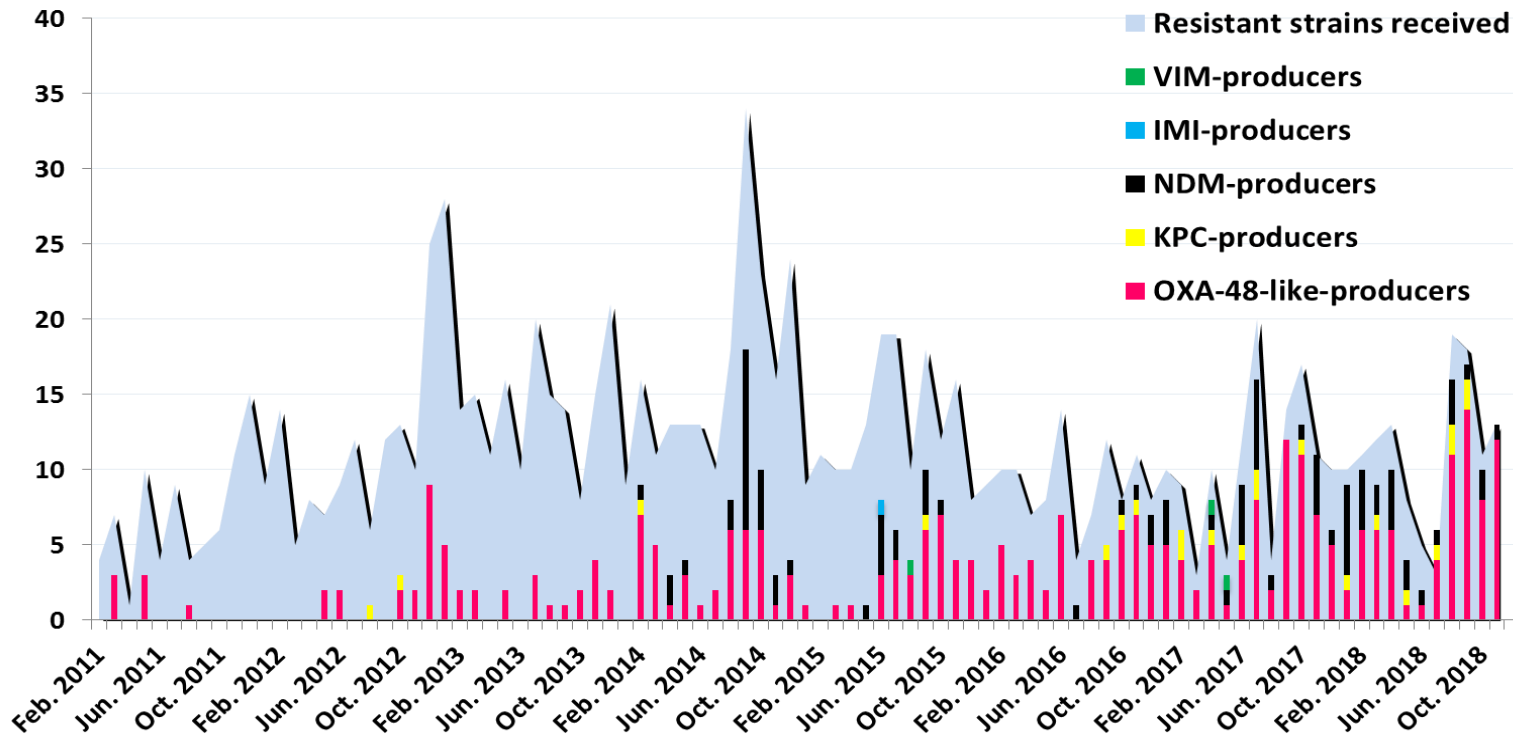
■ Caractérisation moléculaire des ERC



Check MDR
CT102/103
(Check-point)



Xpert® CARBA-R
(Cepheid)

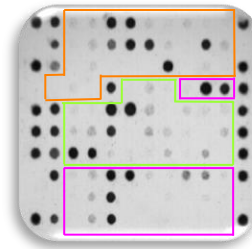


Missions

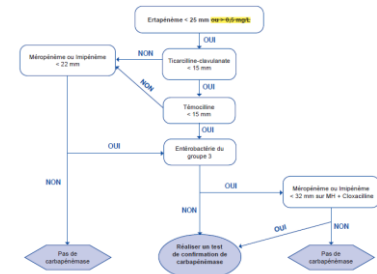
■ Evaluation des nouveaux outils diagnostiques (E-carb study group)



chromID® CARBA et OXA-48
(bioMérieux)



Check MDR CT102/103
(Check-point)



Algorithme CA-SFM



mastdiscs™combi
(Mast diagnostic)



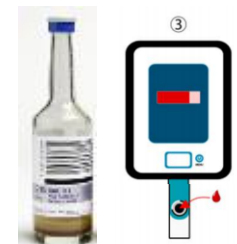
KPC/MBL & OXA-48 Confirm®
(ROSCO DIAGNOSTICA)



RESIST-4 O.K.N.V. (AirDiag)
NG-Test CARBA-5 (NG Biotech)



Rapid CARB Screen®
(ROSCO DIAGNOSTICA)



BL-RED™ (AirDiag)

Missions



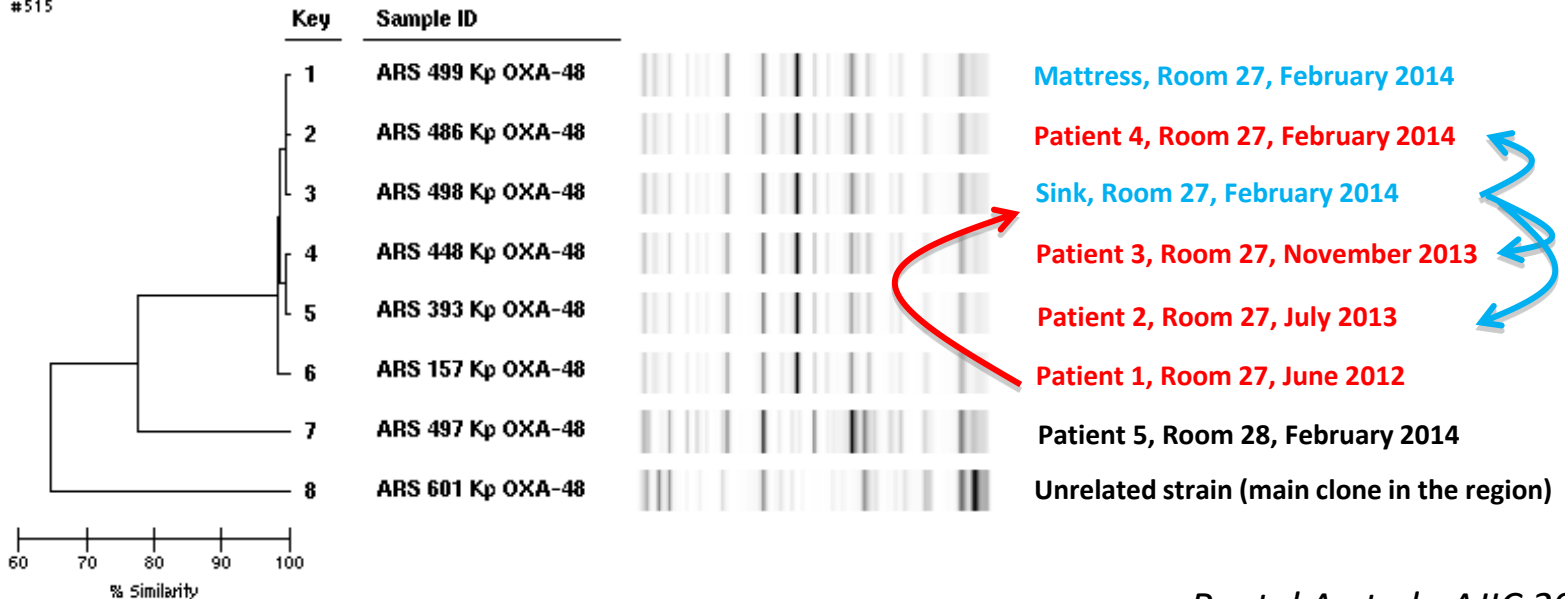
■ Analyse de clonalité / rep-PCR diversiLab (bioMérieux)

- Amplification de séquences répétitives du génome bactérien
- Migration en système microfluidique \Rightarrow fingerprint



\Rightarrow Ex: Epidémie Kp OXA-48, CHU NIMES

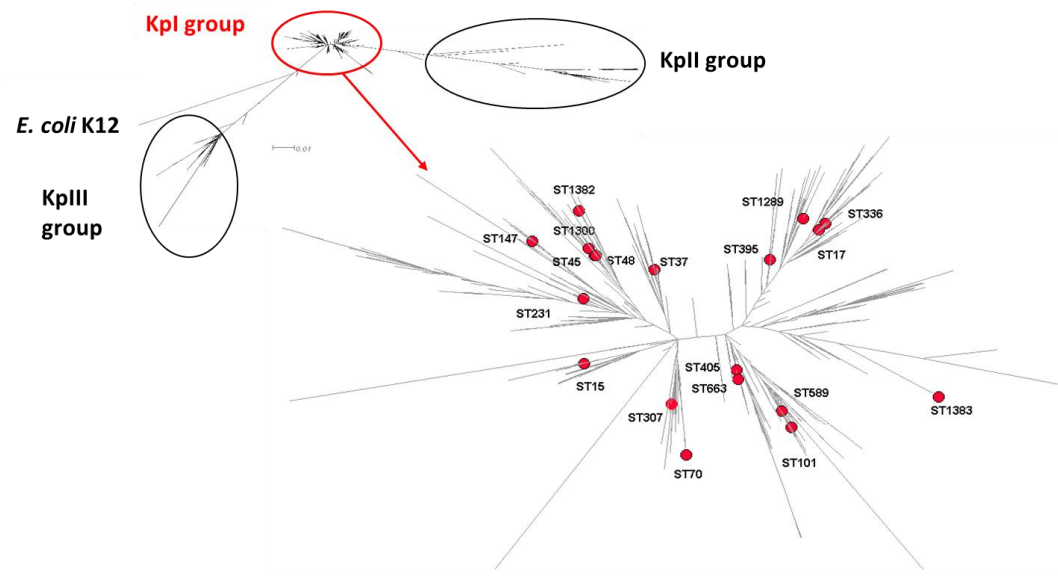
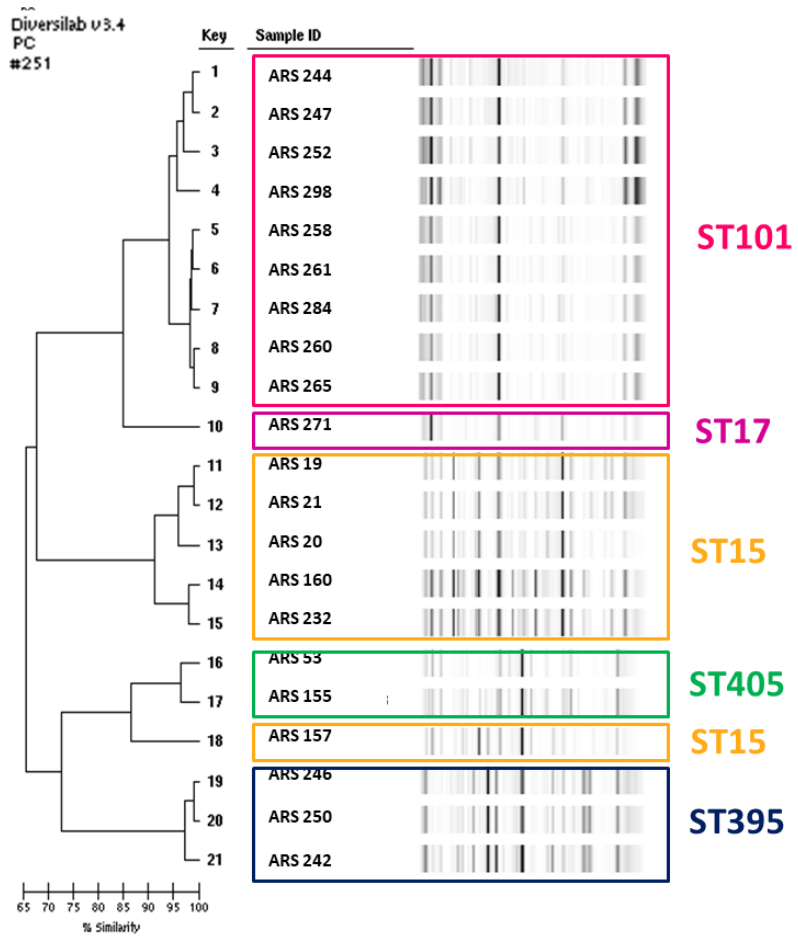
Diversilab v3.4
PC
#515



Missions

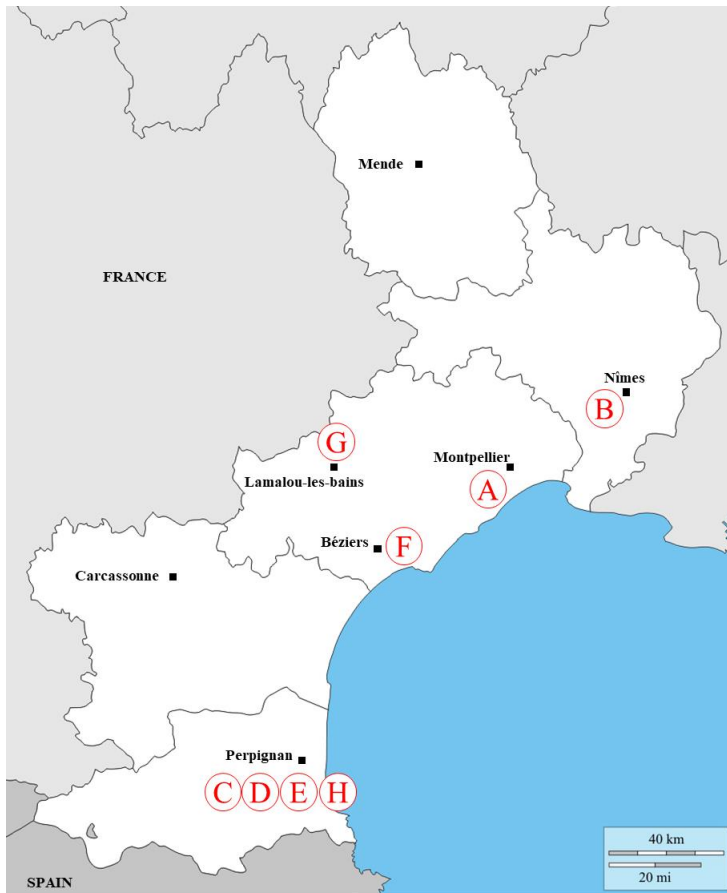
- Etude des clones émergents
 - ⇒ Rep-PCR, MLST
 - ⇒ Caractérisation moléculaire des gènes de résistance

K. pneumoniae OXA-48

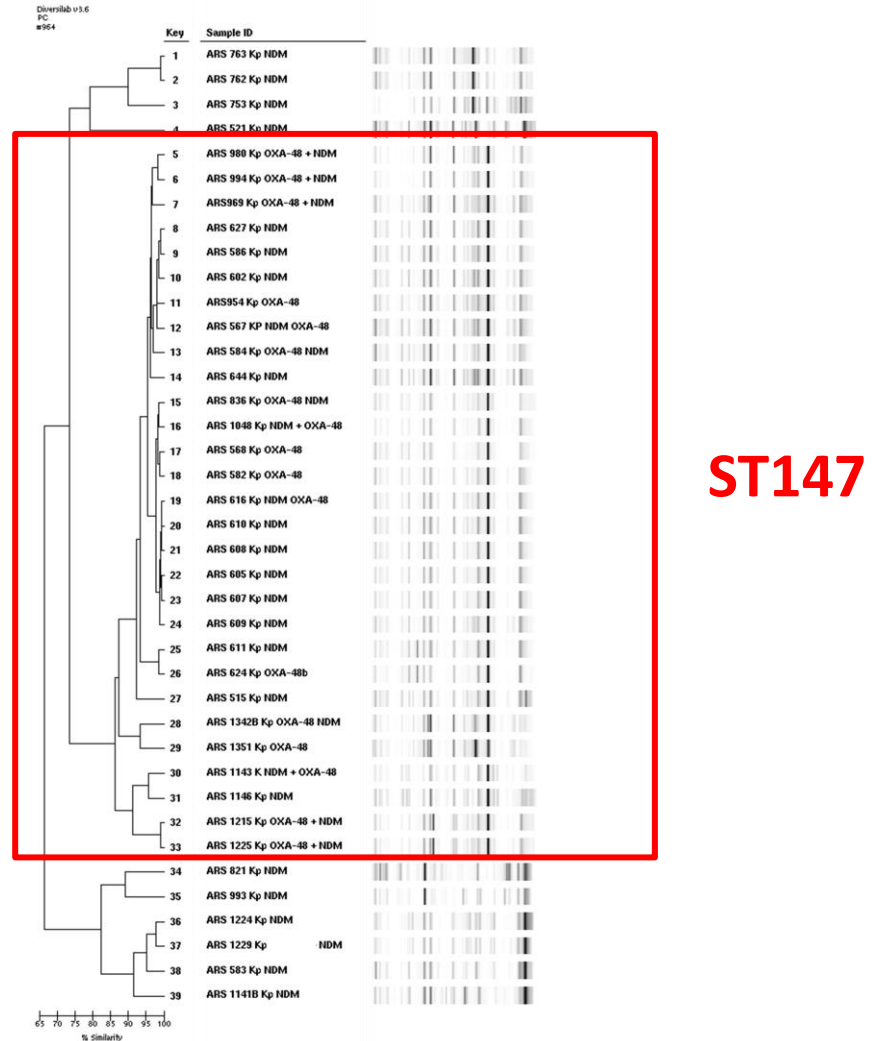


Missions

Etude des clones émergents



K. pneumoniae NDM +/- OXA-48



Episeq CS (bioMérieux)

- NGS (illumina)
- Analyse bio-info intégrée:
 - ⇒ Wg-MLST: Whole-genome-derived housekeeping gene MLST
 - ⇒ Résistome ± Virulome
 - ⇒ Typage plasmidique (fin 2021)



01

UPLOAD



02

ANALYSIS

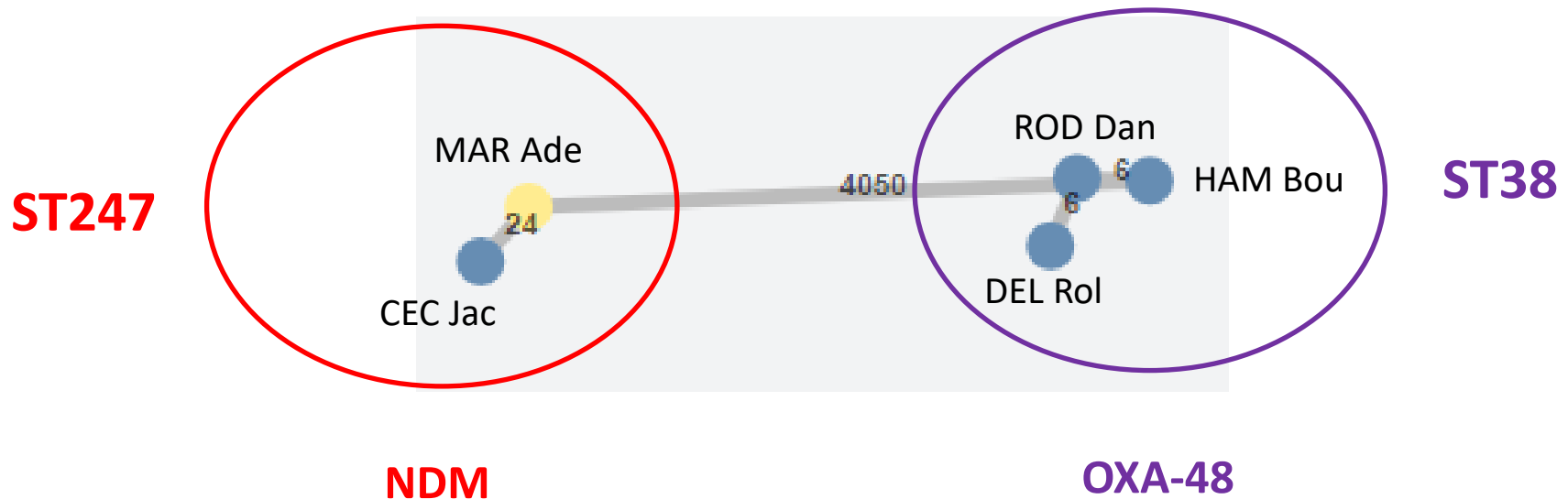
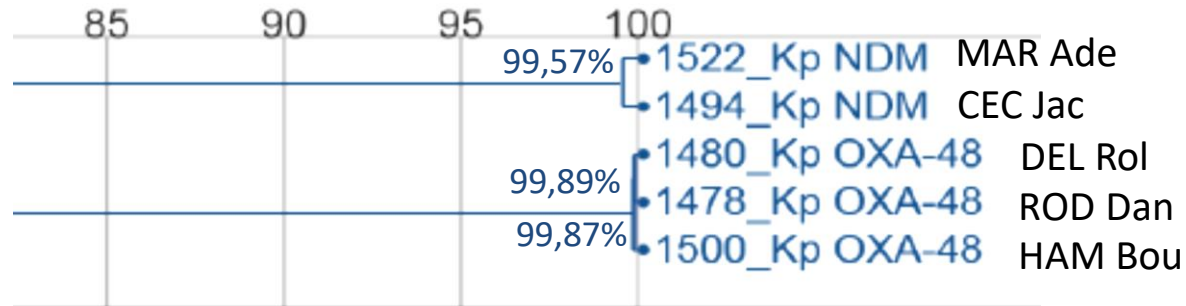


03

REPORT

Episeq CS (bioMérieux)

- Kp OXA-48 et Kp NDM isolées au CHU de Nîmes (2020)



Episeq CS (bioMérieux)

Kp 1522 NDM CHU Nîmes

Resistome

Allele search

Locus	May confer resistance to drugs	May confer resistance to drug families
aadA2	Spectinomycin, Streptomycin	Aminoglycosides
aph(3'')-Ib	Streptomycin	Aminoglycosides
aph(3'')-Ib	Streptomycin	Aminoglycosides
aph(3'')-Ib	Streptomycin	Aminoglycosides
aph(3')-VI	Amikacin, Butirosin, G418, Gentamicin b, Isepamicin, Kanamycin, Kanamycin a, Neomycin, Paromomycin, Ribostamycin	Aminoglycosides
aph(6)-Id	Streptomycin	Aminoglycosides
armA	Amikacin, Arbekacin, Dibekacin, G418, Gentamicin, Gentamicin b, Gentamicin c, Isepamicin, Kanamycin a, Netilmicin, Sisomicin, Tobramycin	Aminoglycosides
blaTEM-1A	Amoxicillin, Ampicillin, Cefalotin, Piperacillin, Ticarcillin	Beta-lactams
BRP(MBL)	Bleomycin, Bleomycin a2, Bleomycin b2, Bleomycinic acid	Glycopeptides
dfrA12	Diaminopyrimidine, Folate pathway antagonist, Trimethoprim	Pyrimidine analogs, Trimethoprim/sulfonamides
dfrA14	Diaminopyrimidine, Folate pathway antagonist, Trimethoprim	Pyrimidine analogs, Trimethoprim/sulfonamides
fosA6	Fosfomicin	Fosfomicins
mph(E)	Erythromycin, Macrolides	Macrolides/lincosamides/streptogramins, Polyketides
msrE	Erythromycin, Lincosamides, Macrolides, Streptogramin b, Streptogramins, Tetracycline	Macrolides/lincosamides/streptogramins, Oxazolidinone, Phenicol, Pleuromutilins, Polyketides, Tetracyclines

Episeq CS (bioMérieux)

Kp 1522 NDM CHU Nîmes

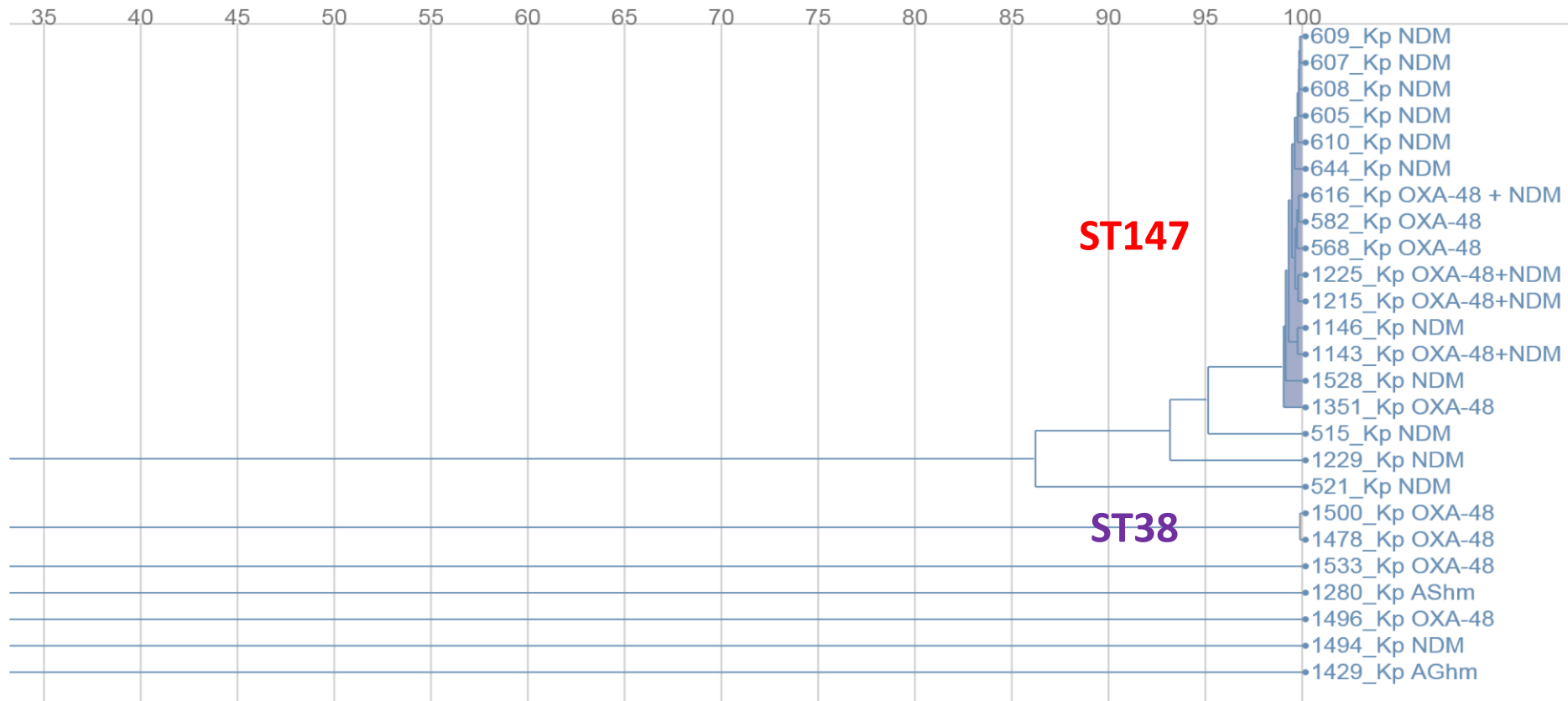
Locus	May confer resistance to drugs	May confer resistance to drug families
NDM-1	Amoxicillin, Amoxicillin/clavulanic acid, Ampicillin, Ampicillin/clavulanic acid, Carbapenem, Cefepime, Cefixime, Cefotaxime, Cefoxitin, Ceftazidime, Cephalosporins, Cephamycins, Ertapenem, Imipenem, Meropenem, Penam, Piperacillin, Piperacillin/tazobactam	Beta-lactams
ompK37	Carbapenem, Cefotaxime, Cefoxitin, Cephalosporins, Cephamycins, Monobactam, Penam, Penems	Beta-lactams
qnrB1	Ciprofloxacin	Quinolones
SHV-11	Amoxicillin, Ampicillin, Carbapenem, Cefalotin, Cephalosporins, Penam, Piperacillin, Ticarcillin	Beta-lactams
sul1	Folate pathway antagonist, Mafenide, Sulfacetamide, Sulfadiazine, Sulfadimidine, Sulfadoxine, Sulfamethizole, Sulfamethoxazole, Sulfasalazine, Sulfisoxazole	Sulfonamides
sul2	Folate pathway antagonist, Mafenide, Sulfacetamide, Sulfadiazine, Sulfadimidine, Sulfadoxine, Sulfamethizole, Sulfamethoxazole, Sulfasalazine, Sulfisoxazole	Sulfonamides

Point mutations

Locus	May confer resistance to drugs	May confer resistance to drug families
acrR		Quinolones
OmpK37	Carbapenem	Beta-lactams

Episeq CS (bioMérieux)

Dendrogram



Episeq CS (bioMérieux)



Similarities

0	5	10	15	20	25	30	35	40	45	50														
99.62	99.59	99.63	99.66	99.61	99.39	100	99.82	99.69	99.68	99.65	99.42	99.44	99.35	99.20	95.52	93.34	85.96	20.18	20.12	19.92	18.50	19.53	17.40	16.52
99.71	99.67	99.68	99.71	99.71	99.54	99.82	100	99.77	99.70	99.68	99.47	99.47	99.44	99.29	95.63	93.42	86.08	19.70	19.63	19.56	18.27	19.28	17.05	16.30
99.62	99.58	99.57	99.61	99.60	99.39	99.69	99.77	100	99.61	99.59	99.36	99.37	99.35	99.12	95.55	93.27	85.99	19.73	19.70	19.57	18.31	19.24	17.08	16.36
99.54	99.52	99.52	99.52	99.54	99.31	99.68	99.70	99.61	100	99.79	99.31	99.30	99.48	99.37	95.42	93.27	85.93	19.93	19.82	19.73	18.28	19.32	17.25	16.35
99.52	99.50	99.49	99.47	99.50	99.31	99.65	99.68	99.59	99.79	100	99.30	99.36	99.46	99.28	95.40	93.19	85.77	19.86	19.83	19.67	18.30	19.41	17.18	16.25
99.34	99.32	99.27	99.34	99.32	99.15	99.42	99.47	99.36	99.31	99.30	100	99.76	99.04	98.88	95.17	93.14	85.90	20.14	20.11	19.80	18.45	19.47	17.43	16.50
99.38	99.36	99.32	99.30	99.35	99.13	99.44	99.47	99.37	99.30	99.36	99.76	100	99.03	98.86	95.30	93.11	85.69	19.94	19.89	19.59	18.22	19.27	17.19	16.25
99.21	99.17	99.18	99.18	99.19	99.00	99.35	99.44	99.35	99.48	99.46	99.04	99.03	100	99.07	95.19	92.92	85.73	19.71	19.66	19.51	18.24	19.23	17.13	16.31
99.18	99.12	99.13	99.14	99.16	98.95	99.20	99.29	99.12	99.37	99.28	98.88	98.86	99.07	100	95.01	93.00	85.81	20.11	20.03	19.91	18.60	19.64	17.45	16.56
95.66	95.57	95.64	95.53	95.58	95.45	95.52	95.63	95.55	95.42	95.40	95.17	95.30	95.19	95.01	100	93.32	86.29	18.69	18.65	18.25	18.10	17.28	17.21	16.07
93.46	93.44	93.32	93.20	93.39	93.19	93.34	93.42	93.27	93.27	93.19	93.14	93.11	92.92	93.00	93.32	100	86.40	18.82	18.76	18.29	18.20	17.42	17.62	15.76
86.11	86.15	86.09	85.92	86.23	85.74	85.96	86.08	85.99	85.93	85.77	85.90	85.69	85.73	85.81	86.29	86.40	100	19.02	18.97	17.99	18.51	17.23	17.30	15.82
18.94	19.06	18.85	18.86	18.94	18.87	20.18	19.70	19.73	19.93	19.86	20.14	19.94	19.71	20.11	18.69	18.82	19.02	100	99.89	18.73	17.70	17.99	17.82	16.61
18.87	18.97	18.75	18.75	18.84	18.78	20.12	19.63	19.70	19.82	19.83	20.11	19.89	19.66	20.03	18.65	18.76	18.97	99.89	100	18.67	17.66	17.98	17.78	16.57
18.40	18.43	18.28	18.25	18.42	18.31	19.02	19.56	19.57	19.73	19.67	19.80	19.59	19.51	19.01	18.25	18.29	17.99	18.73	18.67	100	17.81	17.98	17.17	16.86

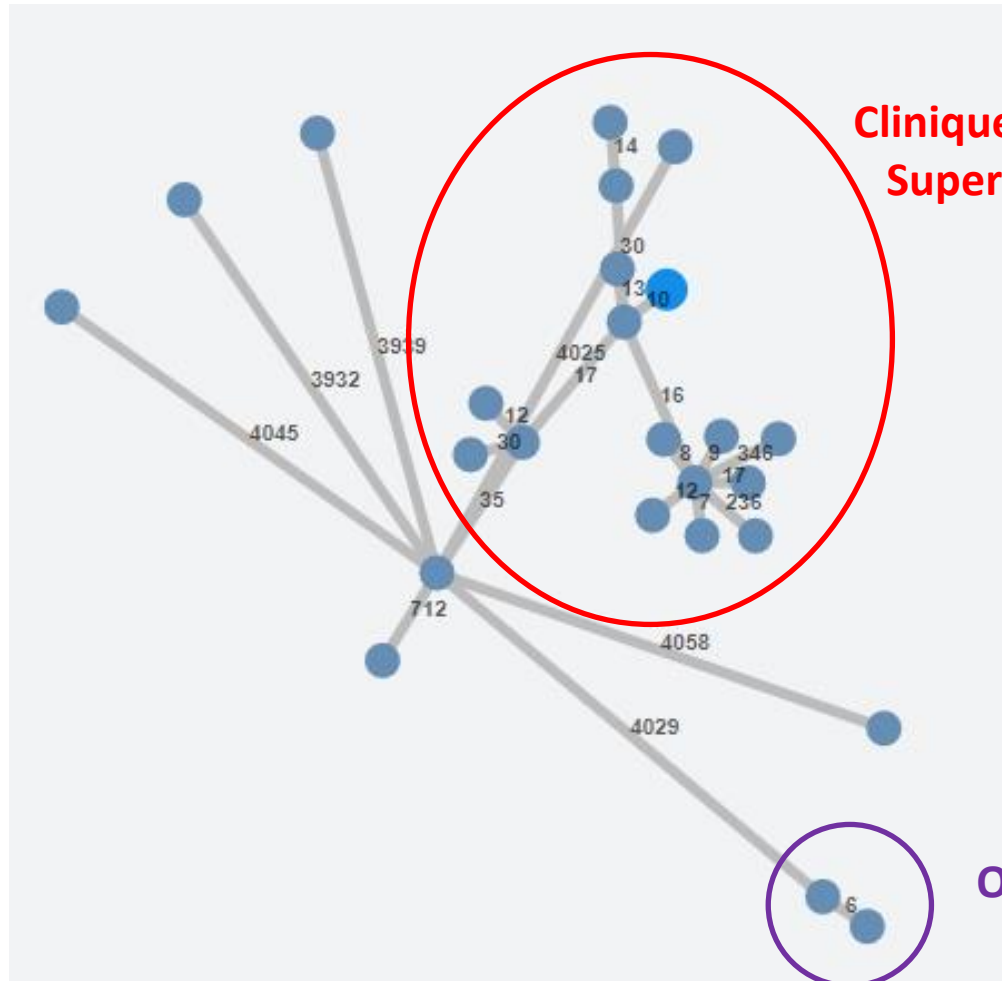
BIOMÉRIEUX EPISEQ® CS v1.1.0 - Not for diagnostic use.

Episeq CS (bioMérieux)

OXA-48 ± NDM

ST 147

**Clinique St Pierre, Médipole,
Supervaltech, CH Béziers,
CPCF**



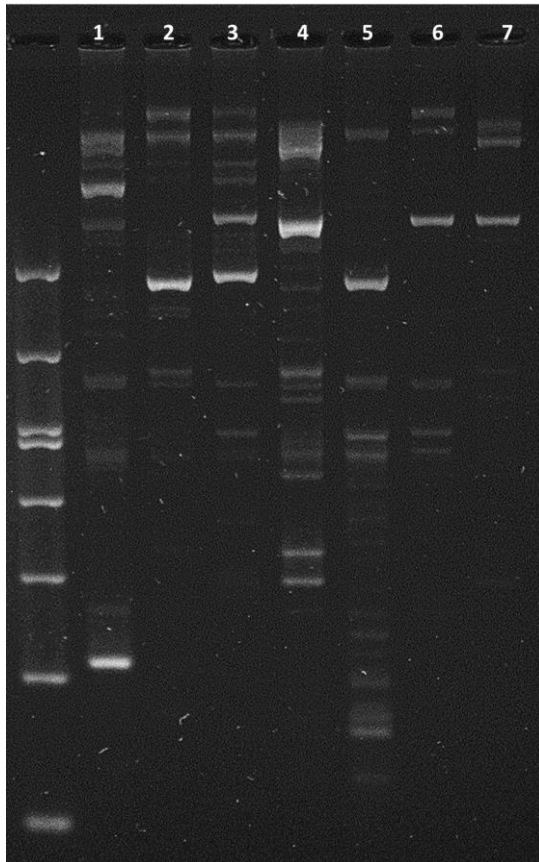
OXA-48

ST38

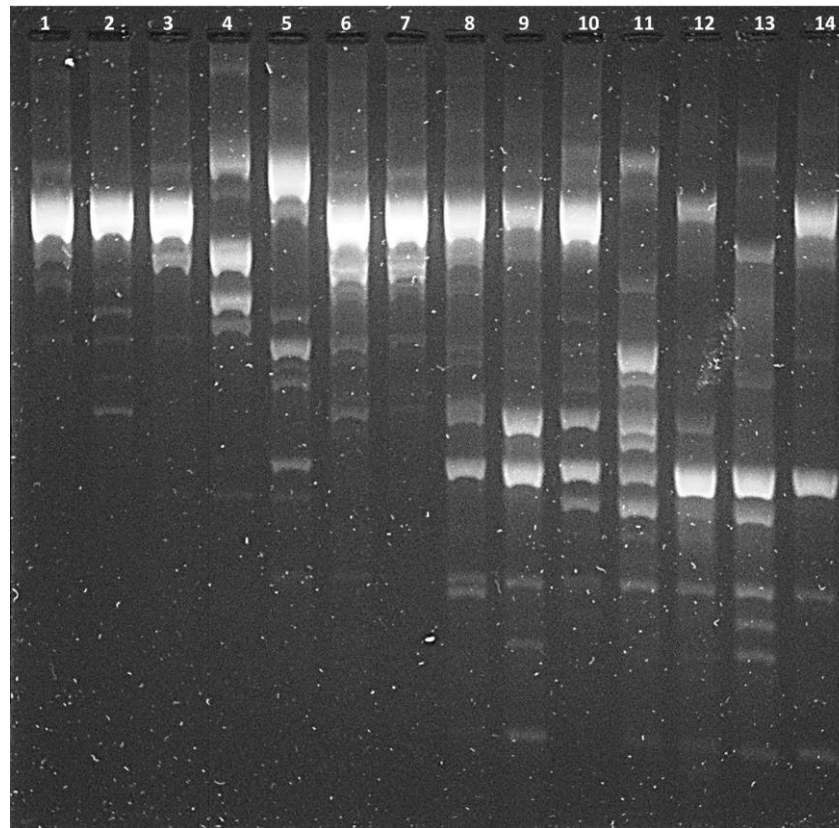
CHU Nîmes

Rep-PCR: espèces ≠ *K. pneumoniae*

Rep-PCR *P. aeruginosa* 30/12/2020



Rep-PCR *S. marcescens* 11/01/2021



Rep-PCR *C. freundii* OXA-48
31/12/2020

