

# THE PRESENCE OF PLASMID-MEDIATED EBLs IN UROPATHOGENS ISOLATED FROM PATIENTS WITH CHRONIC PYELONEPHRITIS

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## Objectives:

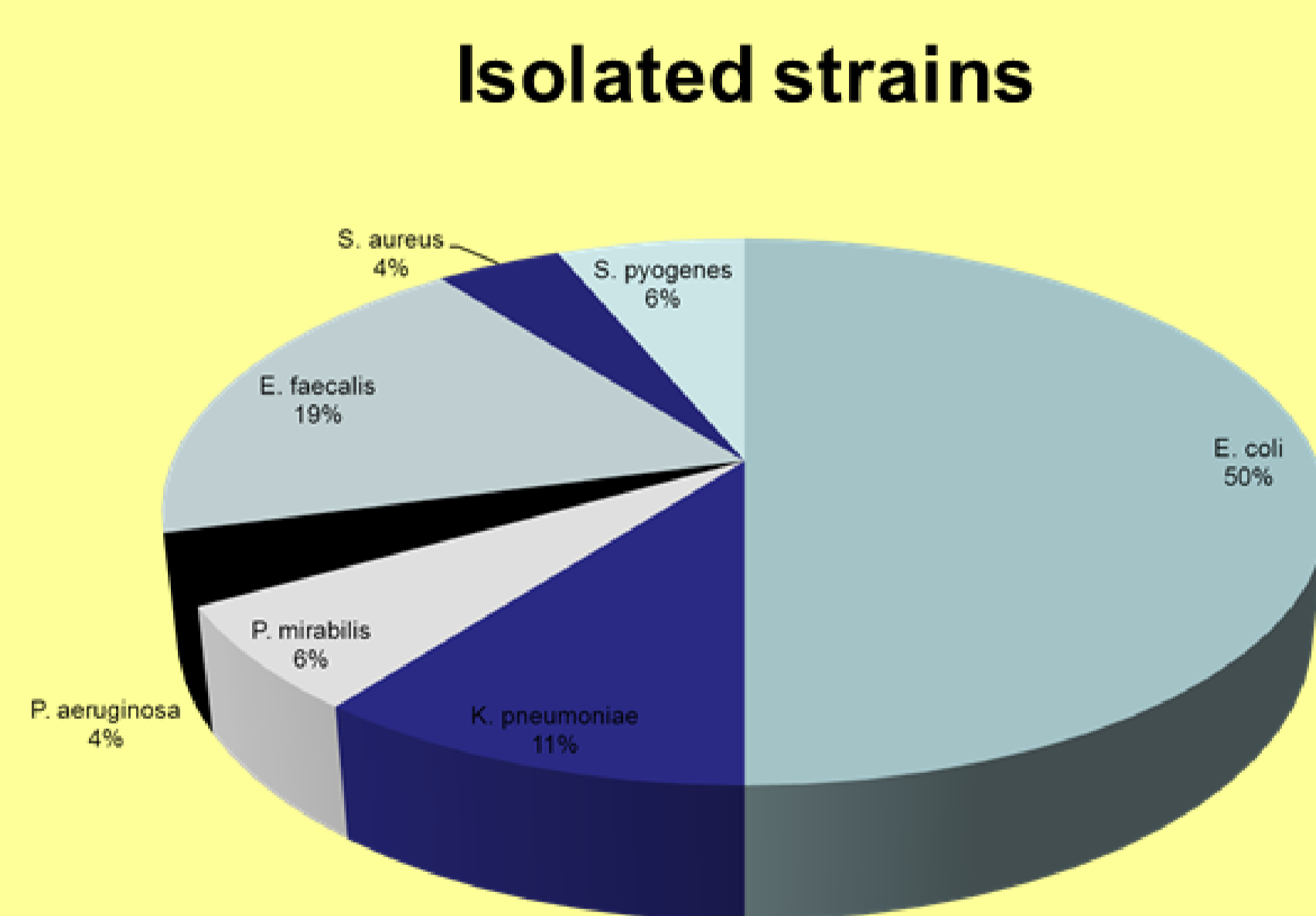
- Resistance to  $\beta$ -lactams has been increasing in the treatment of urinary tract infections during last years.
- The production of plasmid-mediated extended spectrum  $\beta$ -lactamases (ESBLs), that hydrolyze extended spectrum  $\beta$ -lactams, is the major cause of resistance to these drugs.
- The aim of the study was to detect and determine genes encoding the ESBLs including *bla*(TEM), *bla*(SHV), *bla*(CTX-M).

## Methods:

### Measurements:

- Forty-eight clinical strains were isolated from urine samples of hospitalised patients.
- All isolates were identified by conventional biochemical tests and confirmed by serotyping.
- Susceptibility of isolates to 15 different antimicrobial agents was determined using agar disk diffusion method.
- ESBLs were determined by polymerase chain reaction (PCR) and characterise by direct sequences of PCR products.

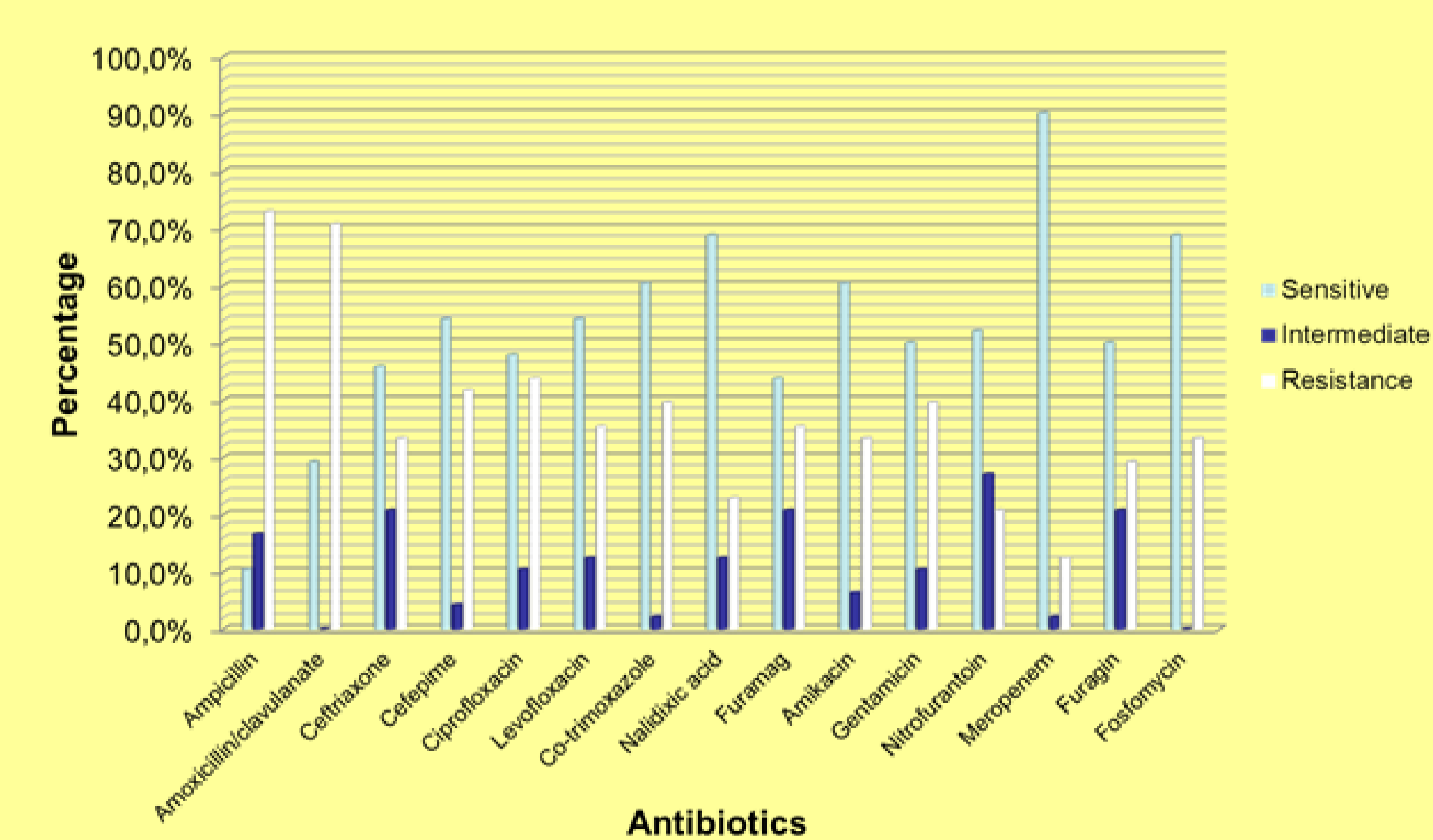
## Results:



### The prevalence of ESBLs among uropathogens

Bacterial isolates	ESBLs genes		
	<i>bla</i> TEM	<i>bla</i> SHV	<i>bla</i> CTX-M
E. coli	8.3 % (2/24)	8.3% (2/24)	12.5 % (3/24)
K. pneumoniae	-	-	40% (2/5)
P. mirabilis	33.3% (1/3)	-	33.3% (1/3)
E. faecalis	-	-	22.2% (2/9)
S. aureus	-	-	50% (1/2)

### Susceptibility of the patterns



## Conclusions:

- Was determined the prevalence of plasmid-mediated ESBLs in patients with chronic pyelonephritis, who were treated in one of the hospitals in Kharkiv, Ukraine.
- Overall prevalence of ESBL production among clinical isolates was 29.3 %. The prevalence of ESBL production was significantly higher with E. coli than another uropathogens. CTX-M types of ESBLs were the most common detected genes.
- The presence of resistance genes among uropathogens indicates a high incidence between bacteria all over the world due to plasmids.

## References:

1. European Centre for Disease Prevention and Control. Antimicrobial resistance surveillance in Europe 2012. Annual Report of the European Antimicrobial Resistance Surveillance Network (EARS-Net). Stockholm: ECDC; 2013.
2. Sader HS et al. SENTRY Antimicrobial Surveillance Program, 2009-2012. Int J Antimicrob Agents. 2014 Apr;43(4):328-34.
3. Ian Morrissey et al. A Review of Ten Years of the Study for Monitoring Antimicrobial Resistance Trends (SMART) from 2002 to 2011. Pharmaceuticals 2013, 6, 1335-1346.
4. Balode A et al. Results from the Tigecycline Evaluation and Surveillance Trial (T.E.S.T.) 2004-2010. Int J Antimicrob Agents. 2013 Jun;41(6):527-35.
5. ARNFINN SUNDSFJORD. Genetic methods for detection of antimicrobial resistance. DAHL APMIS 112: 815-37, 2004.

### Global surveillance studies including ESBL-producing bacterial isolates

Surveillance Study	Date (Year)	Sample origin	ESBLs-positive pathogens	
			E. coli	K.pneumoniae
EARSS <sup>1</sup>	2009-2012	Blood, cerebrospinal fluid	85-100%*	85-100%*
SENTRY <sup>2</sup>	2009-2012	Blood, respiratory tract	n.a.	35.1%
SMART <sup>3</sup>	2002-2011	Intra-abdominal, urinary tract	11.8%	17.9%
TEST <sup>4</sup>	2004-2010	Blood, urine, respiratory tract, wounds, sterile fluids	15.3%	39.3%

\*ESBL-positive isolates among isolates resistant to third-generation cephalosporins. n.a.: not available

### Sequences of the Primers Used in The Study<sup>5</sup>

*bla*TEM

- 5'-ATG AGT ATT CAA CAT TTC CG
- 5'-CCAATG CTT AAT CAG TGA GG

*bla*SHV

- 5'-ATG CGT TAT ATT CGC CTG TG
- 5'-AGC GTT GCCAGT GCT CGA TC

*bla*CTX-M

- 5'-SCSATG TGC AGY ACCAGT AA
- 5'-ACCAGAAYV AGC GGB GC

