Universidad de Navarra

Máster en Investigación Biomédica
Facultad de Ciencias

Research Project Proposal
Academic year 2016-2017

Project Nº 31 ASIGNADO
Title: Study of resistance and virulence gene transfer among Enterobacteriaceae Extended-Spectrum β-lactamases (ESBL) producers.
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Summary The increasing of antimicrobial resistance is a worldwide public health problem. In order to control the wide dissemination of resistances, the WHO has promoted a strategic plan that promotes the study of the problem from a global perspective. According to the One Health initiative (the health of humans, animals and ecosystems are interconnected), there is a need of coordinated, collaborative, multidisciplinary and cross-sectorial approach to address potential or existing risks that originate at the animal-human-ecosystems interface. According to this, our research group has studied the dispersion of Enterobacteriaceae strains resistant to β-lactam antibiotics in different niches of Navarra, focusing the study in the Extended-Spectrum β-lactamases (ESBL) producers. ESBL-E producers were isolated from aquatic environments (effluent treatment plants and rivers), primary animal production sector (farms and feed) and from different food products. The overall objective of this work is the molecular characterization of the collection of ESBL-E isolated, in order to establish phylogenetic relationships among strains and possible pathways of spread. So, the main goals of the project are: - Characterization of genetic markers: integrons (intI1, intI2 and intI3) and insertion sequences (ISEcP1, ISCR1, IS26, IS903, IS5075 and orf47) asociated with ESBL by different PCR - Phylogenetic characterization of E. coli ESBL by PCR (chuA, yjaA, arpA trpAgpC, arpAgpE, TspE4.C2) and by Multi Locus Sequence Typing (MLST) of adk, fumC, icd,

purA, gyrB, recA and mdh genes.

The information obtained will strengthen the knowledge of the problem of multi drug resistant bacteria, allowing understand how the spread of resistance is performed in different ecological niches.

References

WHO, 2015. Antimicrobial resistance. Draft global action plan on antimicrobial resistance. WHO SIXTY-EIGHTH WORLD HEALTH ASSEMBLY Antimicrobial resistance Draft, Prov Agend(March), pp.1–19.

Ojer-Usoz, E. et al., 2014. High dissemination of Extended-Spectrum β -lactamase-Producing Enterobacteriaceae in Effluents from Wastewater Treatment Plants. Water Research, 56, pp.37-47.

Ojer-Usoz, E. et al., 2013. Prevalence of extended-spectrum β-lactamase-producing Enterobacteriaceae in meat products sold in Navarra, Spain. Meat Science, 93(2), pp.316–321.

POSSIBILITY OF PhD

YES*

* (PhD grant required)