Universidad de Navarra
Facultad de Ciencias

MASTER'S DEGREE IN BIOMEDICAL RESEARCH
Research Project Proposal
Academic year 2023-2024

Project Nº 21

Title: Molecular characterization of Listeria monocytogenes clinical strains isolated in Navarra

Department/ Laboratory
Laboratory of Food and Water Microbiology, Department of Microbiology and Parasitology, Faculty of Medicine, Universidad de Navarra

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Summary

Listeria monocytogenes is a foodborne pathogen that can cause invasive diseases in humans and farm animals, including meningitis, fetal loss, sepsis, and febrile gastroenteritis. Although L. monocytogenes is a rare human pathogen, its severity and high mortality place it as one of the most serious foodborne pathogens. The surveillance of listeriosis is compulsory in Spain since 2015 and the molecular characterization of isolates is essential for the detection of possible outbreaks.

Serotyping is a classic subtyping method but with limited discriminatory power. Therefore, Pulsed Field Gel Electrophoresis (PFGE) and Multi-locus sequence typing (MLST) are proposed as more discriminative techniques. The first one allows the separation of high molecular weight DNA fragments while second one is based on the study of nucleotide sequences of housekeeping genes. In this context, the main objective of this study will be the characterization of 50 L. monocytogenes clinical strains (isolated in the last 10 years in Navarra), belonging to the collection of the Laboratory of Food and Water Microbiology, to detect probably occurred outbreaks based on the similarity of profiles.

For this, the PFGE technique will be carried out, using the programme GelJ for the analysis of agarose gels to determine genetic similarity and for the creation of dendograms. On the other hand, the MLST technique will be developed, which establishes different Sequences Type (ST) and Clonal Complexes (CC), to compare these profiles with strains isolated throughout the world. The data obtained for each allele will be analysed in BioNumerics software to create minimum spanning trees (MST), which allows us to establish the phylogenetic relationships between the different strains.

yes	
no	X

Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?