



## What is the role of chitin in the transmission and virulence of *L.monocytogenes* ?



I am [Miguel Villoria Recio](#), an early stage researcher student coming originally from Spain. I graduated in Biology and continued my studies in Italy and the United Kingdom, specialising in infectious diseases. I have moved here and there to upgrade my skills and be ready for my PhD studies, where I will focus my research in foodborne pathogens, and more specifically in *Listeria monocytogenes*. I study the adaptation that this bacterium accomplishes from its environment existence to its pathogenic lifestyle. My project will study the role that the chitinases, the enzymes that allow the hydrolysis of chitin, have in the survival of *L. monocytogenes* in the environment, as well as the role that chitin has in the transmission of this bacterium via food products or through chitinous-like organisms.



## Overview

*Listeria monocytogenes* is a real problem in the food industry and the health care system. Its ability to persist in food processing makes it a threat for many immunocompromised groups and it is leading cause of death among foodborne pathogens. Understanding the adaptation of *L. monocytogenes* to these environments could provide with solutions to improve safety in the production of food. *L. monocytogenes* is a facultative pathogen, capable of adapting and fine-tuning gene expression to benefit from the environmental sources available where it lives. This enhances bacterial fitness and survival, either as a saprophyte or as a pathogen. Understanding how *L. monocytogenes* senses where it lives through the compounds that surrounds it and how it benefits from them is of key importance in the study of the virulence regulation, and therefore in the fight against it.

## Objectives and expected results

Chitin is ubiquitously found in the environment, either in soil or chitinous-like organisms, and it is in turn a sugar that *L. monocytogenes* is able to hydrolyse via the chitinolytic system. I want to know what the relationship between chitin and the persistence of *L. monocytogenes* in food processing and environmental survival is. Also, I am interested in understanding the role that the enzymes that hydrolyse this compound have in virulence and their role as mediators in the adaptation of *L. monocytogenes* from one environment to the other. I will perform a technique known as QRT-PCR to study the levels of expression of the genes involved in both, the hydrolysis of chitin and in virulence to observe whether there is a relationship between first, the expression of the chitinases and the virulence genes and second, further characterise the expression of the chitinases in different environmental models.

This will allow us to better understand the adaptation of this bacterium to different ecosystems and therefore, provide with better solutions to diminish the presence of *L. monocytogenes* in the food processing and thus the appearance of future outbreaks.

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