02
AVR.
2015

de 14h à 15h

SÉMINAIRE

Vibrio diversity and oyster mortality: the hypothesis of a new polymicrobial disease

Frédérique Le Roux
Directrice de recherche IFREMER, Station Biologique de Roscoff

Vibrios have been associated with successive mortality outbreaks ofCrassostrea gigas) in France that have resulted in losses up to 100% of production. Given the near monoculture of C. gigas in Europe, there is an urgent need to understand the epidemiology of these outbreaks, particularly the role of Vibrio in the diseases.The study of the Vibrios distribution on fine phylogenetic and spatial scales has demonstrated that vibrios coexisting in the water column can be divided into closely related populations, which pursue different lifestyles i.e. ecological population (Hunt et al., 2008). However, a link between ecological populations and pathogenicity has not been demonstrated, and it is unclear whether pathogenicity is a trait primarily linked to clones or to populations comprising a large number of distinct genotypes.In the presentVibrio populations in an intensive oyster cultivation area. We demonstrate that Vibrio populations do not assemble neutrally in oysters from water column populations i.e. specific genotypes colonize the oysters. Combining experimental ecology, high throughput infection assay and genome sequencing, we showed that the onset of disease in oysters is associated with progressive replacement of diverse, benign colonizers by members of a phylogenetically coherent virulent population together with quorum sensing pheromone producers. Analyses of oyster mortality following experimental infection suggest that disease onset can be facilitated by the presence of non-virulent strains. Oyster disease may thus represent a new form of polymicrobial disease, in which non-pathogenic strains contribute to increased mortality.Hunt DE, et al. (2008) Resource partitioning and sympatric differentiation among closely related bacterioplankton. Science 320(5879):1081-1085.Lemire A, Goudenège D, Versigny T, Petton B, Calteau A, Labreuche Y, Le Roux F. (2014) Populations, not clones, are the unit of vibrio pathogenesis in naturally infected oysters. ISME J. Dec 9. doi: 10.1038/ismej.2014.233

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