

Diversification of *Vibrio anguillarum* driven by the bacteriophage CHOED

León M.

Kokkari C.

García K.

Castillo D.

Katharios P.

Bastías R.

Bacteriophages are an important factor in bacterial evolution. Some reports suggest that lytic bacteriophages can select for resistant mutant strains with reduced virulence. The present study explores the role of the CHOED bacteriophage in the diversification and virulence of its host *Vibrio anguillarum*. Nine phage-resistant strains were analyzed for their phenotype and different virulence factors, showing alterations in their fitness, motility, biofilm formation, lipopolysaccharide profiles and/or protease activity. Seven of the nine phage-resistant strains showed virulence reduction in a *Sparus aurata* larvae model. However, this is not generalized since two of the resistant strains show equal virulence compared with the parental strain. The genomic analysis of representative resistant strains displayed that the majority of the mutations are specific for each isolate, affecting genes related to lipopolysaccharide biosynthesis, quorum sensing, motility, toxin and membrane transport. The observed mutations were coherent with the phenotypic and virulence differences observed. These results suggest that the CHOED phage acts as a selective pressure on *V. anguillarum*, allowing proliferation of resistant strains with different genotypes, phenotypes and degrees of virulence, contributing to bacterial diversification. © 2007 - 2019 Frontiers Media S.A. All Rights Reserved.

Bacterial evolution

Bacteriophage

Bacteriophage resistance

Diversification

Vibrio anguillarum

Virulence

bacterial DNA

bacterial toxin

lipopolysaccharide

proteinase

siderophore

virulence factor

Article

bacterial growth

bacterial strain

bacterial virulence

bacteriophage

bacterium identification

bacterium isolation

cell motility

cell proliferation

DNA extraction

DNA sequence

electron microscopy

fitness

genetic identification

genotype

growth curve

hemolysis

microbial diversity

nonhuman

phenotype

quorum sensing

Sparus aurata

Vibrio anguillarum