Study investigates aquatic parasites on fish

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Researchers in the Czech Republic, Spain and the United Kingdom have successfully identified the cellular components and mechanisms that play a role in the proliferation of myxozoa, tiny aquatic parasites responsible for diseases in commercially valuable fish. Presented in the journal *PLoS ONE*, the study's findings shed light on the motility of myxozoa's proliferative states and their reproductive process.

Produced through spores and without insemination, myxozoa are related to cnidarians, what researchers define as being primitive marine species of great diversity. Examples of myxozoa include anemones, corals and jellyfish. Fish quickly fall victim to these parasites because of the latter's fast proliferation. It should be noted, however, that research has failed to elucidate the consequences of their development.

Led by the Cavanilles Institute of Biodiversity and Evolutionary Biology at the University of Valencia in Spain, the researchers used confocal laser-scanning microscopy (CLSM) to probe the anatomy and reproductive biology of the pathogens.

For their part of the study, the Spanish team investigated the morphology, structure and composition of the myxozoa Ceratomyxa puntazzi, found in the bile of the bream Diplodus puntazzo. This bream is one of the species experts are using in their attempt to diversify fish farming in the Mediterranean.

Specifically, the team identified two different developmental cycles of the parasite: (a) presporogonic proliferative development, and (b) sporogony. According to the researchers, both developmental cycles occurred in parallel, but fish were observed to have either predominantly stages lacking mature spores or predominantly stages with mature spores.

"The application of in vivo techniques has enabled the analysis of the proliferation mechanisms and the movement of this kind of pathogen, which affects the fishes' digestive system and might cause important losses to fish farms," says lead author Gema Alama-Bermejo from the Cavanilles Institute, who is currently carrying out postdoctoral research at the Institute of Parasitology of the Academy of Science of the Czech Republic.

In the paper, the authors write: "As the present study shows, the combination of light microscopy, scanning and transmission electron microscopy and three-dimensional confocal laser microscopy, successfully contributed novel information on the structure and morphology of ceratomyxid parasite stages in the bile, and provided unique insights into parasite composition, cell motility and cytokinesis in myxozoans, which had not previously been studied."

The researchers point out that although confocal CLSM may be a poorly used tool, it is extremely useful for investigating the three-dimensional morphology of the parasites as well as for determining the presence and location of certain cellular components.

More information: Alama-Bermejo, G. et al., '3D Morphology, Ultrastructure and Development of Ceratomyxa puntazzi Stages: First Insights into the Mechanisms of Motility and Budding in the Myxozoa', *PLoS ONE* 7(2): e32679, 2012. doi:10.1371/journal.pone.003267

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