ACTIVITY REPORT

Zebrafish as a model for fish diseases: a successful new webinar format

A. Gerras[1], E. J. Kim[1], L. von Gersdorff Jørgensen[2], M. Haahr Marana[2], S. Zrnčić[3], B. Gorgoglione[1*]

[1]Michigan State University, East Lansing, Michigan-USA; [2]University of Copenhagen, Copenhagen, Denmark; [3]Croatian Veterinary Institute, Zagreb, Croatia

Zebrafish (*Danio rerio*) is an increasingly popular vertebrate animal model to study human infectious and genetic diseases; however, its utility as a model organism for fish disease is less established. Prolific, fast-growing, and inexpensive, zebrafish are ideal for using in laboratory research settings. Zebrafish reproduce by external fertilization, which allows for readily accessible embryos when utilizing the CRISPR/Cas9 gene editing technique to achieve transgenic lines, with countless applications. Although a disadvantage is that they may be less susceptible or resistant to specific diseases with relevance for aquaculture. The webinar first reviewed a series of studies undertaken by Dr. von Gersdorff Jørgensen's group at the University of Copenhagen, Denmark, to demonstrate the suitability of zebrafish as model organism to advance the study of fish diseases pathophysiology. Examples of applications using four infectious pathogens with a significant economic impact in the aquaculture industry were evaluated, including *Yersinia ruckeri*, *Vibrio anguillarum*, *Ichthyophthirius multifiliis* (Ich), and Viral Haemorrhagic Septicaemia Virus (VHSV). Using a GFP-labeled *Y. ruckeri* vaccine allowed the tracking of bacterin uptake and distribution to host tissues. The systemic spreading of *V. anguillarum* was tracked in zebrafish infected upon intraperitoneal injection in comparison to those infected by immersion. The use of a transgenic zebrafish line allowed the visualization of GFP-tagged neutrophil response to *Ich* in immune and susceptible fish, and to study the neutrophil response during a VHSV infection as well as tropism of the virus. During the second part of the webinar Dr. Haahr Marana provided a practical demonstration on how the CRISPR/Cas9 gene editing technique is performed in the laboratory for genetic manipulation of zebrafish embryos. Each stage, from egg collection to preparation for reagent injection, was explained in detail.

* Corresponding author's email: BartGorg@msu.edu

Figure 1. Snapshot during the WAVMA - EAFP joint Webinar on 'Zebrafish as a model for fish diseases', available on: www.wavma.org/Webinars/b1042-zebrafish-as-a-model-for-fish-diseases

The 2-hour webinar was streamed live on 30th March 2021 through GoToWebinar platform, offered by the recently established partnership between the EAFP and the World Aquatic Veterinary Medical Association (WAVMA). This second joint event was organised and moderated by Dr. Gorgoglione, as the chair of the WAVMA Education and Students Committee, and by the EAFP General Secretary, Dr. Zrnčić. For this occasion, a new webinar format was implemented, including a lecture and practical demonstration each followed by a questions and answers session. The zebrafish webinar format proved to be very successful, indeed it attracted 413 registrations from all around the world, with 238 people watching it live. An impressive 82% average interest rating and 77.5% of total average attentiveness were estimated between all attendees (based on Webinar Engagement Report generated by GoToWebinar). Many students from veterinary universities followed this event. DVM students at Michigan State University during their clerkship on Aquatic Animal Medicine, got the opportunity to practice on scientific writing, getting graded after preparing a scientific style summary. This educational material qualifies for the achievement of Continuing Education and Professional Development (CEPD) credits, that can be used for suitable professional purposes, including advancement to becoming a Certified Aquatic Veterinarian, for national college registration, or for board certifications. For this webinar 2 CEPD credits can be earned, after registering and completing a Knowledge and Skills Assessment (KSA) questionnaire to ensure that the learning objectives are met. This webinar recording and CEPD acquisition opportunity will remain available through the WAVMA website. New initiatives in partnership between the two associations will promote educational contents on key animal aquatic health issues and aquatic veterinary techniques.