

## Abstract 45:

An *in vitro* model of the complex fish gill

Yaqing Zhang<sup>1</sup>, Maria Forlenza<sup>1</sup>, Geert F Wiegertjes<sup>1\*</sup>

<sup>1</sup> Aquaculture and Fisheries Group, Wageningen University and Research, 6708 WD Wageningen, The Netherlands.

\* Corresponding author. E-mail: geert.wiegertjes@wur.nl

This project aims to study gills as a complex organ with a special focus on the interaction between gill epithelial cells with the outer mucus layer and associated microbiota as well as with the inner immune cells populating the gills. Gills of teleosts are best known as the major site for gas exchange with water, participating in important ion-osmoregulation. The large surface area and the epithelial layer separating the gill from the environment, on the one hand effectively facilitate gas exchange while on the other offer opportunity for exposure to water-borne pathogens. To limit pathogen entry, the outer side of the gill epithelium is covered by a mucus layer harbouring an associated microbiota assumed to play a local protective role, whereas on the inner side, it interacts with the so-called gill-associated lymphoid tissue (GiALT), assumed to provide overall protection against water-borne pathogens. Comprehensive studies on gills as a complex organ with an important barrier, immune function are scarce. This project aims to study gills as a complex organ with the focus on the interaction between the epithelial cell layer and the mucus, microbiota and GiALT. To this end, we will develop an *in vitro* co-culture model of gill-derived epithelial cells with immune cells and with commensal or pathogenic microbes,