Immune gene expression in gilthead seabream after nervous necrosis virus (NNV) challenge

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Viral nervous necrosis (VNN) is a disease that affects farmed fish worldwide. Its etiologic agent is the nervous necrosis virus (NNV), genus *Betanodavirus,* family *Nodaviridae*. NNV are small and non-enveloped viruses with a genome consisting of two molecules of positive-sense single-stranded RNA, RNA1 and RNA2, which encode the RNA-dependent RNA polymerase and the capsid protein, respectively. The betanodaviruses have been classified into four species: *Striped jack nervous necrosis virus* (SJNNV), *Tiger puffer nervous necrosis virus* (TPNNV), *Red-spotted grouper nervous necrosis virus* (RGNNV), and *Barfin flounder nervous necrosis virus* (BFNNV). In Southern Europe, natural reassortants between RGNNV and SJNNV have been isolated from Senegalese sole (*Solea senegalensis*), gilthead seabream (*Sparus aurata*) and European seabass (*Dicentrarchus labrax*) associated to VNN outbreaks. Immune response against betanodavirus infections has been poorly studied in gilthead seabream. In this study, fish were challenged by intramuscular (im) injection or by immersion, using a reassortant strain containing RGNNV-type RNA1 and SJNNV-type RNA2 segments. Head kidney and brain samples were collected at 24, 48 and 72 h post-challenge (pc) for the injection experiment, while in the bath challenge sampling was performed at 48 and 72 h pc. The immunogen expression analysis was carried out using the platform OpenArray®. In the im-injected fish, 21 differentially expressed genes (DEGs) were identified in head kidney samples at 24 h pc, whereas a lower immune response was detected at 48 and 72 h pc (11 and 9 DEGs, respectively). In brain samples, a delayed response was observed, with 32 DEGs recorded at 72 h pc. Regarding the bath-challenged fish, fewer immunogenes were differentially expressed although all of them were up-regulated. This research was funded by the Ministerio de Ciencia, Innovación y Universidades (MCIUI) and FEDER under Grant RTI2018-094687-B.