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Molecular characterization and expression of interleukin-10 and interleukin-22 in golden pompano (*Trachinotus ovatus*) in response to *Streptococcus agalactiae* stimulus

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1 **Molecular characterization and expression of interleukin-10 and**  
2 **interleukin-22 in golden pompano (*Trachinotus ovatus*) in response to**  
3 ***Streptococcus agalactiae* stimulus**

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16

17 **Abstract**

18 In the present study, members of the interleukin (IL)-10 family of cytokines, including IL-10  
19 (TOIL-10) and IL-22 (TOIL-22) of golden pompano (*Trachinotus ovatus*), were cloned for the  
20 first time, and their expression patterns and 3D structures analyzed. The full-length cDNA  
21 sequences of TOIL-10 and TOIL-22 contained open reading frames of 564 and 567 bp,  
22 respectively. TOIL-10 and TOIL-22 shared higher homology (78%–89%) with the corresponding  
23 genes from various fish relative to other species (25%–34%) and contained the IL-10 family  
24 signature and four cysteine residues that are well conserved in other vertebrate IL-10 members.  
25 Phylogenetic tree analysis of our sequences alongside other IL-10 family proteins revealed that  
26 TOIL-10 and TOIL-22 cluster together with other teleost IL-10 and IL-22 molecules. Expression  
27 of TOIL-10 and TOIL-22 genes was ubiquitous in all tissues examined. The TOIL-10 gene was  
28 also highly expressed in skin, heart, gill, spleen, kidney, brain and liver, and lower levels were  
29 detected in intestine and muscle. High expression of the TOIL-22 gene was observed in gill,  
30 intestine, kidney, spleen, with the lowest levels in liver. TOIL-10 and TOIL-22 were rapidly  
31 activated after SA $\Delta$ phoB immunization and significantly increased to peak levels at 12 h and 4 d  
32 in golden pompano kidney and spleen respectively following challenge. Expression in the brain  
33 reached peak levels at 4 d and 3 d respectively after post-immunization. Our results collectively

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