

The roles of toll-like receptor 4 in the pathogenesis of pathogen-associated biliary fibrosis caused by *Clonorchis sinensis*

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Pathogen-associated biliary fibrosis (PABF) is a type of liver fibrosis characterized by injuries of cholangiocytes and extra cellular matrix (ECM) deposition around bile ducts caused by various bacteria, fungi, virus and parasites. Recent studies show that TLR4 plays an important role in several other types of liver fibrosis, but the mechanism of TLR4 in PABF is yet really unclear. In the present study, a PABF mouse model was established by a trematode infection-*Clonorchis sinensis* which dwells in the bile ducts and causes severe biliary fibrosis of mice. The results showed that the levels of collagen depositions, α -SMA and hydroxyproline (Hyp) contents in TLR4^{mut} mice infected by *C. sinensis* were significantly lower than in those of TLR4^{wild} ones. Furthermore, we found that the activation of TGF- β signaling was impaired in the TLR4^{mut} mice, compared with wild mice when they were challenged to the same dose of *C. sinensis* metacercariae. Moreover, the mice with TLR4 mutation showed a decreased activation of hepatic stellate cells indicated by the expression of α -SMA, when compared with TLR4^{wild} mice. These data demonstrate that TLR4 contributes to PABF caused by *C. sinensis* and TLR4 signaling may be a potential medical target for treatment of PABF.

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Myxozoan parasitic infestation of aquaculture fishes in Punjab, India

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In Punjab, there is lot of development in aquaculture and increasing interest in fish farming, representing it as the fastest growing animal husbandry. As natural stocks have declined due to over exploitation/pollution, the aquaculture has become increasingly important as the source of fishery products. Fishes in these farmlands are prone to several diseases like trichodiniosis, hemorrhagic septicemia and various parasitic infectious diseases. Myxozoanosis is the emerging disease caused by microscopic metazoan parasites are economically important group of parasites infecting fish harvested for food. Myxozoans are widely dispersed in native and pond-reared fish populations. Since, new aquaculture practices such as intensive and polyculture systems have resulted in increased disease outbreaks therefore, research in this direction is urgently needed. The present study was conducted to record diversity, prevalence and effects of pathogenicity caused by myxozoan parasitic infections in cultured fishes in Punjab. For this native carps such as *Labeo rohita*, *Catla catla*, *Cirrhinus mrigala*, exotic carps such as *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Ctenopharyngodon idellus* and catfish *Sperata seenghala* were collected and examined for the presence of myxozoan parasites. In total 30 species belonging to four genera *Myxobolus* (19), *Thelohanellus* (7) and *Henneguya* (3) and *Triangula* (1) have been identified. Description of morphological and morphometric variations of myxospores, host specificity, locality, site of infection, size of the *Plasmodium*, type of *Plasmodium* and pathogenicity have been provided. Histopathological studies reveal the type of plasmodia, exact location of the plasmodia for each species studied and identified infecting gills, fins, scales, liver and gall bladder of cultured fishes. Intensity of infection and mixed infection was also recorded. Native fishes were more infected with prevalence of 44.2% as compared to exotic fishes 27.4%. Female fishes were more infected with prevalence of 38.25% as compared to males 26.21%. Temperature influenced the prevalence of myxozoan as with the increase in temperature, prevalence of infection also increased.

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