

ABSTRACT

This dissertation explores the way David HerberImmune system provides protection against diseases by identifying and killing pathogens and tumour cells. Immunity involves both specific & non-specific parts. The non-specific components act either as barriers of wide range of pathogens. Other components of the immune system adapt themselves to every new disease encountered and are able to generate pathogen-specific immunity. It takes some time to show its response. This type of immunity is called adaptive immunity. Adaptive immunity can be either T cell mediated or B cell mediated in response to intra cellular or extra cellular pathogens respectively. When it is T cell mediated it will lead to the secretion of cytokines including interferon play central role in innate immunity, also called natural immunity. B cell mediated immune system leads to production of antibodies in response to extra cellular pathogens in blood or other body fluids. The whole immune system are linked with each other and activating each other against foreign invaders.

In this work experiments have been established to know about the adaptive immune system of farm fish, common carp which is main source of white meat in Pakistan. Interferon production is regulated by immune genes called interferon regulatory factors (IRF). These IRF genes are 10 in number and are named as IRF1 to IRF10 and overall form IRF family. IRFs appeared near the beginning in vertebrate evolution, with IRF4 & IRF8 probably evolved from the same parent gene. In our studies we report the expression analysis of cDNA homologues of one of our local farm fish common carp (*Cyprinus carpio*). The subfamily 4 has been worked out and two IRF genes, CypIRF4 & CypTRF8 have been isolated from controlled tissues of lymphoid and myeloid lineage, the IRF4 being least described in fish. Mammalian IRF4 & IRF8 are known to be vital in changing a range of functional and developmental processes in lymphomyeloid cell lineages. Both genes were detected in a range of carp tissues where IRF8 was the overall predominant transcript. Consistent with mammalian studies, the highest expression levels of IRF4 and IRF8 were observed in the lymphomyeloid-rich fish tissues, spleen, head kidney, gills & liver