Interferon (IFN) is stimulated by the immune system in response to any pathogen. IFN is essential component of the immune system that helps to protect us from the daily exposure of abundant of germs that are threatening to life. They always play key roles in confronting viral infections. They respond to external stimuli and establish antiviral state in the host body. IFN proteins perform autocrine as well as paracrine activities. The IFN response displays an early defense, the one that occurs prior to the onset of immune response. IFN possess not only antiviral activity but also regulate cell growth, differentiation, apoptosis and modulation of immune system.

IFN regulate the activities of a number of specific cells within the immune system. For example, type I interferon can either stimulate or inhibit the B lymphocyte production. Interferon type II can induce the production of a class of T lymphocytes and also enhances immune function by helping macrophages. The B lymphocytes and T lymphocytes attack infected cells and also stimulate other cells to facilitate defensive mechanism. IFN is especially effective in stimulating macrophages to eliminate tumor cells and other cells infected by parasites, viruses and bacteria.

Transcription factors of the interferon regulatory factor (IRF) family commands the entire interferon (IFN) system from induction of IFN to diverse IFN responses, thereby providing a principal basis for host resistance against pathogens. Evidence indicates that IRFs confer antiviral mechanisms not directly ascribed to the IFN system. IRF 3 and IRF 7 are known to be crucial in regulating the type I interferon response to viral infection in mammals. It depicts as a part of transcriptional complexes which are binding to IRF-binding elements (IRF-Es) and interferon stimulatory response elements (ISREs) within IFN and interferon-stimulated genes (ISGs). Here, we report the expression of IRF3 and IRF7 in common carp. Studies revealed that each of them possessing a putative DNA-binding domain (DBD) containing a tryptophan which is characteristic of all IRF family members. But, the presence of putative IRF association domains (IADs), serine-rich C terminal domains and phylogenetic analysis placed these two genes in the IRF3 subfamily. Both genes were found to regulate type I IFN, type II IFN, macrophage cell line and fibroblast cell line in vertebrates including fish. So, the data supports the premise that IRF3 and IRF7 are important molecules in the regulation of antiviral responses in fish.

During the project, IRF3 and IRF7 have been expressed in lymphoid organs of Cyprinus carpio. So far, all IRF genes have been sequenced in many species including human beings. Purpose of present study is to open the aspects relating to immune system of Cyprinus carpio (common carp) which are main source of Omega 3 rich protein in Pakistan. This will ultimately benefit the over all health of human beings.