ABSTRACT

Immunity is the aptitude of a body system to categorize pathogens and defend the body against those specific pathogens by presenting multifaceted responses. Among the two types of immunity, innate immunity is non-specific, genetically based and functions through macrophages, while adaptive immunity could be acquired both naturally and artificially, antigenic specific and works through two basic types of lymphocytes called B-lymphocytes and T-lymphocytes. Immunity generated by B-cells is called humoral immunity that responds by the production of antibodies from **plasma cells**. T-cells generate cell-mediated immunity facilitated by the production of **cytotoxic T-cells (CD8+)** and **helper T-cells (CD4+).** T-cells identify foreign antigens on the surface of cells. Immune system works by means of chemical messaging and networks. One of the chemical messengers is cytokine. Approximately 100 cytokines have been identified. Among them interferons are most important which react against viral attack. The secretion of interferons is regulated by a class of transcriptional factors called interferon regulatory factors (IRFs).

Fish is known to produce substances with antiviral activities. In present project, an expression study of interferon regulatory genes called IRF-1 and IRF-2 was conducted on our famous cultured fish called common carp (*Cyprinus carpio*). Because of structural similarities between IRF-1 and IRF-2, both factors are placed in the same sub-family called subfamily1. Both factors are involved in the transcription of IFN-α and ß which are under the category of Type I IFNs. IRF-1 and 2 are involved in the important processes of antiviral defense, apoptosis, cell cycle regulation and maturation of various immune cells. Expression of IRF1 and IRF2 was determined in control fish tissues. Both genes showed enhanced expression in lymphomyeloid tissues like spleen, liver, gill and head kidney. IRF-1 showed most pronounced expression in gill, spleen and head kidney while IRF-2 mostly showed its expression in head kidney and spleen. Overall IRF-1 was most expressed in different tissues. Sequencing of isolated genes is going on as the next step of our project that will further used for the comparison of sequence homology among different animal groups.