

THE ROLE OF INTERLEUKINES- 6, 12 AND TUMOR NECROSIS FACTOR - ALFA IN THE IMMUNE RESPONSE TO TYPE 2 DIABETIC PATIENTS INFECTED WITH TOXOPLASMOSIS

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ABSTRACT : This study was performed on Type 2 diabetic patients infected with *Toxoplasmosis* to estimate the role of interleukine-6, interleukine-12 and Tumor necrosis factor –alfa in immune response against *Toxoplasma gondii* parasite. Study groups includes also patients infected with type 2 diabetes only 30 samples, patients infected with *Toxoplasmosis* only 30 samples and controls 30 samples. We collected samples from Thi-Qar hospitals and private laboratories in the period from 1st of November 2017 to the end of July 2018. *Toxoplasmosis* infection diagnosed by ELISA test by using kits from (Elabscience Company, U.S.A.). A total of 120 sample was infected of chronic *Toxoplasmosis* among 520 samples of type 2 diabetes mellitus. This study founded high concentration of interleukine-6 in type 2 diabetes infected with *Toxoplasmosis* then a group infected with *Toxoplasmosis* only, then a group of type 2 diabetes only compared with control which recorded lower concentration. The study founded increased concentration of interleukine 12 and TNF- α in type 2 diabetes infected with *Toxoplasmosis*, then a group of patients infected with *Toxoplasmosis* only, then a group of patients infected with type 2 diabetes only compared with control which recorded lowest concentration.

Key words : IL-6, IL-12, TNF- α , toxoplasmosis, type 2 diabetes.

INTRODUCTION

Toxoplasmosis is a parasitic infection result of *Toxoplasma gondii* an obligate intercellular parasite that infected animals from warm-blooded group. Cats and all feline family is definitive hosts while human, rats birds and some other animals is an intermediate hosts (Dubey, 2009). Infection with *Toxoplasma* happened by ingestion oocysts of parasite contaminated food or drinks, infection route also includes eating raw or undercooked meats or by contacts with soil has oocysts (Dubey, 2008). Type 2 diabetes mellitus is a chronic disease results of disturbances of carbohydrates, fats and proteins metabolism caused Hyperglycemia, this disease results of abnormalities in insulin action, secretion or both (Shaw and Tanamas, 2016; Karlove, 2013). Type 2 diabetes infected more than 90% of people from all other types of diabetes. It's called maturity onset because it's infected people in maturity age and above (DeFronzo, 2004). Interleukin play a critical role in both innate and adaptive immune response to *Toxoplasmosis*. Interleukins are small soluble proteins weight between (5-20) Kd, secreted by many cells like Macrophages, T and B lymphocytes, Mast cells, Endothelial cells and

Fibroblasts (John, 2010). Interleukine-6 is a proinflammatory cytokine induce immune response against infectious agents like parasite and injury, causing inflammation which has a critical role to resistance infection (Boulauger *et al*, 2003). IL-6 intermediate fever and acute phase proteins, IL-6 induce activity of cytotoxicity of Nk cells and Cytotoxic T-lymphocytes, IL-6 also inhibit insulin secretion from pancreas and institute in insulin resistance (Luigi *et al*, 2007).

Interleukine-12 induce the induction of interferon-gamma (INF- γ) and Tumor Necrosis Factor –alfa (TNF- α) from Nk cells. Also IL-12 intermediate differentiation of Naïve T cells to T helper 1 and reduce the induction of IL-4 which inhibit INF-d. IL-12 induce the activity of Cytotoxicity of Nk cells and CD8+ T lymphocytes, so all those responses play much important role in resistance of *Toxoplasmosis* (Newport *et al*, 2007). Tumor Necrosis Factor –alfa has a critical role in *Toxoplasma gondii* resistance. TNF- α institute in fever, Apoptotic cells death and Inflammation and inhibit cancer and viruses proliferation (Swardfager *et al*, 2010). TNF- α induce cytotoxic activity of Macrophage and play as Co-signaling with INF-d to activate Macrophages to inhibit parasite