CHAPTER 3

CONCEPTUAL FRAMEWORK AND HYPOTHESIS

Conceptual framework:

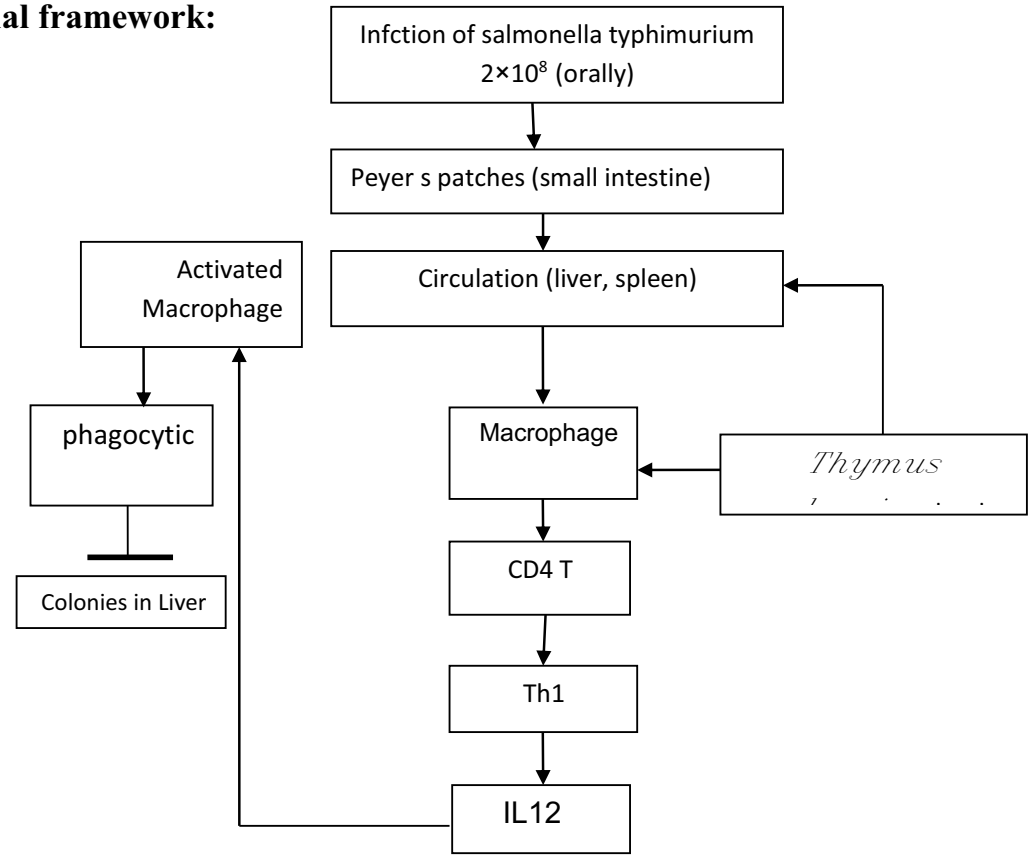

Figure3.1 Conceptual framework

3.1 Explanation of Conceptual Framework

After ingested orally and colonializing the small intestine, *S. Typhimurium* enters the epithelium of intestine and continues to the Peyer patch, the lymphoid structure which lines the intestine.The primary entrance of *S. Typhimurium* to the Peyer patch is the M cell, a special cell lining the Peyer patch which is involved in antigen sampling from the lumen of intestine to the lymphoid follicles. From the Peyer patch, S. *typhimurium* goes to the nodes of mesenteric lymph, from which S. *typhimurium* dissiminate through the lymph into the system of circulatory, causing transient bacteremia. *S. Typhimurium* is quickly removed from blood by phagocytes in the liver and spleen, and these cells kill the majority of bacteria. The first stage of this Salmonella infection, which is usually finished in a several hours, is followed by a multiple-day stage, in which bacterial intracellular multiplication occurs and bacterial titer in the spleen and the liver subsequently increases and causes a second fatal bacteremia *(Mittru¨cker et al., 2000; Salcedo et al., 2001).* After a mouth infection, Salmonella attacks M and epithelial cells and goes through Peyer's patch, nodes of mesenteric lymph, lymph vessels into the bloodstream. Alternative invasion mechanisms have been described in which mucosal dendritic (DC) cells engulfe Salmonella and transport it from the gastrointestinal tract going to the bloodstream by CD8 phagocytes *(Mastroeni and Me'nager et al., 2003).* The last infection stage is performed by the immune generation responses obtained to remove S. *Typhimurium*, and long-term immunity to reinfection *(Mittru¨cker et al., 2000).* TLR is the initial critical form of defense against bacteria attackers and plays an important role in microbial sensing *(Lizard et al., 2013)*. Especially TLR and mannose receptors, and their ligation work as stimuli of the production of nitric oxide with cells, which are toxic to bacteria. Signals by TLR stimulate the produce of IL12, which in turn encourages NK cells in order to produce IFN-γ in the early phases of the immune response.IL12 also stimulates the antigen-specific CD4 cells to produce IFN-ɣ (Murphy *et al*., 2012). Thus, *Thymus vulgaris* extract is expected to be anti-inflammatory and antimicrobial agents because the inflammation is a consequence of infection. Besides, the effect of different doses of thyme as antibacterial and immunomodulator need to be analyzed *(Picone et al., 2013).*

3.2 Research hypothesis

1) the extract of *Thymus vulgaris* increases the blood IL-12 in mice which are infected with *S. Typhimurium*

2) the extract of *Thymus vulgaris* decreases the Bacterial colonies in the Liver in mice infected which are with *S. Typhimurium*