

HISTOLOGICAL AND MORPHOMETRICAL STUDY OF THYMUS GLAND IN DIFFERENT AGES OF MALE WHITE RATS

Bashaar Rasim Karem*¹ and Seenaa Jabbooree Al-Bazi²

¹College of Education for Pure Sciences, Karbala University, Karbala, Iraq.

²College of Medicine, Karbala University, Karbala, Iraq.

*e-mail : bashaarasem@gmail.com

(Received 18 April 2019, Revised 12 August 2019, Accepted 7 September 2019)

ABSTRACT : Thymus is an organ of the central lymphatic system to develop T cells. Thymus epithelial cells (TECs) are a major component of the thymus structure, which provides a specialized microenvironment for survival, reproduction and differentiation of immature T cells. The thymus gland remains partially active during aging old, then it undergoes significant degeneration with age and the microenvironment of the thymus is replaced by adipocytes. In this study, different age groups were examined of male rats (Albino rats) in the prenatal and postnatal age groups (day 19 of fetal stage, first month after birth, second month, third month, fourth month, fifth month and sixth month) to study the histological and functional changes of thymus gland with age. Histological sections were staining with H and E revealed the significant differences in the histological composition of the thymus gland for the studied age stages. Thymus was surrounded by a thin capsule composed of connective tissue and extending from it delicate trabecular, the significant increase ($p < 0.05$) in thickness of capsule showed with age in the studied groups. On the other hand, the cortex contains a density of lymphocytes in small and medium size, which gives dark color, the thickness of the cortex decrease in the age group (fourth, fifth and sixth months). The thickness of the medulla was decrease synchronized with the aging of the studied groups. Hassall corpuscles are the final stages of differentiation epithelial cells and are commonly regarded as diagnostic features to determine the microenvironment of thymus development. The number of Hassel corpuscles increased in the early stages of thymus gland development (first, second and third months of age), as they appear in different shapes and sizes, small size consisting of one or more epithelial cells. In the groups (4 month, 5 month and 6 month), there are significantly decreased in number of Hassel corpuscles, but they were large in size and different diameters.

Key words : Thymus, prenatal and postnatal age, histological changes, rat.

INTRODUCTION

The thymus is the central immune system of mammals and other vertebrate species, which is located in the upper front of the chest cavity behind the sheath, which is responsible for the growth and maturation of T lymphocytes (Boyd *et al*, 1993). The thymus surrounds a fibrous capsule that separates it from other peripheral tissues; The trabecular consists of connective tissue with a diameter of about 0.5-2.0 micrometers, which divide the thymus into small lobules. Thus, the thymus is a lobular organ composed of an outer layer, the cortex, which consists of epithelial cells of the ventral origin, the inner layer (Rodewald *et al*, 2001). The epithelial cells of the apparent origin of lymphocytes. These epithelial cells form the thymus structure, instead of the median web; epithelial cells are called and can be classified formally and functionally into six types. In the cortex epithelial cells are of different forms forming a network that extends into the tissue of the gland that occupies the space between the lymphocytes. The medulla involves lower-

density medium-sized lymphocytes, mature T cells and connective tissue (Gordon *et al*, 2004). In the medulla, there are also some other malformed cells of the keratinocytes called the thymus particles, which are compounds of degraded epithelial cells, whose importance remains unclear, although recent data available suggest that these Hassall corpuscles participate in activities Physiological of the gland (Asghar *et al*, 2012). Mature thymus lymphocytes are left by entering the blood circulation of the capillaries within this layer and forming the T-cell group deployed in the immune system (Bodey *et al*, 2000; Lele *et al*, 2001).

MATERIALS AND METHODS

Animals

Forty-five (45) were used in different ages of male albino rat (embryonic group, postnatal group and post-puberty group). The animals were placed in Animal House of the Faculty of Veterinary Medicine, Karbala University in plastic cages for breeding rats. It is supplied with a metal cover with a front-end buckle and is supplied