Effect of Darkness and Illumination on the Pineal Gland of the Adult Male Albino Rat: Morphological and Ultrastructural Study

Randa A. Sofy [1] , Safwat W. Gergies[2], Sameh H. Doss[2] and Maha K. Adel Wahed[1]

Anatomy and Embryology Departments, Faculties of Medicine, Cairo University[2] and Fayoum University[1].

ABSTRACT

Background: The pineal gland is a neuro-endocrine tissue that secretes melatonin hormone which regulates changes of the functions of the endocrine system as well as the functions of many other systems according to the diurnal phenomenon. The aim of the current work was to study the histological and ultrastructural changes of the pineal gland according to dark and light conditions.

Material and Methods: Thirty adult male albino rats were used in the present study. The rats were subdivided into three groups (ten rats each) as follow: group I (exposure to natural diurnal changes), group II (exposure to continuous darkness for 4 weeks) and group III (exposure to continuous light for 4 weeks). Continuous darkness was accomplished by covering the animal cage by thick black cloth, while continuous illumination was achieved by putting a fluorescent lamp at a level of one meter above the animal cage. The rats were sacrificed by cervical decapitation and the entire pineal gland was extracted and processed for light and electron microscopic examination.

Results: Exposure of rats to continuous darkness or continuous illumination for 4 weeks induced observable changes of the relative population of pinealocytes type I and type II. Continuous darkness increased the number of pinealocyte type I, associated with increase

in the cytoplasmic organelles. However continuous illumination decreased the number of pinealocytes type I associated with a relative increase in pinealocytes type II.

Corresponding Author **:**Maha Khaled Abd El Wahed Hussein, Anatomy and Embryology Department, Faculty of Medicine, **Fayoum University, Egypt, e-mail: dr.mahakhald @ yahoo.com, Mobile: 01001803145.**

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