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Evaluation of the effect of Thymosinbeta 4 and transforming growth factor-β1 expression on developing dental tissue

(Experimental study on rats)

A Thesis Submitted to the Council of the College of Dentistry,at theUniversity of Baghdad,In Partial Fulfillment of theRequirements for the Degree of Master of Science in Oral Histology

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Abstract

Background: Tooth development is a physiological process requires proper environment and reciprocal interactions between oral epithelium and mesenchyme, enhancement of odotogenesisdepend on activity of growth factors and signaling molecule.

Thymosin beta4 isa biologically active peptidehaving diverse biological properties including recruitment and differentiation of progenitor stem cells into mature cells and involved in many of cellular activities and reactions.

Aim of study: To study the effect of exogenous synthetic thymosin beta4 on tooth development and study immunohistochemical expression of transforming growth factor beta 1in developing dental tissue of rats embryo.

MaterialsandMethods: Thirty six Albino wister pregnantfemale rats were used in this study and are divided into two groups:

1. Control group includes 18 female rats were received normal saline in dose 50µl as intraperitoneal injection (I.P) starting at zero time of gestation for ten days.
2. Experimental group includes 18 female rats were received exogenous synthetic Tβ4 as I.P injection in dose 50µg/300µlstarting at zero time of gestation for ten days.

   Embryos of 16thday and 18th day intra uterine life were obtained by scarifying the pregnant mothers, one day old rats obtained at time of delivery almost at 21th day of gestation.

Results

1. Histological findings

a. Experimental group including the three different periods (16thday,18th day I.U.L and 1 day post natal)show enhancement of toothgerm development with presence of multiple tooth germs in some specimens.

b. Identification of packed proliferative cells in enamel organ, dental papilla and dental sac;the last two showed theformation of numerous blood vessels.

c. Acceleration of apposition of dental enamel and dentin.

Statistical evaluations of the mean of enamel organ, dental papilla and dental sac cells record a highly significant value for both control and experimental groups with different periods.

For enamel organ, dental papilla and dental sac cells the experimental group regarding the studied period presented a highly significant difference in comparisons to control.

Immunohistochemical findings: high positive expression of TGF β1 by odontoblast, ameloblast and osteoblast in experimental group with highly significant difference in comparison to control group.

Conclusions: The present results give an attention to the initiator effect of exogenous synthetic thymosin beta 4 on rat anterior teeth development.