ULTRASTRUCTURE OF HUMAN THYROID

A STUDY OF NORMAL THYROID, UNTREATED AND TREATED DIFFUSE TOXIC GOITER

BY

PETER HEIMANN

ACTA ENDOCRINOLOGICA
Supplementum 110
Accompanies Vol. 53.

GÖTEBORG
ELANDERS BOKTRYCKERI AKTIEBOLAG
1966
Translated by
Norman Lewis
Numerous histological investigations have shown that the morphology of the thyroid is principally the same in all mammals (Bargmann, 1939). Light as well as electron microscopical studies have however revealed certain differences between various species concerning the appearance of the follicle as well as the morphology of the individual follicle cell. This means that the results of electron microscopical investigations of the thyroid of laboratory animals cannot be directly applied to the human thyroid.

The main purpose of the present investigation is to elucidate the ultrastructure of the human thyroid in diffuse toxic goiter. However, as such an investigation is of little significance if the observations cannot be compared with the ultrastructural appearance of the normal gland, the study also comprises an account of the normal human thyroid. Furthermore, since several kinds of medical treatment of thyrotoxicosis result in clinical euthyroidism, a study on the ultrastructure of variously treated toxic goiter is included.

An investigation for this purpose seems justified for several reasons. First of all, electron microscopical studies on diffuse toxic goiter are completely lacking and accounts on the ultrastructure of the normal human thyroid are very scanty. Furthermore, the increased knowledge during recent years of the physiological role of various subcellular components has afforded opportunities to estimate functional disturbances in the cell on the basis of its ultrastructure. This possibility seems to be of special value in the present study with respect to the fact that the mechanism for the thyroid stimulation in thyrotoxicosis is not understood.

In this investigation the interest has been concentrated on the architecture of the follicle and the structure of the individual follicle cell. The study consequently does not embrace all the interfollicular structures such as larger blood vessels and nerves, nor the parafollicular cells. With regard to the wide problem, requiring examination of all follicular cell structures, and large material, comprising three different groups, it has been necessary to confine the electron microscopical analysis to a moderate resolution level.

Preliminary results of this investigation have earlier been presented by Heimann & Ekholm (1963, 1966) and by Heimann (1965 a and b).