A STUDY OF A STRAIN OF ALBINO MICE WITH REGARD TO SUITABILITY FOR INVESTIGATIONS OF THE ROLE OF THE ADRENAL CORTEX IN MAMMARY GLAND GROWTH

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by

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P R E F A C E

The experiments reported in this thesis were carried out in the hope that they might assist in the clarification of the role of the endocrine system in the regulation of mammary gland development. A large part of the work was concerned with the elucidation of the general effects of adrenal insufficiency in mice, and with the maintenance of adrenalectomised mice by the injection of cortisol acetate. It is hoped that the results obtained with these mice will be of some assistance in future studies of the endocrine control of the growth of the mammary glands in mice, where it is dersired to exclude any influence mediated by, or originating from the animal's own adrenal cortex.

This study was prompted by Dr. D.S. Flux, to whom the author is indebted for guidance, encouragement, and patient instruction.

The advice of Professor I.L. Campbell, in whose department the work was carried out, and the assistance of Mr D.J. Myers are gratefully acknowledged.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Scope of the Investigation

The role of the adrenal cortex in the growth of the mammary gland has been investigated by a number of workers, and the relevant studies have been most recently reviewed by Flux (1953, 1954) and by Folley (1955). The majority of published investigations utilised the rat as an experimental animal. The influence of adrenal steriods upon mammary development in the mouse (Flux, 1954) appeared to differ from that in the rat (Selye, 1954 a,b). Accordingly it was decided to extend the scope of previous investigations of the part played by the adrenal cortex in the growth of the mammary glands in the mouse.

Logically, any examination of the function of the adrenal cortical hormones in mammary growth should be preceded by an enquiry into the more general effects of alterations in the level of the normal spectrum of adrenal steroids. The greater part of this study is concerned with elucidation of the reaction of mice to bilateral adrenalectomy, and--in order that mammary growth could be studied in the adrenalectomised mouse---with the evaluation of the influence of certain factors upon the ability of the operated animal to survive. In Chapter V attention is directed towards the mammary gland. The experiment described, however, is to be regarded as preliminary; the final stage in the accumulation of information sufficient to allow the investigation of the effect of different factors on the mammary gland, without the complication of possible effects mediated by the adrenal cortex.

Presentation of Results

Where possible the results of experiments, and the details of statistical examinations of these data, are presented in tables removed from the text. The procedure followed is to include tables of mean values, together with the results of statistical tests, in the body of the thesis and to place tables of original data and detailed analyses of variance in the appendix. Tabular material is arranged so that it can be consulted in conjunction with the relevant portions of the text.