

PINK DISEASE (ACRODYNIA). A PHYSIOLOGICAL APPROACH.
(AN EVALUATION OF ADRENAL FUNCTION AND THE
IMPORTANCE OF WATER AND ELECTROLYTE METABOLISM).

By Donald B. Cheek.



Appended Papers:

- (1) PINK DISEASE: AN INVESTIGATION OF ITS CAUSE AND TREATMENT.
- (2) PINK DISEASE: ITS NATURE PREVENTION AND CURE. (CASE REPORTS ONLY).
- (3) THE IMPORTANCE OF THE SUPRARENAL GLAND IN DISEASES OF INFANCY AND CHILDHOOD WITH PARTICULAR REFERENCE TO PINK DISEASE.
- (4) PINK DISEASE: THE MANIFESTATION IN OLDER CHILDREN AND THE ESTIMATION OF THE BLOOD ADRENALINE CONTENT.
- (5) EVIDENCE OF ADRENAL CORTICAL FUNCTION IN PINK DISEASE.
- (6) EXTRA RENAL BASIS OF ALKALOSIS IN POTASSIUM DEFICIENCY.
- (7) A METHOD FOR THE ESTIMATION OF THE BROMIDE SPACE.

PINK DISEASE (INFANTILE ACRODYNIA) -

A PHYSIOLOGICAL APPROACH. (AN EVALUATION OF ADRENAL
FUNCTION AND THE IMPORTANCE OF WATER AND ELECTROLYTE
METABOLISM)

A THESIS

BY

DONALD B. CHEEK.

Foreword.

This thesis represents the results of research carried out over a period of 3 years. Firstly is presented the results of biochemical, physiological, clinical and pathological investigations into the nature of pink disease. Secondly this thesis embodies the results of work done in the field of electrolyte and water metabolism performed in the Department of Pediatrics, Yale University School of Medicine, New Haven, Connecticut, the United States of America. This latter year's work was carried out under the guidance of Professor Daniel C. Darrow and with the aid of a medical research fellowship (Rotary International Foundation).

Research concerning pink disease was initially begun as a private endeavour, but subsequent support of this work was given by the National Health and Medical Research Council of Australia, and also by the University of Adelaide. In the earlier stages of this work the author was given facilities to work in the Department of Physiology of this university. Although assistance, facilities and nursing staff were not at hand for complete metabolic studies at the

Adelaide Childrens Hospital, the valuable cooperation and assistance of the Board of Honouries of this hospital, and of Marseba Babies Hospital are gratefully acknowledged. Proper facilities for plasma mineral determinations were available only at the Waite Agricultural Institute in Adelaide, and these were generously carried out by the Division of Soils of the Commonwealth Scientific and Industrial Research Organization.

Interest in the problem of pink disease began while this author was a Resident Medical Officer at the Adelaide Childrens Hospital. Such interest was fostered by cases of this disease which were presented during this period of clinical training, and by the exasperating and pernicious nature of this obscure condition.

A child of five and a half years of age suffering from "florid" pink disease - a considered rarity - came under the care of this author. This led to a study of the age incidence of this disease, which in itself proved stimulating and provoking (vide reference (1 a) - this paper is not appended).

A physiological approach (which had hitherto been neglected) was the course chosen by this author. At the outset it seemed that there could be some disturbance of electrolyte or mineral metabolism, perhaps related to that important mediator of homeostasis, the adrenal gland. It was then, with these ideas in mind, that this author began work in the laboratory of the Adelaide Childrens Hospital, some little time before help, information, or financial aid were sought.

It should be pointed out that because pink disease is uncommon,

the undertaking to study this disease was not simple, and often necessitated long journeys into all parts of the State of South Australia.

The results of this work have been published in full, and are submitted as five appended papers. The interpretation of the results obtained has hitherto been to some extent difficult, and has caused some speculation and confusion.

It is fit and proper, therefore, that acknowledgment should be made to Professor Daniel G. Darrow and Robert E. Cooke of the Yale University School of Medicine; for these men, authorities in the field of electrolyte and water metabolism, have been of help in elucidating the interpretation of results obtained. They have therefore led this author to a correct approach to the available evidence, which is the context of this thesis. Recent studies have failed to confirm the consistently low sodium concentrations reported by this author. Since the method used was not as reliable as other methods, it will be considered that some of these values are erroneously low and conclusions will not be based on these findings. For obvious reasons, therefore, the case reports alone of the second appended paper are presented, and the theoretical interpretations and hypothesis of primary adrenal glandular involvement and insufficiency are excluded. In the light of subsequent work, such a hypothesis is untenable. Reference to any significance relating to constantly low serum sodium values is likewise deleted.

It is felt that this work which yields a new approach to pink disease also provides important facts which subsequently will fit into the correct aetiological pattern when the exact state of body water and electrolyte has been defined.

The sixth appended paper in which this author has been a collaborator, is based on some 2,500 separate chemical determinations.

The seventh appended paper is an independent project undertaken, and it is felt that this should prove of future value in both the clinical and research field. Although research into the field of electrolyte and water metabolism has provided this author with an insight into this particular field, it has been unfortunate that the extreme rarity of pink disease in the state of Connecticut has prevented the present extension of this clinical project.

Throughout the duration of the study of pink disease, this author wishes to acknowledge the help and inspiration of a friend and colleague, Basil S. Hetzel, and also the encouragement given by Professor Sir G. Stanton Hicks.