
THE COMPARATIVE

MORPHOLOGY OF

THE CAROTID BODY

AND CAROTID SINUS

By

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DEDICATION

TO THE MEMORY OF
MY FATHER
GEORGE JOSEPH ADAMS
M.D., F.R.C.S., F.R.C.P. (Edin.)
and
TO MY FORMER CHIEF
WILLIAM PERCY GOWLAND, M.D., F.R.C.S. (Lond.)
Emeritus-Professor of Anatomy in the
University of Otago

PREFACE

Whereas several books are available on the physiology of the carotid body and carotid sinus, the worker in this field has at hand no ready book of reference on the anatomy of these structures, and their homologues in the lower vertebrates. The most comprehensive comparative survey of this region is to be found in Professor Erik Ask-Upmark's monograph—*The Carotid Sinus and the Cerebral Circulation*—which in some respects is concerned with wider issues, and in others is more restricted in its scope, in that it is almost entirely macroscopic, and furthermore deals very cursorily with the carotid body. On the other hand, Dr. P. de Boissezon, in his book *La Zone Réflexogène Carotidienne*, discusses in considerable detail the comparative anatomy, histology and embryology of the carotid body and carotid sinus, but has confined himself solely to the mammals. The same applies also to the works of Professor de Castro and Professor Meijling, while the monograph of Professor Watzka (1943) deals purely with developmental and histological aspects, particularly of the carotid body.

My aim here is to overcome this deficiency by considering, as far as possible, the morphology of the carotid fork throughout the vertebrate series. Since there is no comprehensive review in English of this field, I have thought it worthwhile to include an historical survey of the development of our knowledge, not only of the anatomy, but of the physiology of this important region.

I realise that by restricting myself to the carotid bifurcation, it may be felt that I am unwisely neglecting ancillary aspects (such as the "rete mirabile caroticum" and the aortic bodies and aortic depressor region) which may have important physiological associations with the carotid reflexogenic zone. But I did not feel competent to extend the scope of the work into fields in which I have not worked myself, particularly so in view of the present state of our knowledge of the comparative physiology of the cerebral circulation.

Within this somewhat limited framework, then, I have attempted to review comprehensively and in detail, all the work which bears

on the anatomy, development and histology of the carotid body and carotid sinus in the mammals, and of the homologous regions in the other classes of vertebrates. Yet I have not hesitated to discuss functional aspects where these seem relevant to the matters under discussion.

I have endeavoured to make the bibliography as complete as possible, to relieve others of the tedium of searching for details of obscure references which are, very often, only incompletely cited in most papers. In this connection I owe much to the comprehensive bibliographies in the papers of Svitzer (early historical), Professors Kohn, de Castro, Ask-Upmark, Meijling and Watzka; but even these sources are not exhaustive, and many references have turned up in the course of my work which appear to have been generally overlooked in the past. Nevertheless, it would be presumptuous of me to regard my own bibliography as complete, in spite of my earnest attempt to make it so.

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Throughout the course of my work and the preparation of this book, I have had help, encouragement and advice from so many people that it would be impossible to name them all. The fact that I do not mention them all by name does not detract from my sincere appreciation of their kindness and assistance for which I would like to thank them here.

To certain persons I owe a particular debt because they have unselfishly devoted very considerable time, energy and expense to assist me in one way or another. Mr. W. R. LeFanu, Librarian of the Royal College of Surgeons of London, has made it possible for me to give an accurate account of the early history, by searching out the appropriate references from the original sources, and providing me with microfilms of them; he has also given considerable help in checking and correcting numerous references for me, as well as in various other ways. Professor Giulio Muratori, of the University of Ferrara, has very generously, and unsparingly, given me similar assistance with regard to Italian references and other relevant matters. Dr. Takashi Ito (Nagoya University) has helped over a long period by supplying me with translations and summaries of original papers published in Japanese, and keeping me in touch with Japanese work in my field. I owe a great deal to the continued cooperation of these gentlemen and I wish to record my sincere appreciation here. I also wish to acknowledge the stimulus I have had from discussion (by correspondence) of various aspects of the subject with Professor Erik Ask-Upmark, of the University of Uppsala, and with Professor Alfred Kohn, who, although now in his ninety-first year, still retains a remarkable interest in this field in which he has played such a prominent part. (Nevertheless, it must be understood that the opinions I express and the interpretations made are entirely my own responsibility.)

A work such as this, carried out in a young country like New Zealand, in which the majority of the bibliographic sources have been unavailable, has had to depend more than usually on the

cooperation of our own and other libraries. I would like particularly to express my appreciation of the help I have had from Mr. H. D. Erlam, the Librarian, and his assistant, Miss E. Murray, of the Medical School Library, University of Otago, and from Mr. D. G. Esplin, Reference Librarian of the University of Otago Library, who has always been most considerate not only in the matter of obscure and difficult references but in many other ways. And I am equally grateful to all those who have from time to time provided me with reprints, or microfilms, of their papers.

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SINUS**

PART I
MAMMALIA

