FOREWORD

The mast cell can be defined as a connective-tissue cell which is capable of elaborating
basophilic, and often metachromatic, granules in its cytoplasm. Satisfied, as we usually are, with one function for each type of cell, it seemed entirely appropriate that the first convincing function for the mast cell should be stated in terms of its known biochemical and morphological attributes. Thirty years ago, Scandinavian workers showed that the basophilic, metachromatic component of the granule is heparin. It seemed then that the ‘Riddle of the Mast Cell’ had been solved.

Today, we are not so sure. The expert in blood-clotting no longer requires heparin to balance his complex equations: some heparins, indeed, are almost devoid of anticoagulant activity. Moreover, we now know that the mast cell forms and stores much more than a mucopolysaccharide with anticoagulant properties. Histamine (all higher vertebrates), 5-hydroxytryptamine (mouse and rat) and proteases are manufactured by the mast cell and are released when the cell is injured.

There can hardly be another cell of which it can be said that the more we come to know about its contents, the less certain we are of its function. One is left with a suspicion that in our researches some fundamental aspect of mast-cell physiology has been overlooked.

The interest of Dr. Fernex in the mast cell began in an unusual and refreshing way. He observed that Africans in the Senegal have many more mast cells in myocardium and skin than are to be found in a comparable group of Europeans. Why? Why should there be an apparent ethnological distribution of the tissue mast cells? Can this be related to any other difference in the two groups? The African is more prone to the formation of keloid in the skin and displays, in general, a hyper-reactivity of the connective tissues not seen in Europeans. He is less prone to develop atherosclerosis; myocardial infarction is extremely rare. He usually has a high content of eosinophils in his blood. Is there anything to link these various observations? Can it be the mast cell?

VI Foreword

In order to establish a base-line for future work, Dr. Fernex began his investigations on the Wistar rat, and almost immediately discovered that tissue mast-cell counts and blood eosinophil levels are both significantly increased in rats infested with helminths. Here, at the outset, is a possible explanation for the observed differences between Africans and Europeans. Turning next to conditions in man, Dr. Fernex first reviews the mastocytoses, local and general, and this prompts him to consider
more fully the role of the mast cell in connective tissues. Here, his knowledge of tropical medicine suggests many ways in which the mast cell may be an index, or even a cause, of the curiously reactive connective tissue in the African.

Thereafter, Dr. Fernex considers a possible relationship between the mast cell and lipid metabolism. Of especial interest to the clinician is his analysis of the mast-cell status of the myocardium in cases of coronary occlusion. Here the evidence strongly suggests that a high mast-cell count in the myocardium is associated with freedom from infarction. And since histamine from mast cells can stimulate a local eosinophilia in man, Dr. Fernex suggests that a high blood eosinophilia may be a pointer in the same direction. These are interesting ideas. The reader may not agree with all that Dr. Fernex has to say. Nevertheless, his mind cannot fail to be stimulated. What more can one ask of any hypothesis?

Dundee, January 1967

James F. Riley

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PREFACE

'Mast cells and blood basophils are dealt with rather summarily in the majority of text-books and manuals of Internal Medicine. This is
unjust as there is hardly any other cell of tissues or blood about which so many biochemical and functional data are available' (Braunsteiner and Thumb, 1963).

In histological and histopathological studies the hematoxylin-eosin staining method is generally used; this fails to stain the mast cells. Many physicians have thus never had occasion to see a mast cell and have been unable to form an opinion on these cells which, nevertheless, are present in varying numbers in the connective tissue of all organs.

The finding of an increased concentration of mast cells in the myocardium and in the skin of Senegalese in comparison to those tissues in Europeans, provided the impulse to study the cause of such a difference, due to ethnological or geographical factors, and to investigate the consequences of an increase or of a decrease of the number of mast cells in the organism.

Part of this work has been carried out in experimental animals, part in man. As other workers have already discussed, this led inevitably to a consideration of the role of the eosinophil, which has some functional link with the mast cell. Correlation between mast-cell number or activity and lipid metabolism, atherosclerosis and connective-tissue repair were also observed. Curiously enough, there is as yet no entirely satisfactory hypothesis to cover the functions of these cells. It is hoped therefore that the present report will add to the store of knowledge by which the 'Riddle of the mast cell' will eventually be solved.

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given fatty acids under influence of mast-cell stimulation.

I wish to place on record the debt of gratitude which I owe to Dr. P. Dorolle, Permanent Associated Director of World Health Organisation, Geneva, who permitted by means of a grant very valuable and friendly collaboration with Dr. H. Sternby in the Department for Pathology of Prof. Linell, Malmö, on the special problem of mast cells and coronary diseases.

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To Solange
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