The Cohen Diabetic Rat

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Editors: A.M. Cohen; E. Rosenmann, Jerusalem

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Preface
Since von Mehring and Minkowski conducted their famous studies in dogs just 100 years ago in 1889 and discovered that the removal of the pancreas resulted in diabetes mellitus, many other animal models have been used to try and reach a better understanding of the disease in humans. This holds true mainly for type I diabetes, although the great majority of human diabetics suffer from type II of the disease. Because of its continuing increase worldwide and the fact that its pathophysiology is in many respects still unknown, animal models of type II diabetes may still be of great importance for future research in diabetology. Therefore, the long-standing work of A. M. Cohen using nutritional and genetic mechanisms for developing a rat strain with the characteristics of type II diabetes is of great scientific interest for several reasons. The animal model described is based on the unique epidemiological and clinical observations which were made in some Jewish communities with people who had immigrated to Israel from a completely different environment, namely Kurdistan and Yemen. Upon their arrival the prevalence of Diabetes mellitus was 0.06 and 0.0 % in the two populations respectively. In Israel they joined Jewish settlers of the same ethnic groups who had already lived for more than 25 years in this part of the Western world, were therefore integrated into its customs and daily life, and who exhibited a prevalence towards diabetes of 2 - 3 %.

This fascinating historical background, which is described in detail by Professor Cohen in the first chapter of this volume, created the idea of introducing an animal model which would allow the development of Diabetes mellitus on the basis of endogeneous (genetic) and environmental (nutritional) factors to be studied. The similarity of this model to human type II diabetes is the aspect which was the most intriguing and which raised so much interest in the past as well as providing an impetus for further studies. On the one hand, it allows an examination of the various factors from the point of view of genetics, and on the other hand the role of environmental factors such as food composition and the importance of trace elements could be assessed. Furthermore, the model gives a deeper insight into glyconeogenesis, lipogenesis, hyperinsulinemia - which later turns into hypoinsulinemia -, insulin resistance, and insulin receptor function, etc. in a way which is not possible in human beings. In addition, the Cohen diabetic rat is a very suitable model for obtaining more exact information on the pathophysiology and histopathogenesis of late complications involving the kidneys, eyes, nerves, testes, and the skeletal system, etc., since these diabetic changes eventually develop in the animals after manifestation.
of the disease and resemble the human lesions very closely. Finally, therapeutic interventions are discussed in this book ranging from the administration of insulin or sulfonylureas to glycosidase inhibitors and even to the transplantation of islets. The latter treatment may provide an insight into the function of the endocrine pancreas in this model and may help to understand not only the role of this gland but also of the peripheral tissues in type II diabetes. It is A.M. Cohens great merit, that together with his colleagues at the Hebrew University Hadassah Medical School, he has pertinaciously elaborated the numerous biochemical, pathophysiological, morphological and functional characteristics of this animal type of diabetes, which not only is already helping us towards a better understanding of human type II diabetes today, but has also provided us with a firm basis for future studies. Therefore, we hope this book will not only be of interest to those colleagues interested in experimental and spontaneous diabetes in animals, but that it will also encourage younger scientists to begin their own work in search of better answers to the many open questions regarding diabetes mellitus.

K. Federlin