Diabetes and Protein Glycosylation

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Measurement and Biologic Relevance

With a Foreword by Harold Rifkin

With 32 Figures

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**To Louis and Tillie Panush
and to Perry, Michael, Daniel,
and Jonathan Cohen**

Foreword

In the years since the initial discovery that blood from diabetic patients contains increased amounts of a posttranslationally glucosylated form of hemoglobin (hemoglobin A_{1c}), an impressive number of studies have clarified and expanded the use of glycohemoglobin levels to assess disease status. Many other structural proteins have been shown to undergo similar changes, including proteins from tissues most commonly affected in diabetes (e.g., lens, aorta, peripheral nerve, basement membrane). Thus, the nonenzymatic glycosylation of hemoglobin emerges as an invaluable model for the pathogenesis of certain chronic diabetes complications.

In addition to reviewing a wealth of investigative possibilities in the area of these chronic complications—including eye, kidney, nerve, and vascular disease—Dr. Cohen indicates how enhanced nonenzymatic glycosylation in uncontrolled diabetes underscores the pressing need for maintenance of long-term euglycemia.

Dr. Cohen is an endocrinologist and diabetes specialist whose research activities have largely focused on the chemistry and metabolism of the basement membrane in diabetes. This superb monograph on nonenzymatic glycosylation clearly shows the major trends of her past and present research and clinical activities.

This book is beautifully written and a pleasure to read. It provides great insight into the mechanisms of the pathogenesis of the compli-

cations of diabetes and should be of immense value not only to basic and clinical investigators, but also to internists, diabetologists, and endocrinologists in clinical practice.

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Preface

Nonenzymatic glycosylation of proteins, long known to food chemists as the “browning” reaction, has become the subject of a surge of interest that has made its biologic relevance—particularly in diabetes—increasingly clear in recent years. Hyperglycemia promotes the enhanced nonenzymatic glycosylation of both circulating and tissue proteins, thereby not only allowing the assessment of diabetes control through determination of glycohemoglobin and glycoalbumin levels, but also providing insight into the pathogenetic mechanisms associated with the chronic complications of diabetes, as well as with the aging process.

Diabetes and Protein Glycosylation: Measurement and Biologic Relevance was written with the conviction that the crucial role of glucose in the pathogenesis of diabetic complications can no longer be ignored. A comprehensive discussion of the chemistry, methods for measurement, clinical use and abuse, and pathophysiologic consequences of non-enzymatic protein glycosylation should be of value to all physicians concerned with the diagnosis and management of diabetes and to clinical and basic science investigators interested in the biochemical basis of the disease's sequelae.

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February 1986

M.P. COHEN

Contents

1. Introduction	1
References	3
2. Chemistry	5
Condensation of Glucose With Proteins	5
Other Monosaccharides	9
Modifying Factors	10
Maillard Browning	12
References	14
3. Measurement	17
Circulating Proteins	17
Tissue Proteins	29
References	35
4. Clinical Use	43
Monitoring Glycemic Control	43
Diagnosis	49
Pregnancy	52
Complications of Diabetes	55
References	58

5. Pathophysiologic Significance	67
Blood Components	67
Enzymes and Hormones	77
Tissue and Structural Proteins	79
Advanced Glycosylation End Products	94
References.....	101
 Bibliography.....	 113
Index	137