"Forget *Sugar Busters.* Forget *The Zone.* Read this book."
—JEAN CARPER, best-selling author of *Food: Your Miracle Medicine*, on *The Glucose Revolution*

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The NEW GLUCOSE Revolution

COMPLETELY REVISED AND EXPANDED

The Authoritative Guide to THE GLYCEMIC INDEX —the Dietary Solution for Lifelong Health

THE SCIENTIFICALLY PROVEN PLAN THAT HELPS YOU TO:

- Lose Weight
- Control Blood Sugar
- Tackle Syndrome X
- Reduce Your Risk of Heart Disease
- Manage Type 1 and Type 2 Diabetes

Jennie Brand-Miller, Ph.D. • Thomas M. S. Wolever, M.D., Ph.D.
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Recipes by Kaye Foster-Powell and Lisa Lintner

Adapted by Johanna Burani, M.S., R.D., C.D.E.

MARLOWE & COMPANY
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THE NEW GLUCOSE REVOLUTION:
The Authoritative Guide to the Glycemic Index—the Dietary Solution for Lifelong Health

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Praise for the first edition of
THE GLUCOSE REVOLUTION

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"The concept of the glycemic index has been distorted and bastardised by popular writers and diet gurus. Here, at last, is a book that explains what we know about the glycemic index and its importance in designing a diet for optimum health. Carbohydrates are not all bad. Read the good news about pasta and even—believe it or not—sugar!"

—ANDREW WEIL, M.D., University of Arizona College of Medicine,
author of *Spontaneous Healing* and *8 Weeks to Optimum Health*

"Forget *Sugar Busters*. Forget *The Zone*. If you want the real scoop on how carbohydrates and sugar affect your body, read this book by the world's leading researchers on the subject. It's the authoritative, last word on choosing foods to control your blood sugar."

—JEAN CARPER, best-selling author of
Miracle Cures, Stop Aging Now!, and *Food: Your Miracle Medicine*

"Mounting evidence indicates that refined carbohydrates and high glycemic index foods are contributing to the escalating epidemics of obesity and type 2 diabetes worldwide. This dietary pattern also appears to increase the risk of heart disease and stroke. The skyrocketing proportion of calories from added sugars and refined carbohydrates in westernized diets portends a future acceleration of these trends. *The Glucose Revolution* challenges traditional doctrines about optimal nutrition and the role of carbohydrates in health and disease. Brand-Miller and colleagues are to be congratulated for an eminently lucid and important book that explains the science behind the glycemic index and provides tools and strategies for modifying diet to incorporate this knowledge. I strongly recommend the book to both health professionals and the general public who could use this state-of-the-art information to improve health and well-being."

—JOANN E. MANSON, M.D., Dr.P.H., Professor of Medicine,
Harvard Medical School, and Co-Director of Women's Health,
Division of Preventive Medicine, Brigham and Women's Hospital

"Here is at last a book explaining the importance of taking into consideration the glycemic index of foods for overall health, athletic performance, and in reducing the risk of heart disease and diabetes. The book clearly explains that there are different kinds of carbohydrates that work in different ways and why a universal recommendation to "increase the carbohydrate content of your diet" is plainly simple and scientifically inaccurate. Everyone should put the glycemic index approach into practice."

—ARTEMIS P. SIMOPOULOS, M.D., senior author of *The Omega Diet*
and *The Healing Diet* and President,
The Center for Genetics, Nutrition and Health, Washington, D.C.

"*The Glucose Revolution* is nutrition science for the 21st century. Clearly written, it gives the scientific rationale for why all carbohydrates are not created equal. It is a practical guide for both professionals and patients. The food suggestions and recipes are exciting and tasty."

—RICHARD N. PODELL, M.D., M.P.H., Clinical Professor, Department of Family Medicine, UMDNJ-Robert Wood Johnson Medical School, and co-author of *The G-Index Diet: The Missing Link That Makes Permanent Weight Loss Possible*

"Although the jury is still out on the utility of the glycemic index, many of the curious will benefit from a careful reading of this book, and some will find that the glycemic index is particularly helpful for them. Everyone can enjoy the recipes, some of which are to die for!"

—JOHANNA DWYER, D.Sc., R.D., editor of *Nutrition Today*

"The glycemic index is a useful tool which may have a broad spectrum of applications, from the maintenance of fuel supply during exercise to the control of blood glucose levels in diabetics. Low glycemic index foods may prove to have beneficial health effects for all of us in the long term. *The Glucose Revolution* is a user-friendly, easy-to-read overview of all that you need to know about the glycemic index. This book represents a balanced account of the importance of the glycemic index based on sound scientific evidence."

—JAMES HILL, Ph.D., Director, Center for Human Nutrition, University of Colorado Health Sciences Center


The NEW
GLUCOSE
Revolution

Other **GLUCOSE REVOLUTION** Titles

The Glucose Revolution Pocket Guide to the Top 100 Low Glycemic Foods

The Glucose Revolution Pocket Guide to Diabetes

The Glucose Revolution Pocket Guide to Losing Weight

The Glucose Revolution Pocket Guide to Sports Nutrition

The Glucose Revolution Pocket Guide to Sugar and Energy

The Glucose Revolution Pocket Guide to Your Heart

The Glucose Revolution Pocket Guide to the Glycemic Index and Healthy Kids

The Glucose Revolution Pocket Guide to Children with Type 1 Diabetes

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Forthcoming

The New Glucose Revolution Pocket Guide to the Top 100 Low Glycemic Foods

The New Glucose Revolution Pocket Guide to Diabetes

The New Glucose Revolution Pocket Guide to Losing Weight

The New Glucose Revolution Pocket Guide to the Complete Glycemic Index Values

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What Makes My Blood Sugar Go Up . . . And Down? And 101 Other Frequently Asked Questions About Your Blood Glucose Levels

Introduction

THE RIGHT KIND of carbohydrate can make an important contribution to the quality of your life: That was the essential message of the original edition of this book, and now, in *The New Glucose Revolution*, that message is more relevant to more people than ever before.

The New Glucose Revolution is about the glycemic index, which is simply a measure of carbohydrate quality—the degree to which the carbohydrates in different foods will raise blood-glucose levels. A knowledge and appreciation of the glycemic index will help you choose the right amount of carbohydrate and the right sort of carbohydrate for your health and well-being. The glycemic index—and its newer companion value, the glycemic load, which we discuss in this book—is relevant for everyone. People with diabetes, heart disease, the metabolic syndrome (Syndrome X), or an interest in controlling their weight will gain the most from putting into practice the findings and recommendations of *The New Glucose Revolution*. But it's also for those who want to do the best they can to prevent these problems in the first place, and to improve their overall health.

In 1996, we wrote *The Glucose Revolution*, the first book about the glycemic index (which we abbreviate as GI), the health breakthrough that revolutionized the way people approach their diet. Six years later *The Glucose Revolution*, *The Glucose Revolution Life Plan*, and a series of pocket guides are worldwide best-sellers.

In the years since, researchers around the world, including us, have continued to investigate the glycemic index, and we've received thousands of letters and e-mails, with useful feedback from readers all over the world about our earlier books. Now, *The New Glucose*

Revolution presents the most comprehensive, up-to-date information about the glycemic index and its application in the lives of everyone interested in their food choices.

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THE GLYCEMIC index (GI) is a physiologically based measure of carbohydrate *quality*—a comparison of carbohydrates (gram for gram) based on their immediate effect on blood-glucose levels.

- **Carbohydrates that break down quickly during digestion have high GI values. Their blood-glucose response is fast and high.**
- **Carbohydrates that break down slowly, releasing glucose gradually into the blood stream, have a low glycemic index.**

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Most people have some notion of how blood "sugars" (in truth, glucose) rise and fall throughout the day. However, much of the information currently in print about food and blood glucose is wrong. *The New Glucose Revolution* tells you the true story about the connection between carbohydrate and blood glucose.

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- **The blood-glucose response to a meal is primarily determined by its carbohydrate content.**
- **Both the quantity and quality of carbohydrate in the food influence the rise in blood glucose.**
- **Meals containing the same amount of carbohydrate can produce either high or low effects on blood glucose, depending on the type (or quality) of carbohydrate. In other words, its GI value.**

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Our research on the glycemic index began in the 1980s when

health authorities all over the world began to stress the importance of high-carbohydrate diets. Until then dietary fat had grabbed all the public and scientific attention (and to some extent this is still true). But low-fat diets are by their very nature *automatically* high in carbohydrate. Nutrition scientists started asking questions: Are all carbohydrates the same? Are all starches good for health? Are all sugars bad? In particular, they began studies on the effects of carbohydrates on blood-glucose levels. They wanted to know which carbohydrate foods were associated with the least fluctuation in blood-glucose levels and the best overall health, including reduced risk of diabetes and heart disease.

An overwhelming amount of research on the glycemic index over the past twenty years shows that different carbohydrate foods have dramatically different effects on blood-glucose levels. These differences have important implications. We have played a significant role in validating and testing the glycemic index in the context of diabetes management, weight and appetite control, and sports. We know from our own experience and from letters from our readers that understanding the glycemic index of foods makes an enormous difference to people's lives. For some it means a new lease on life.

Scientists around the world, including our laboratories, have now tested the glycemic index of hundreds of foods, both singly and in mixed meals (meals that consist of a number of foods), and carried out long-term studies on its potential to improve diabetes control. Studies in the United States have shown that consuming low-glycemic-index foods is associated with a lower risk of both type 2 diabetes and coronary heart disease.

It is now obvious, not only to us, but to many expert committees and health authorities around the world, that the glycemic index of foods has implications for *everybody*. It is indeed a "Glucose Revolution" in that it has changed forever the way we think about carbohydrates.

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The Glucose Revolution Helps People:

- **with type 1 diabetes**
- **with type 2 diabetes**
- **with gestational diabetes (diabetes during pregnancy)**
- **who are overweight**
- **who have a normal weight but too much fat around the middle (abdominal overweight)**
- **whose blood-glucose levels are higher than desirable**
- **who have been told they have pre-diabetes, "impaired glucose tolerance," or a "touch of diabetes"**
- **with high levels of triglycerides and low levels of HDL-cholesterol**
- **with Syndrome X (the insulin resistance or metabolic syndrome)**
- **who suffer from polycystic ovarian syndrome**
- **who want to prevent all of the above and live a healthier life!**

In all these conditions, high blood glucose levels are a key feature. High blood-glucose levels are undesirable and have both short- and long-term adverse effects.

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The New Glucose Revolution gives people with diabetes a new lease on life, freeing them from hard-to-follow, misguided, and often counterproductive dietary restrictions. Many people with diabetes find that, despite doing all the right things, their blood-glucose levels remain too high. *The New Glucose Revolution* provides the knowledge and know-how to choose the right kind of carbohydrate for optimum blood-glucose control.

The glycemic index is part of the solution to high blood glucose.

We also provide advice on choosing the best carbohydrates for weight reduction, the ones that give you control over hunger pangs, those that minimize insulin levels and help you burn fat. By preventing weight gain as we age, we give our body the best chance of avoiding diseases such as diabetes and heart disease. In this connection, we discuss high-protein diets and Mediterranean diets. We provide a clear scientific rationale for choosing between all the different types of diets that are described in the popular press.

The New Glucose Revolution also helps answer your questions about diet in pregnancy and childhood, specifically diseases such as polycystic ovarian syndrome (a form of infertility closely linked to insulin resistance) and celiac disease.

We argue more strongly than ever that the glycemic index is for *everybody, every day, every meal.* The scientific evidence that the glycemic index is important for health is now beyond dispute and goes much further than we ever imagined ourselves.

We give you all the details on the New Glucose Revolution, plus new recipes and more meal plans. We discuss the glycemic load, which helps you calculate the amount *and* type of carbohydrate you are consuming. We also include all the very latest findings, including:

- recent studies on the glycemic index
- information on the glycemic load
- new studies on heart disease and blood-glucose levels
- the latest studies on the glycemic index and diabetes, including type 1 diabetes in children
- recent studies on the glycemic index and weight reduction
- new studies on the glycemic index and cancer
- the latest on the glycemic index and polycystic ovarian syndrome, weight gain in pregnancy, and gestational diabetes
- the lowdown on high-protein diets
- new GI values for recently tested foods, including high-protein bars, gluten-free foods, convenience meals, and many more

Lastly, we've included some real-life stories of how much the glycemic index has changed the lives of people who have adopted the low-GI approach.

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Blood Sugar or Blood Glucose?

BLOOD SUGAR and blood glucose mean the same thing, although the latter is technically more correct. We will use the term blood glucose in this book.

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HOW YOU CAN USE THIS BOOK

We've arranged the chapters to make it easy for those who want to get straight to the point—exactly what you need to do to adopt a low-GI approach to eating. We recommend you read the introductory chapters as they will give you a complete overview and scientific update on the carbohydrate story. The facts we reveal about carbohydrate will surprise many people—and are facts that can make life a lot easier.

Part 1 contains the most recent information about what is considered a balanced diet and why—information based on scientific research, clinical trials, and large-scale studies in whole populations. It stresses what's wrong with today's diet and the proven value of diets high in fruits and vegetables. In this section, we explain the importance of being choosy about the types of carbohydrates *and* fats you eat, no matter what the proportions of protein, fat, or carbohydrate. Part 1 discusses high-protein diets and new concepts such as glycemic load and answers some of the most commonly asked questions about the glycemic index.

Part 2 is your guide to low-GI eating. We show you how you can include more of the right sort of carbohydrate in your diet, and give both hints for meal preparation and practical tips and food combinations to help you make the glycemic index work for you throughout the day. This section includes fifty imaginative and delicious recipes and meal ideas for breakfast, lunch, dinner, and in-between snacks, along with their GI rating and nutritional analysis.

In Part 3, there are separate chapters for specific applications of the glycemic index, including its use for weight control, type 1 diabetes, type

2 diabetes, heart disease, and the metabolic syndrome (Syndrome X), pregnancy and gestational diabetes, children, and sports performance.

If it's just the GI values you are after, you'll find them in the updated and much-improved tables in Part 4. We've grouped them according to types of food (breads, fruits, etc.) and included not only the glycemic index value and amount of carbohydrate per serving, but also their glycemic load per serving. We've added the foods that were often queried—meat, fish, cheese, broccoli, avocados, etc.—even though they don't contain carbohydrate and their glycemic load is zero. This is the most comprehensive list of GI values for different foods *ever* published. Finally, there's a complete list of scientific references on pages 331 to 334 to back up everything we say.

With *The New Glucose Revolution* you will discover that a new, healthier way of eating is both easy and delicious.

Dispelling Some Myths about Food

THIS BOOK DISPELS many myths about food and carbohydrates. We now know from scientific research that the following popular beliefs about food and carbohydrate are not true.

MYTH 1 Starchy foods like bread and pasta are fattening.

FACT Most starchy foods are bulky and rich in carbohydrate. They fill you up and stave off hunger pangs—they are among the best foods you can eat to help you lose weight. Just watch your portion sizes.

MYTH 2 Sugar is the worst thing for people with diabetes.

FACT Sugar and sugary foods in normal portions have no greater effect on blood-glucose levels than many starchy foods. Overprocessed flours and grains, along with saturated fat, is of greater concern for people with diabetes.

MYTH 3 Sugar causes diabetes.

FACT Sugar has no unique role in causing diabetes. Foods that produce high blood-glucose levels may increase the risk of diabetes, but sugar has a more moderate effect than most starches, especially refined and highly processed ones.

MYTH 4 All starches are slowly digested in the intestine.

FACT Some starch, like that in most kinds of potatoes, is digested in a flash, causing a greater rise in blood glucose than many sugar-containing foods.

MYTH 5 Hunger pangs are inevitable if you want to lose weight.

FACT High-carbohydrate foods, especially those with a low GI value (e.g., rolled oats and pasta), will sustain the feeling of fullness almost to the next meal.

MYTH 6 Foods high in fat are more filling.

FACT Studies show that high-fat foods are among the least filling. It is extremely easy to "passively overconsume" foods like potato chips.

MYTH 7 Sugar is fattening.

FACT Sugar has no special fattening properties. It is no more likely to be turned into fat than any other carbohydrate. Sugar is often present in foods high in energy and fat (e.g., cakes and cookies), but it's the total energy (calories) rather than the sugar in those energy-dense foods that may contribute to new stores of body fat.

MYTH 8 Starches are best for optimum athletic performance.

FACT In many instances starchy foods (e.g., potatoes) are too bulky to eat in the quantities needed for active athletes. Sugars can help increase carbohydrate intake.

MYTH 9 Diets high in sugar are less nutritious.

FACT Studies have shown that diets high in sugar (from a range of sources, including dairy food and fruit) often have higher levels of micronutrients, including calcium, riboflavin, and vitamin C, than low-sugar diets.

MYTH 10 Sugar goes hand in hand with dietary fat.

FACT The reality is that high-sugar diets are usually low in fat and vice versa. Most sources of fat in the diet are not sweetened (e.g., potato chips) and most sources of sugar contain no fat (e.g., soft drinks). Yes, there are many foods high in both fat and sugar (chocolate, ice cream, cakes, cookies, and pastries) but there are equally many that are delicious combinations of starch and fat (potato chips, french fries, some crackers).

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