

Preface

The liver is the largest solid vital organ in mammals that supports other organs in the body in some facet. Without a healthy liver, a person cannot survive. In the human it is located in the upper right quadrant of the abdomen, below the diaphragm. This book constitutes an effort to sum-up all the primary and relevant metabolic information that one needs to review to understand the complex and diverse role of the liver in metabolism.

With the current epidemic of metabolic diseases, it is of immediate importance to understand the contribution of the liver in health and its role in the development of impaired metabolic regulation. Many studies have unmasked important roles that proteins expressed in the liver play in the development of or protection from metabolic diseases.

Obesity is currently a worldwide public health burden that increases the risk for developing insulin resistance and several metabolic diseases such as diabetes, cardiovascular disease, inflammation and non-alcoholic fatty liver disease. Dietary approaches to limit fat intake are commonly prescribed to achieve the hypocaloric conditions necessary for weight loss. But dietary fat restriction is often accompanied by increased carbohydrate intake, which can dramatically increase endogenous fatty acid synthesis depending upon carbohydrate composition. It should be pointed out that although western societies consume high fat diets, the consumption of high carbohydrate diets in developing countries is on the rise. Since both dietary and endogenously synthesized fatty acids contribute to the whole-body fatty acid pool, obesity can therefore result from excessive fat or carbohydrate consumption.

One of the major metabolic functions of the liver is to carry out *de novo* lipogenesis, which is the metabolic pathway that allows the conversion of excess carbohydrates into fatty acids. The process of *de novo* lipogenesis utilizes several enzymes that convert the two-carbon acetyl-CoA into 16- and 18-carbon long chain saturated fatty acids (palmitate and stearate, respectively). Stearoyl-CoA desaturase (SCD) enzymes catalyze the conversion of palmitate and stearate into the monounsaturated fatty acids palmitoleate and oleate, which upon esterification into triglycerides are transported by very low-density lipoprotein (VLDL) to white adipose tissue (WAT)

for storage. There is also extensive crosstalk between the liver and WAT via signaling factors such as adipokines, lipokines and hepatokines that are involved in regulation of metabolic homeostasis.

There is a vast literature and ongoing research on liver function. Our contributions in this book are focused on some aspects of metabolism. I am therefore extremely grateful to many people who have helped me make possible the current series on the role of the liver in *de novo* lipogenesis and metabolism. I would like to express my sincere appreciation to all contributors of the diverse chapters for their cooperation and excellent work. Without their participation this edition would not have been possible. I would like to thank Cori Praska, Mackenzie Carlson, and Andrew Denu who have helped in the editing of some chapters of the book. I would also like to thank Springer for their assistance and support during the course of this project. Finally I would like to thank my family for their support, encouragement and patience over the years.

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Hepatic De Novo Lipogenesis and Regulation of
Metabolism

Ntambi, J.M. (Ed.)

2016, XI, 305 p. 35 illus., 5 illus. in color., Hardcover

ISBN: 978-3-319-25063-2