

Preface

This book was written with the aim of widening the reader's spectrum of knowledge regarding the uses of shock waves in medicine and biology, as well as to contribute to safer and more efficient treatments and encourage scientific research. For experts, it may be a stimulus to generate innovative ideas and introduce their colleagues and students to novel topics. Each chapter was written to be read as smoothly as possible, without continuous interruptions to look up the meanings of specialized terms. Nevertheless, it was difficult to decide which terms should be considered as "specialized" or "not obvious" and which words are part of the cultural heritage of most academicians. Depending on his background, the reader may want to skip certain sections of this book, keeping them as a reference to look up specific data or details on published research.

Collaborations between specialists from several areas, such as physics, mathematics, biology, medicine, engineering, and chemistry, are required to develop biomedical improvements and implement experimental and clinical protocols. This need for teamwork has increased the necessity for researchers to understand concepts belonging to areas that are different from their field of expertise; however, the learning process may be difficult due to the lack of a bibliography for nonspecialists and because of the time demanded to become involved in unfamiliar topics. One of the goals of this book is to foster interactions between scientists so that, for instance, a molecular biologist may have a fruitful talk with a specialist in fluid dynamics about how to take advantage of acoustic cavitation to genetically transform tumor cells or so that a urologist and a computer engineer can analyze algorithms to predict successful outcomes in extracorporeal lithotripsy. Some sections of this book may also serve as a reference during the writing of scientific papers.

It is interesting but also worrisome that the clinical use of focused shock waves and radial pressure waves started long before the basic phenomena involved were fully understood. Evidence of this is the vast number of articles reporting *in vitro* and *in vivo* experiments published many years after the first clinical application. The underlying responsibility of the scientific community and the manufacturers of clinical equipment is evident. Further research to better understand the interactions of pressure waves with living tissue and cells will certainly lead to safer

therapies and novel biomedical uses. Worldwide, there are more research groups working on shock wave-related topics than ever, indicating that this is still a promising research field.

The biomedical applications of shock waves are fascinating. I hope that all readers will benefit from the insights provided in this book and enjoy reading it as much as I enjoyed writing it. Hopefully, many of them will be inspired to develop further improvements and enhance the understanding of the phenomena involved in the medical and biomedical applications of shock waves.

Querétaro, Qro., Mexico
September 17th, 2016

Achim M. Loske

Medical and Biomedical Applications of Shock Waves

Loske, A.M.

2017, XXIII, 378 p. 198 illus., 184 illus. in color.,

Hardcover

ISBN: 978-3-319-47568-4