

Preface

As the author has been involved in medical engineering research at the National Institute of Advanced Industrial Science and Technology and also at Kobe University, in the development of a medical product with a company, and in regulatory affairs at the Pharmaceuticals and Medical Devices Agency, he thought that it would be useful to collect and record his knowledge. This book therefore describes design concepts for surgical blood pumps, so-called ventricular assist devices or mechanical circulatory supports, to assist blood circulation. Chapter 1 suggests medical care options to patients who need organ replacement or organ repair. Chapters 2, 3, 4, 5, 6, and 7 provide mainly the engineering tools including R&D and design evaluations. Chapter 8 describes bioreactions and evaluation methods. Among them, hemocompatibility refers to such factors as the reduction of blood cell/protein damage and the prevention of blood coagulation. In Chap. 9 it is shown how the devices are evaluated to verify their safety and efficacy for the purpose of clinical use. Finally, Chap. 10 describes the concluding remarks and future aspects.

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