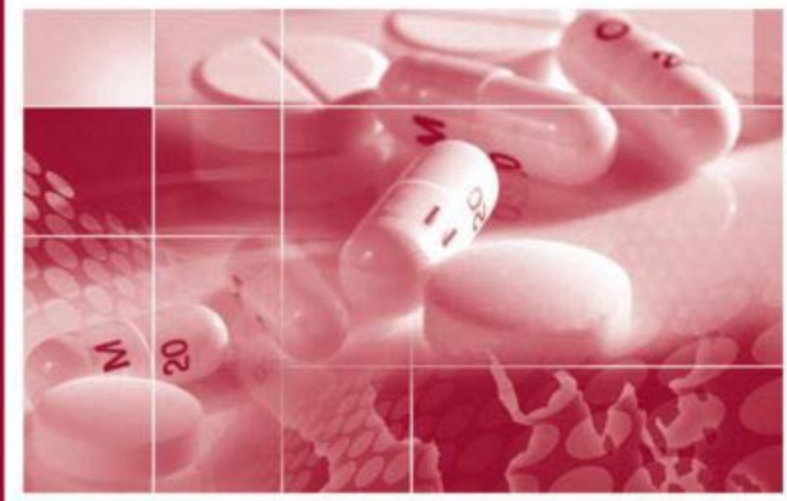
DRUGS AND THE PHARMACEUTICAL SCIENCES VOLUME 199

SECOND EDITION

Pharmaceutical Preformulation and Formulation

A Practical Guide from Candidate Drug Selection to Commercial Dosage Form



edited by

Pharmaceutical Preformulation and Formulation

Second Edition

A Practical Guide from Candidate Drug Selection to Commercial Dosage Form

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Informa Healthcare USA, Inc.
52 Vanderbilt Avenue
New York, NY 10017

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Printed in the United States of America on acid-free paper
10 9 8 7 6 5 4 3 2 1

International Standard Book Number-10: 1-4200-7317-6 (Hardcover)
International Standard Book Number-13: 978-1-4200-7317-1 (Hardcover)

Library of Congress Cataloging-in-Publication Data

Pharmaceutical preformulation and formulation: A practical guide from candidate drug selection to commercial dosage form / edited by Mark Gibson.
—2nd ed.
p. ; cm. — (Drugs and the pharmaceutical sciences ; 199)
Includes bibliographical references and index.
ISBN-13: 978-1-4200-7317-1 (hb : alk. paper)
ISBN-10: 1-4200-7317-6 (hb : alk. paper) 1. Drugs—Dosage forms. I. Gibson, Mark, 1957- II. Series: Drugs and the pharmaceutical sciences ; v. 199.
[DNLM: 1. Drug Compounding. 2. Biopharmaceutics—methods. 3. Dosage Forms. 4. Drug Discovery. 5. Drug Evaluation. W1 DR893B v.199 2009 / QV 778 P53535 2009]
RS200.P425 2009
615'.1—dc22
2009012458

For Corporate Sales and Reprint Permissions call 212-520-2700 or write to: Sales Department, 52 Vanderbilt Avenue, 16th floor, New York, NY 10017.

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Similarly, a list of requirements can be produced for the primary pack, such as the following:

- The pack will be acceptable to regulatory authorities in the countries to be marketed (other approved marketed products already use this type of pack).
- Only packs that can be multiple sourced from more than one supplier/country will be used.
- The pack must have consistency of dimensions and performance.
- The pack will meet function/user tests and specifications.

These dimensions, performance limits, and function/user test limits should be specified in the product design report.

Even though the product has not yet been developed, a high-quality product specification can be proposed with tests and limits that the product should meet at the time of manufacture and at the end of shelf life. For the intravenous product example, tests might include appearance (clear, particle free), pH, osmolality, particulate levels, sterility, and endotoxin levels. Appropriate standards or limits can also be proposed on the basis of the knowledge of similar types of products that have already been developed and from standard pharmacopoeial monographs.

Finally, in this section, it is useful to agree on what the minimum acceptable shelf life for the product should be. The product will need to be stable enough to allow time for quality control (QC) testing and quality assurance (QA) release after manufacture; distribution to wholesalers, pharmacists, and doctors; and with acceptable time for storage until prescribed and used by patients. Normally, a minimum three-year shelf life at room temperature (15–30°C) is targeted. However, if the treatment is very novel, it may be possible to justify a shorter shelf life and/or storage at lower temperatures, if stability is likely to be a problem.

Commercial and Marketing Considerations

Any pharmaceutical company's economic objective must be to maximize its ROI after launch. Therefore, the commercial viability of a new product to be developed needs to be commercially assessed at the product design stage to satisfy the company that it will achieve a satisfactory ROI. Some of the factors that should be considered in the evaluation are as follows:

- Development costs
- Timing to market
- Market size (disease prevalence, diagnosis and treatment rates, market value)
- Competition (current, developing, and impact on future market)
- Unmet medical need (effectiveness of current treatment, improvements required)
- Pricing and reimbursement (current and future)
- CoG (target)

The development costs are an estimate of the total costs of development of the product through the various stages of R&D, including preclinical, clinical, pharmaceutical (drug substance and product), and marketing costs. As a rule, the development costs will increase exponentially with development time (see Fig. 2, chap. 1), and the cost of conducting the phase III clinical studies are usually the most expensive element of the development program. Estimates of the total cost of all material, labor, and overhead costs should be included.

A major consideration for the development costs is whether to contract out some or all of the work (Spurlin et al., 1996). Contract research organizations (CROs) can offer a broad range of services covering all parts of the drug development process. In terms of product development, preformulation studies, including drug substance characterization, formulation development, stability testing, clinical trial manufacturing, and scale-up/technology transfer,