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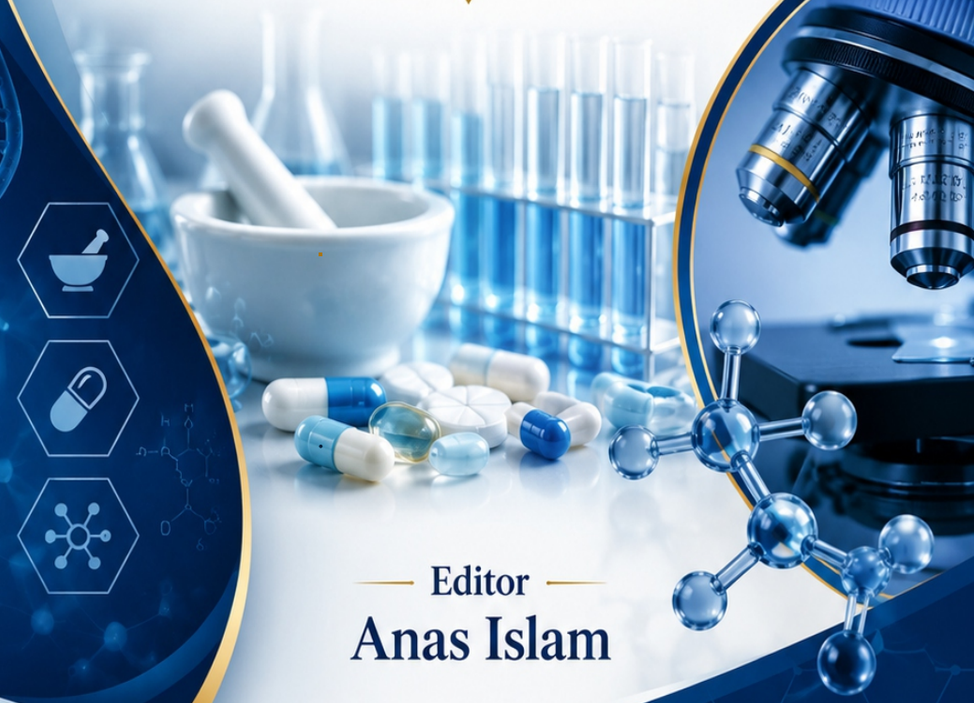

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PREFACE

Pharmaceutical sciences continue to evolve through the integration of natural product research, drug design, formulation development, and pharmacological evaluation. The increasing complexity of healthcare demands a multidisciplinary understanding of medicines, from their origin and development to their therapeutic application and regulatory evaluation. This book, *Integrated Pharmaceutical Sciences: From Natural Sources to Therapeutic Applications*, was prepared to provide a concise and structured overview of major domains within pharmaceutical sciences.

The book presents fundamental and applied concepts related to pharmacognosy, pharmaceutics, pharmaceutical chemistry, and pharmacology in an integrated manner. Each chapter has been designed to provide clear academic content with emphasis on practical relevance, recent developments, and current pharmaceutical approaches. Topics included range from natural drug sources and phytochemicals to novel drug delivery systems, toxicological screening, regulatory aspects, nanotechnology, and personalized medicine.

This book is intended for undergraduate and postgraduate students, researchers, and academic professionals seeking a compact interdisciplinary resource in pharmaceutical sciences. The contributors have aimed to maintain scientific accuracy while presenting the material in a concise and accessible format.

We hope this book will contribute to academic learning and encourage further exploration in the field of pharmaceutical sciences.

ANAS ISLAM

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Chapter – 10
Toxicological Screening

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10.1 Introduction

10.1.1 Definition and Scope of Toxicological Screening

Toxicological screening is an indispensable discipline within the pharmaceutical sciences, dedicated to the systematic evaluation of the adverse effects of xenobiotics—including investigational new drugs, excipients, and formulation byproducts—on biological systems. It serves as the primary scientific mechanism for identifying, characterizing, and quantifying the potential hazards associated with a chemical entity before it is administered to human subjects. The fundamental goal of these screening protocols is not merely to determine whether a compound is toxic, as all substances exhibit toxicity at a sufficiently high concentration, but to establish the precise conditions under which toxicity manifests. This involves delineating the specific nature of the toxic injury, the target organs affected, the reversibility of the damage, and the dose-response relationship governing these adverse events. By rigorously assessing these parameters, toxicological screening establishes the foundational safety profile required to progress a molecule from preclinical development into early-stage clinical trials.