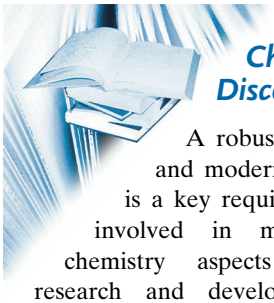

Heterocyclic Chemistry in Drug Discovery

A robust knowledge of classical and modern heterocyclic chemistry is a key requirement for any scientist involved in medicinal and process chemistry aspects of drug discovery research and development. Undergraduate and graduate students involved in organic synthesis are usually well versed in modern catalytic methods for functionalization and coupling of heterocycles. In contrast, thorough training in classical heterocyclic synthesis seems to have been replaced by more current topics. As a consequence, this gap in knowledge is typically filled by on-the-job training.

The new book *Heterocyclic Chemistry in Drug Discovery* is intended to bridge this gap. The book was edited by the prolific Jie Jack Li, who brings first-hand industry experience to the table. He assembled a large team of twenty individual contributors from industry and academia, and authored some of the chapters himself. The book intends to function as a textbook for undergraduates and graduates, as well as a guide for medicinal and process chemists. It plays in an already crowded field of general heterocyclic chemistry textbooks, which are easily associated with the names of their corresponding authors: *The Chemistry of Heterocycles* (Eicher and Hauptmann), *Heterocyclic Chemistry* (Gilchrist), *Heterocyclic Chemistry* (Joule and Mills), as well as *Handbook of Heterocyclic Chemistry* (Katritzky).

The book is structured in a similar fashion to the traditional texts. After a general introduction, the common five and six-membered heterocycles are covered in individual chapters. All regular aromatic heterocycles are covered, but the books falls short of including more exotic heterocycles with two or more heteroatoms in different rings, which are quite prevalent in drug discovery. This is not a major shortcoming, as basic concepts detailed for the simpler structures usually extend to the more complicated derivatives.

Each individual chapter commences with an introduction, which discusses electronic and structural properties of the parent heterocycle, including examples of the heterocycle in marketed drugs and development compounds. The proton and carbon NMR spectrum of each parent heterocycle is also provided, a feature of somewhat limited value in a relatively advanced textbook. Each chapter then proceeds with a discussion of reactivity and synthesis of the respective heterocycle. The order of information in all chapters is not harmonized as several chapters begin with the synthesis details followed by pertinent reactions. The key classical name reactions, which lay the foundation of heterocyclic chemistry, are covered across all classes of compounds. As expected for a textbook, the mechanisms are explained with arrow-pushing schemes. A few of the well-known classical reactions are misspelled (for example, the Hantzsch pyrrole and the Fischer oxazole synthesis). The great feature of this book is that the selected examples for even the oldest reaction types include the synthesis of prominent and currently marketed drugs. For some heterocycles, a subsection is reserved for discussions of cross-coupling chemistry. The majority of the chapters conclude with a short but useful section about possible in vivo liabilities of the respective heterocyclic scaffold. This section is of good utility and a clear differentiator from the more traditional heterocyclic chemistry textbooks. Each chapter includes adequate literature references, spanning from the original references to the name reactions up to very current work in the field (2011).

In summary, this book provides a valuable addition to the field of textbooks on heterocyclic chemistry. It has some of the typical shortcomings of an edited book which includes contributions from many authors. This issue could have been addressed slightly better through more thorough editing. A closer alignment of chapter structure would have made the book easier to follow for less experienced readers. On the other hand, the book has two distinguishing features that add significant value. The inclusion of relevant synthetic examples from currently marketed drugs can provide inspiration and knowledge on how to construct more complexly substituted heterocycles. The subchapters about potential liabilities of certain heterocycles are of use for the novice medicinal chemist. The largest target audience for this book would be entry level chemists in drug discovery and development in need of a quick refresher of heterocyclic chemistry. Beyond that, it can serve as a desktop reference manual for any chemist in the pharmaceutical industry. Inclusion of relevant literature references allows for a fast follow-up in the primary literature. The book can also serve as a textbook for undergraduates and graduates, which is highlighted by the inclusion of interesting problem sets. However, the aforementioned classical texts do have a more easily followed structure and are more didactically suited to teach the fundamentals. In contrast, this book could serve as a refresher or advanced textbook in a more specialized course geared towards organic chemistry in drug discovery research and development.

Oliver Thiel
Amgen Inc., Thousand Oaks, CA (USA)

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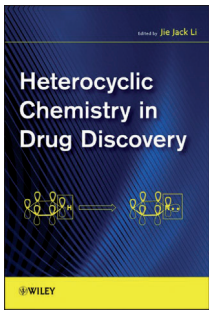

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