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Let us look, then, not at a book about NO, or about hemoglobin, or indeed about heme-based O₂ sensing. It is very all of these subjects and more, but above all, the book's cover claim is to present a multifaceted overview of the intersection of chemical ligands with heme proteins. An overarching goal is to build bridges among disciplines by bringing about a meeting of minds.

The contributors to this book hail from diverse university departments and disciplines – chemistry, biochemistry, molecular biology, microbiology, zoology, physics, medicine and surgery, bringing with them diverse viewpoints on heme-ligand interactions. My hope is that the juxtaposition of this diversity will lead to increased exchanges of ideas, approaches, and techniques across traditional disciplinary boundaries. In other words, the goal is to inspire biologists to think about physiological problems and biomedical researchers to think about heme-based ligand interactions.

The book starts with two introductory overviews. The last by Litvin and I think represents the up-to-date to recent years of our perception of how heme regulates signaling, along the three very similar-sized diatomic (CO, NO) and O₂. The old picture that strategy gets carried with a long-ignored discrimination against CO by having the bound ligand into a high-energy level of conformation has given way to a view where protein electrostatics (especially hydrogen-bonding interactions) is the key agent of discrimination. The second chapter by Miller and Miller provides an overview of the rapidly burgeoning field of heme-based sensors, a major theme of the book.

The next set of chapters on electronic structure and spectroscopy focus on well-established techniques – resonance Raman (Saito and coworkers) and IR (DeWitt) – as well as on a new spectroscopy, nuclear resonance vibrational spectroscopy (NRS) (Saito), that promises to become a part of the technological chemical toolbox.

Chapters 6–18 focus on a variety of somewhat specialized aspects of heme, including model heme and globin-coupled sensors (Alam, hemoglobin and cytoglobin (Gardner and Hargrove)), cell-sited hemoglobins (Brittain), and hemoglobins from non-mammalian organisms (1–4).

The next six chapters (nos. 11–16) provide a fairly good, comprehensive overview of heme-ligand interactions. Chapter 11 (Wang, Shapiro, et al.) focuses on a major biomedical story that is currently unfolding – namely the role of nitric in hemoglobin-mediated hypoxic regulation. Similarly, Chapter 12 addresses another recent development, the role of hemoglobin as a nitric oxide dioxygenase. The next five chapters cover other important topics, respectively nitric oxide reduction (Zandi), NO donor (Quarles, Sheng, Ibraghimovskii), NO₂ (Chen), and the bioinorganic chemistry of the H₂O ligand (Chen and Gorman).

The book concludes with a set of chapters (nos. 17–21) on specific enzymes and sensors heme controls: cGMP (Ramasamy et al.), cGMP (Roberts et al.), soluble guanylate cyclase (Saito et al. and Pal and Kitagawa), and FixL (Rodgers and Lukat-Rodgers).