

The Tao of Chemistry and Life

What might a book with such a title contain? To begin answering that: this book about the molecules of life is an educational book, not a philosophical one, and is primarily written for readers without a chemical background. Nevertheless, chemists should take a good look at this remarkable book.

The starting point is the author's view that most textbooks of general chemistry "focus on the stuff that is exceptionally unimportant for most people." He comments: "All of this is a bit frustrating to me since chemistry, particularly as it relates to life and health, is deeply important to most of us, and most of us would be better off if we knew more. So that is the rationale for this book: to help the intelligent, interested non-scientist to come to grips with some essentials of chemistry and how they relate to life and health."

That is interesting enough to make one want to see what follows. The first two chapters start with considerations about life as such, its origin, the diversity of living organisms, science (why "intelligent design" is a failed hypothesis), and about molecules and metabolic pathways as the unifying factors common to all forms of life.

Chapters 3–7 are about molecules, starting with elements and chemical bonds, followed by simple hydrocarbons, nitrogen and oxygen, and more complex molecules, such as alcohols, phenols, and esters. You find this boring? En passant, you learn that methylphenols are components of human sweat, that female *Anopheles* mosquitoes have odor receptors for such substances, and that this might be a novel approach for the development of mosquito repellents and traps.

Chapter 8 deals with the elements, such as zinc, phosphorus, sulfur, sodium, calcium, chlorine, and iron.

In Chapters 9–14, proteins and nucleic acids are discussed, together with their building blocks, basic molecular biology, and genomes. Chapters 15–24 are about vitamins, sugars, fats, steroids, the human brain, antibiotics, cancer, and chemical communication. In the steroids chapter, for example, you learn about cholesterol function, biosynthesis, sex hormones, the difference between observational and controlled clinical trials, glucocorticoids and mineralocorticoids, their intracellular targets, and examples of inhibitors, agonists, and antagonists that are in clinical use. The topics covered in the two chapters on the brain include the human nervous system, membrane potentials, neurotransmitters, and diseases such as Huntington's disease, fragile X syndrome, depression, and schizophrenia, and the molecules that are of relevance for

the pathogenesis and treatment of these diseases.

Each chapter ends with a summary of key points. Notes to the individual chapters are collected together at the end of the book. These include literature references (up to the year 2006), and remarks and citations, for example about different aspects of the second law of thermodynamics, or on how energy and enthalpy are related. That is a brief outline of the contents.

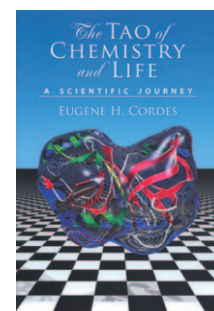
However, it would be misleading to give the impression that the book is only a nonscientific introduction to selected aspects of biochemistry and pharmacology. As the title promises, it is more a chemical journey into areas that are of relevance to many people. In this regard, chemists might also be interested to learn what the author considers to be important for a broad readership without a chemical background. Not all of us are aware of the molecular basis of learning and memory, how habituation, sensitization, and conditioning work on the molecular level, why the seminal discovery by Gerhard Domagk of Prontosil, the first antibiotic, would not necessarily have been possible with present-day drug research, whether hormone replacement therapy is beneficial for post-menopausal women, why we should avoid *trans*-fats, or why resveratrol in red wine is expected to be beneficial for human health. If you are interested in where bacteria living several kilometers below the earth's surface get their energy from, in what botox does, if you want to know more about the relationship between longevity and limiting calorie intake, how Hox genes determine the shape of the body, what retinoic acid has to do with that, or whether we carry neanderthal genes in our genome, then read the book.

For the interested reader without a chemical background, this is an alternative, competent, and exciting introduction to the molecular basis of life, and for the chemist it is a nice way to learn more about fascinating aspects of our field. This book deserves many readers.

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