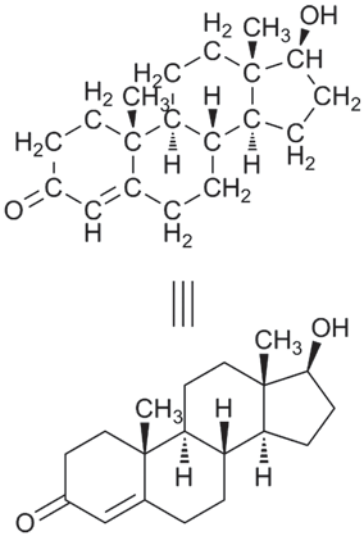
Preface

"For every complex problem there is a simple solution, and it is always wrong," said Dr. Victor Herbert, renowned hematologist and champion of evidence-based medicine. In this book, the authors intend to describe chemical misconceptions from as many different points of views as their talent allows, often times explaining connections between distinctly non-chemical phenomena. A quest for finding the truth is by no means an easy one and has often been compared to peeling an onion. Peer Gynt in Henrik Ibsen's play declares the following when he peels an onion layer by layer:

> There's a most surprising lot of layers!
> Are we never coming to the kernel?
> [Pulls all that is left to pieces.]
> There isn't one! To the innermost bit
> It's nothing but layers, smaller and smaller.
> Nature's a joker!
> (Translation by Edgar Lucas)

This book has been written for open-minded non-specialists, but we also hope to surprise chemists with a few stories never heard before. The text is divided into four main chapters and altogether describes one hundred misconceptions: after a general introduction, myths about food take center stage, followed by a look at misconceptions about medicines, and finally, we investigate all sorts of catastrophes, poisons and other chemical-related stuff. These groups are by no means intended to be exclusive or even unambiguous: there is a lot of overlap between them. The stories were written independently of each other, but we made efforts to make connections between the different stories by inserting the related chapter number into the text as shown here (→**Chapter number**). At the end of the book, the reader will find some literature connected to each story, sometimes the reference provides further information, and sometimes the material was used as sources to write our text.

Many of the concepts developed in this book occur in multiple stories, these are written in **bold letters** at their first appearance and a definition or explanation is given for each one at the end of the book in the *Glossary of terms*.



We had to make choices in representing the chemical structures of organic compounds, almost all commonly used methods are represented in one or more stories of the book. In two-dimensional structures, we followed the convention that only occasionally gives the symbols for the carbon or hydrogen atoms, lines were used instead (Fig. 1). In these formulae, lines mean chemical bonds and no symbol at the intersection of lines means a carbon atom with just enough hydrogen atoms to make the valence count four for each carbon. Sometimes, at the end of chains, it is customary to give these symbols to avoid confusions. The wedged bold ( ) and wedged hashed ( ) lines used as bonds carry some information about three-dimensional structure. The former means a bond in front of the plane of the rest of the molecule, the latter behind.

In three-dimensional structures, we wish to give some sort of image of the actual shape of the molecule. Individual atoms are often represented by spheres, and bonds may or may not be visible depending on the size of the spheres (Fig. 2).

There are more complicated substances (proteins, for example), where further simplifications were necessary: the main characteristics of the structures are often shown by colored ribbons, helices, or other irregularly shaped lines (Fig. 3).

The authors
Szeged and Debrecen, June 2014

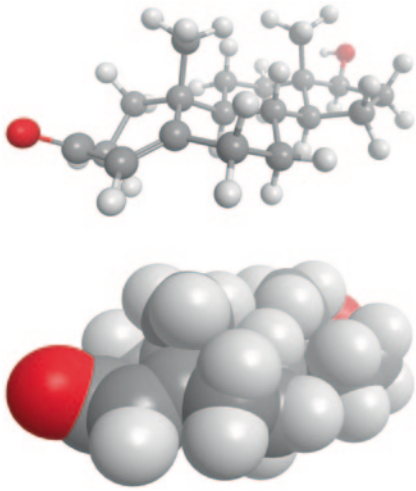


Fig. 2 Three-dimensional structures of testosterone

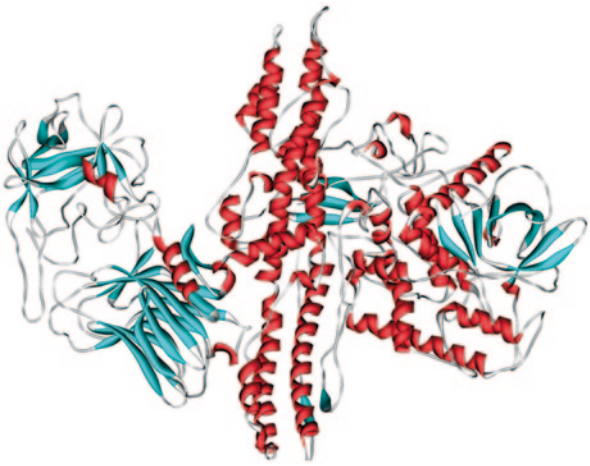


Fig. 3 Simplified three-dimensional structure of botulinum toxin

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100 Chemical Myths

Misconceptions, Misunderstandings, Explanations

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