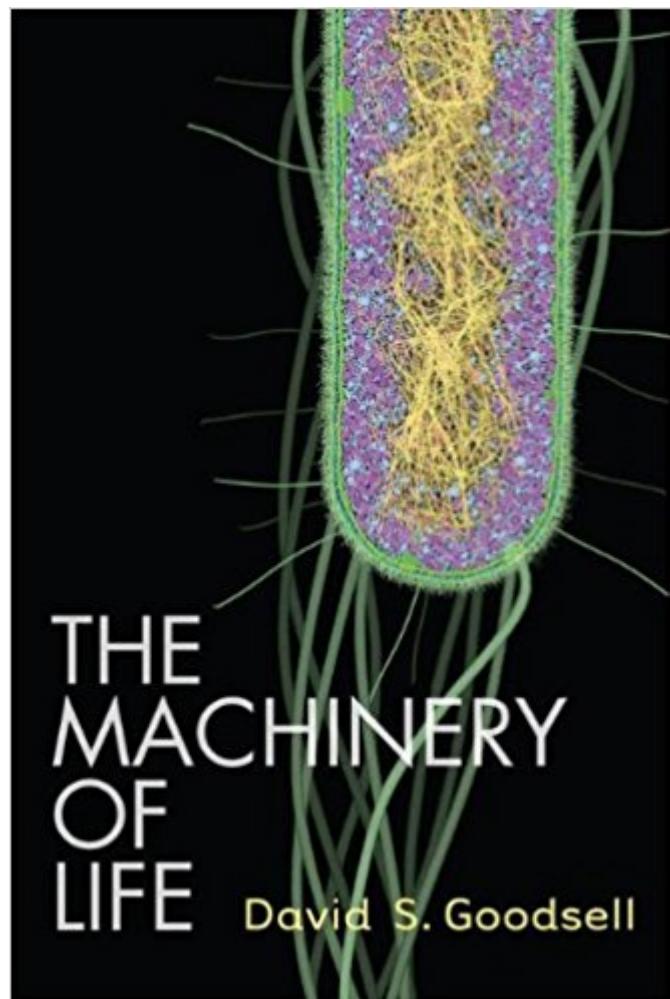


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# The Machinery Of Life



## Synopsis

Imagine that we had some way to look directly at the molecules in a living organism. An x-ray microscope would do the trick, or since we're dreaming, perhaps an Asimov-style nanosubmarine (unfortunately, neither is currently feasible). Think of the wonders we could witness firsthand: antibodies attacking a virus, electrical signals racing down nerve fibers, proteins building new strands of DNA. Many of the questions puzzling the current cadre of scientists would be answered at a glance. But the nanoscale world of molecules is separated from our everyday world of experience by a daunting million-fold difference in size, so the world of molecules is completely invisible. I created the illustrations in this book to help bridge this gulf and allow us to see the molecular structure of cells, if not directly, then in an artistic rendition. I have included two types of illustrations with this goal in mind: watercolor paintings which magnify a small portion of a living cell by one million times, showing the arrangement of molecules inside, and computer-generated pictures, which show the atomic details of individual molecules. In this second edition of *The Machinery of Life*, these illustrations are presented in full color, and they incorporate many of the exciting scientific advances of the 15 years since the first edition.

## Book Information

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## Customer Reviews

From the reviews of the second edition: "The Machinery of Life is a journey into the sub-microscopic world of molecular machines. Readers are introduced to the types of molecules within the cell, including proteins, nucleic acids, lipids and polysaccharides. The Machinery

of Life is a pictorial overview of the molecules that orchestrate the processes of life. "The book provides a fascinating introduction to biochemistry and molecular biology for the non-specialists." It is written in clear, jargon-free text that is accessible to the lay reader." (Medical News Today, May, 2009) "This book is amazing. " this second edition is a major update. And what it conveys is the sheer unbelievable intricacy and realness of every cell in your body. David Goodsell accomplishes this via amazing full-color illustrations, paintings based on computer animations created from microscope images. "It's slim, readable and engaging, a nonfiction book that calls to you from the nightstand table. If you are even a little curious about how cells work, get your hands on The Machinery of Life." (Lisa Parsons, The Hippo, July, 2009) "The Machinery of Life, which is a new edition of Goodsell's 1993 book of the same name. " the author's full-color illustrations are astonishing, forcing the reader to dwell for minutes on every picture. They are based on data from scientific papers, electron microscopy and information about molecular structures that were obtained by X-ray crystallography. " He does a good job. " Goodsell's technique is remarkable. He uses a combination of hand-drawing and computer graphics illustration." (Wearable Kimblewood, Lab Times, Issue 5, September, 2009) "Anyone who finds biology, especially modern biology at the molecular level, quite baffling and bristling with incomprehensible jargon this could be the book for you! " David Goodsell is clearly a master of communication, conveying complex biological processes with great clarity. " An excellent gift, then, for anyone interested in learning about biology in an enjoyable way. A book bursting with colour and genuinely difficult to put down. " (Michael Smith, Chemistry World, December, 2009) "In science, true understanding comes with the ability to visualize the system. For students of cell and molecular biology, this visualization often comes in the form of diagrams simplified in the name of clarity. " Using coordinates taken from the RCSB Protein Data Bank, Goodsell's wonderfully drawn illustrations are true to the scale and shape of the real molecules. " This work will be enjoyed by all who are interested in the molecular processes from new students to experienced scientists. Summing Up: Highly recommended." (D. Carroll, Choice, Vol. 47 (4), December, 2009) "This well-written, beautifully illustrated volume serves as an introduction to the molecules that compose cells and viruses. The book is written at a very accessible level and is appropriate for nonspecialists and students beginning their study in biology. " experienced biologists will appreciate the lucid treatment of complex concepts, particularly the idea of molecular crowding in cells. " In summary, the easy-to-read narrative and beautiful illustrations of The Machinery of Life make this

volume worthwhile to recommend to both nonspecialists as well as practicing biologists. (A. James Link, *The Quarterly Review of Biology*, Vol. 85 (1), March, 2010)

Dr. David S. Goodsell is Associate Professor in the Department of Molecular Biology at The Scripps Research Institute, La Jolla, CA, USA. His illustrations have become well known and now appear in many publications as the primary demonstration of the crowded nature of cells. He has also provided expertise and illustrations to many science museums, most recently acting as a "thinking partner" for a new multi-site nanotechnology initiative headed in part by the Exploratorium in San Francisco.

If only all biological textbooks had these pictures, we'd all understand their concepts better. I can't recall how many classes I took in college where the concepts were taught with conceptual drawings only; it was just too hard for me to understand and envision concepts twice removed from reality. Now comes along a new artform that can accurately depict images at 1,000,000 to 40,000,000 times original and more. I purchased this book for the pictures and understanding the scale differences between concepts, knowing that the functions of depicted organelles and other items weren't going to be elucidated. Recommended... - lc

I'm using this as a companion to other other molecular biology books, and find it very helpful for picking up a better 'conceptualization' of molecular processes through the great visualizations in this book. Though I mostly read ebooks, I purchased this as hard copy since it's all about the pictures.

David Goodsell's *Machinery of Life*, is by far the best introduction to molecular Biology that I have ever come across. This book approaches the daunting and at times intimidating subject of molecular biology with simplicity and eloquence. Life inside a cell is so small and hectic that most of the time it is near impossible to fully comprehend what is occurring, but Goodsell's use of images make cellular life much easier to understand. As reviewers have mentioned above the illustrations in this book are what makes it a truly magical read. The illustrations are so powerful and engaging that they help the reader take knowledge of cell and transform it into a true overall understanding of the happenings within a cell. Whether it be simple pictures of protein folding, or a more involved look at the way in which DNA winds itself within the cell, it is clear that after seeing the pictures ones understanding is significantly enhanced. In addition, Goodsell uses very simple writing in his descriptions, and provides many examples. Because of this he does a truly great job in not losing

the reader in a topic which can become very dense and difficult to grasp. In all, this book is really great, if you want to know about molecular biology or just know more about it this book is for you.

Agree with many of the previous reviewers: This book is a treasure trove of useful information. The graphics images (even on the Kindle edition) are stunning. The author's prose is succinct and to the point but still manages to convey the sense of wonder most people feel when delving into the details of how life works on a molecular level. Great science.

Great illustrations make this the only book that allows you to see what's going on at the level of the molecules in the cell (photos aren't so good at this level). Unique and valuable. Also, the text is precise, concise, and makes what is usually a dry subject interesting and relatively easy to understand.

As an introductory text on microbiology, I can't imagine one that would be better than *Machinery of Life*, especially for those who can benefit from many images to supplement their learning. It's quite the benefit that the images here are as real to life as they can be at their scale! I always wondered the exact ratio between an atom and parts of a cell, and the illustrations here make it clear just how remarkable it is that life exists at all with such finely designed particles working in unison. At times the text got ahead of itself and used too many undefined technical terms, but overall I can forgive the book considering how much it does right. And the images! They are worth it alone.

The *Machinery of Life* is the best book on molecular biology I have ever read. If you have ever looked into a microscope and saw a blob and wanted to see further into that blob this is the book for you. Microscopes can only go so far. This book goes all the way down to the atom then back up to the small molecule then big molecule, then macro molecule, then even a near atomic understanding of a cell. The tone is clear and the grand architecture of the cell's machinery is masterfully explained as well as illustrated. I bought two copies. One for me and one to give to friends. This is a great book to give to your parents or grandparents who want to know what you do at work if your work in molecular/cellular biology or even immunology.

The book is beautifully illustrated and is a perfect introduction to molecular biology for the lay person. For people like me who are visual it puts a whole new perspective on what you learn from books. However it lacks the details that would make it a good text book or text book companion. So

if you want to learn in depth how cells work this is not the book for you

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