

Everything you always wanted to know about tRNA

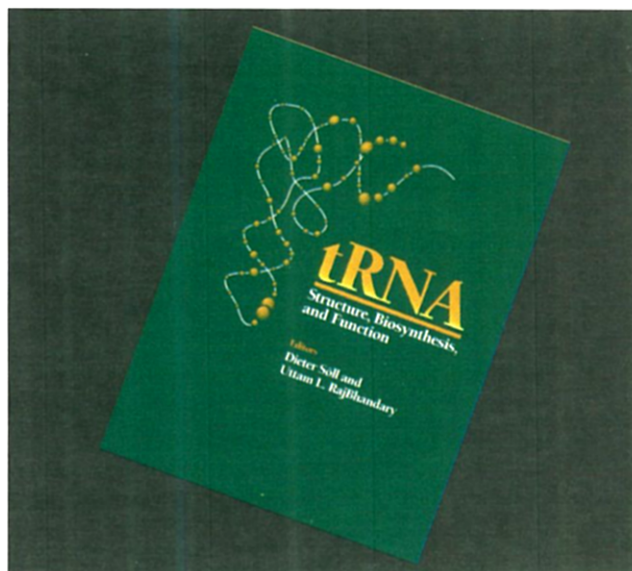
Chemistry & Biology June 1995, 2:365

tRNA: Structure, Biosynthesis and Function
edited by Dieter Söll and Uttam L RajBhandary, ASM Press, November 1994, 575 pages. \$99.00 hardcover (ISBN 1-55581-073-X).

Over the past decade, the American Society for Microbiology has published some remarkably useful books. Its two-volume set on *E. coli* and *Salmonella* (*Escherichia coli and Salmonella typhimurium: Cellular and Molecular Biology* edited by Neidhardt *et al.*, 1987) and the volume on ribosomes (*The Ribosome: Structure, Function, and Evolution* edited by Hill *et al.*, 1990) come quickly to mind. Both are indispensable for members of the communities that work in the fields concerned. The volume under review here, *tRNA: Structure, Biosynthesis and Function*, is a publication of the same high quality. If you work on tRNA in any way, you need a copy of this book.

It has been understood for about 40 years that transfer RNAs are the adapter molecules that broker the interaction of amino acids with messenger RNA during protein synthesis. Because the fate of an amino acid during protein synthesis is determined by the identity of the tRNA to which it becomes attached, the genetic code is a consequence of the way amino acids, tRNAs and aminoacyl tRNA synthetases interact. Interest in the code ensured that every aspect of tRNA structure, function and biogenesis would be thoroughly scrutinized. That work is still in progress today, some four decades after tRNAs were discovered. No class of RNA molecules is better understood. The structures of several tRNAs, as well as several of the proteins with which they interact, have been determined at atomic resolution; structures are also available for a few tRNA-protein complexes. Even though much has been learned, the field is very much alive. There are still major problems to solve; for example, what happens to tRNAs during the ribosomal phase of protein synthesis? The tRNA field is not just protein synthesis, however. tRNAs serve as amino-acid carriers in a number of other metabolic pathways, and this aspect of tRNA biochemistry has also been the focus of much research.

An area of molecular biology and biochemistry as important and mature as the tRNA area deserves book-length treatment from time to time. What is surprising, therefore, is not that the tRNA community decided to write a book now, but that it has been so long since it last did so. As far as I know, the two-volume set (*Transfer RNA: Structure, Properties and Recognition* edited by Schimmel *et al.* and *Transfer RNA: Biological Aspects* edited by Söll *et al.*) published by Cold Spring Harbor Laboratory Press in 1980 was the last major update of



this kind. Now that *tRNA: Structure, Biosynthesis and Function* is in hand, all is forgiven, however.

Söll and RajBhandary have persuaded 59 prominent members of the transfer RNA fraternity to write 27 chapters covering their respective areas of expertise. I found each chapter to be concise, thorough, authoritative — as far as I can judge — and fully referenced. This volume gives the reader access to the entire tRNA literature, both old and new. (Incidentally, thank God for publishers who insist that reference lists include titles!) Although this is a multi-author work, there is little redundancy, and the style is quite uniform. I would be doing no more than expressing personal prejudices if I were to single out any chapter(s) for special mention. Suffice it to say that I was impressed by the chapters that covered areas I know about, and was instructed by those dealing with topics that I do not. What more could you ask?

In summary, the authors, editors and publisher deserve great praise for producing *tRNA: Structure, Biosynthesis and Function*. Every laboratory working on tRNA problems, as well as many engaged in related areas, will find it an essential source of enlightenment. I would recommend that senior scientists, students and postdocs in these fields make the investment required to add it to their personal libraries.

Let us hope that the field issues its next update before 2010!

Peter B Moore, Departments of Chemistry, Molecular Biophysics and Biochemistry, Yale University, P.O. Box 208107, New Haven, CT 06520-8107, USA.