

Editorial

Molecular Mechanisms in Biological Processes Nobel Symposium 130

Our knowledge of the complexity of the molecular mechanisms in biological systems and the processes that take place in living cells is expanding rapidly. This is due to a number of factors, among others the completion of many genome sequences and advances in structural biology. Structure determinations, primarily by X-ray crystallography but to a growing extent also by cryo-electron microscopy, have eliminated many of the experiments that were previously performed to get fragments of structural information. Now we can describe the mechanisms of many processes in atomic detail. The detailed descriptions of these, often large and complex systems, have ushered in a new phase of biology where experiments based on detailed structural descriptions are performed or where the interpretations of observations can be made from atomic structures.

However, rarely do we understand these systems so well that we can predict what conformational changes will take place or how different molecules will interact in less well known parts of the processes. To understand the rates at which things happen, and to predict what are the rate determining steps, is usually well beyond the current capacities. Thus, our understanding in many instances remains descriptive. It is important to bring scientists of different fields of biology and physical and theoretical chemistry together in an attempt to catalyze the development towards a deeper understanding of biological phenomena.

The Nobel Symposium 130 and this issue focus on some of the basic biological phenomena: replication, transcription,

translation and transport where there are tremendous research activities and where the molecular systems and the functional mechanisms can now be described in atomic detail. These fields are now available for more fundamental research to give us a improved chemical understanding of the processes and the interactions, opening up the potential to predict what happens at steps not yet accessible to experimental research.

This meeting was held 51 years after the structure of DNA was published and 45 years after the first protein structure was reported. These achievements form the basis for much of the current research and it was highly appropriate that the meeting (and this issue) opened with a memoir of F.H.C. Crick presented by Aaron Klug.

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