

The DNA Story

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*The DNA Saga: 50 Years of the
Double Helix*

Biman Basu

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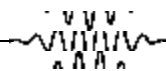
Last year, the world at large and biologists in particular, celebrated the golden jubilee of the proposal of the double helical structure of DNA by James Watson and Francis Crick. The event has been used effectively to take stock of the remarkable progress made in biological sciences over the last five decades. Extensive accounts of the breakthrough, as well as reviews of the subsequent developments triggered by the event, were published in both the popular as well as the scientific press. Though many of them are objective, in some cases, outrageous claims regarding the power of the new science of biotechnology/genetic engineering have been made, including one by Watson himself (*DNA – The Secret of Life*). In this context, the book *The DNA Saga: 50 Years of the Double Helix* by Biman Basu (Vigyan Prasar Publishers) deserves a special mention. The book gives a concise account of the events leading to the proposal and the discoveries that followed.

For biologists, the past fifty years have been truly exciting with fundamental discoveries being made one after another that expanded

our understanding of the living world. In the heady excitement generated by these findings, it is easy to forget that these were the culmination of work started more than fifty years ago. The most positive aspect of the book under review is that it helps to put the double helix in the proper perspective by presenting the research work that preceded the discovery. Basu manages to convey the excitement of the discoveries without getting caught up in the hype.

The two major achievements of the 19th century biology were the proposal of the theory of evolution by natural selection by Darwin and Wallace and the discovery of the laws of heredity by Gregor Mendel. Though the two form the pillars of the edifice of biological sciences, Darwin's work was mired in controversy whereas Mendel's was completely ignored and forgotten. The rediscovery of Mendel's laws, almost exactly fifty years before the double helix, forms an ideal setting for beginning the saga of the gene. Basu traces all the key discoveries made in the period that have a direct bearing on the double helix. The presentation is lucid and is interspersed with pictures of scientists and their contributions wherever it is appropriate. Particularly for students, the historic approach will be stimulating and inspiring.

Other than the background, the events leading to the actual discovery is well presented. Though the contribution of Rosalind Franklin has been cited, probably she deserved better mention in the account for the



significant role played by her in the discovery (see Article-in-a-Box in this issue). It was her extraordinarily fine X-ray diffraction picture of B-DNA, shown to Watson and Crick by Wilkins without her knowledge, that gave the experimental support to their double helix model. The papers of the three groups, Watson and Crick, Wilkins and coworkers and Franklin and Gosling were published in the same issue of the journal *Nature*. Watson and Crick's had the hand-drawn picture of the double helix and Franklin's had the beautiful X-ray diffraction picture of B-DNA. Curiously, the weakest of them is the one by Wilkins *et al*, as it lacked substantial experimental data and major conclusions. The creative genius of Watson and Crick lies in recognizing that the helices are anti-parallel and in invoking the complementarity of bases, already alluded to by Pauling and biochemically demonstrated by Erwin Chargoff. The possibility that the chains are held together by hydrogen bonds between bases was deduced earlier by John Gulland based on titration experiments on DNA. The aesthetically beautiful model of Watson and Crick was the result of creative synthesis of ideas and experimental evidence individually accumulated by many others. Interestingly, Gulland's work is cited by Rosalind Franklin but not by Watson and Crick! Many writers have also commented on the rather weak scientific integrity on the part of Watson and Crick for not giving any credit for Franklin's experimental contribution that was critical to their model. The harsh and totally unflattering references to Franklin in his book *The Double*

Helix by Watson also angered many and curiously worked in the opposite direction by bringing into focus the contributions of Franklin. Probably Basu wanted to steer clear of this controversy since much has been written on this issue.

For me the best aspect of the book is that Basu devotes enough attention to the fundamental insights that were gained subsequently such as the cracking of the genetic code, the discovery of gene regulation and the idea of transposable genetic elements. There is even a brief mention of the recent breakthroughs in the field of developmental biology. The reader is steered clear of the usual hype that is seen in many of the recent popular writings. A brief but lucid account of biotechnology and its application and a well-balanced account of cloning of organisms make the book very informative. The author and Vigyan Prasar have to be congratulated for bringing out this delightful book. At the modest price, it is highly affordable to students and teachers who will definitely benefit from the volume. Though the treatment of topics is concise, it is sufficiently lucid and inspiring that those interested will be tempted to go to the original sources for more details. I would recommend the book to students as well as to any one interested in modern biology. It will serve as a nice pocket reference to molecular biology.

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