breath and read the paper carefully. Ask yourself why was your paper cited? Was it for the sorts of reasons that you found for yourself? Would it have made any material difference to the publication at hand if the author had failed to cite your paper? Be brutally honest with yourself. Remember that you do not have to publish the results or even tell anybody about them.

These experiments should help you decide for yourself the meaning of it all.

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Maurice Wilkins: the third man of the double helix

'DNA, you know, is Midas' gold. Everybody who touches it goes mad.'

The words used by Maurice Wilkins, joint winner of the Nobel Prize in 1962 for his role in the elucidation of the structure of DNA, capture some of the strong emotions felt by those closest to what was perhaps the defining moment in contemporary biology – the solution of the double-helical structure of DNA. The success of Watson and Crick through model building is widely known but this accomplishment inevitably overshadows the key contributions made by Wilkins and Rosalind Franklin, the capable research student Wilkins hired. The contribution of Wilkins was to demonstrate how X-ray diffraction, a technique commonly used to determine the structure of inorganic molecules, could be used to solve the structure of DNA. Without this step, the structure of DNA would not have been as immediately forthcoming.

What is life?

Wilkins was born in 1916 in Pongaroa, New Zealand, a small town situated in the south of the North Island. His parents came from Ireland and his father was a doctor in the school medical service. When Wilkins was six, the family moved to England. He went on to study physics at St John's College, Cambridge (UK), and as a research assistant to John Randall at the University of Birmingham (UK) investigated the luminescence of solids. After completing his PhD thesis in 1940 on the theory of phosphorescence and the stability of trapped electrons in phosphors, Wilkins went on to study the separation of uranium isotopes. This undertaking was to continue at the University of California, Berkeley (USA), where he joined the Manhattan atom bomb project. His work on this project, and the eventual dropping of the bombs on Hiroshima and Nagasaki in 1945, left an indelible mark on Wilkins' life and career, leading him to question the moral implications of scientific research that could produce such devastating destruction.

Like many scientists of his generation, Wilkins' career path was to be transformed by reading Schrödinger's highly influential book entitled *What is Life?* [1]. Although the originality of this book has sometimes been questioned, it undeniably captured, in an accessible style, the way in which physical methods could have a major impact on biological problems. Like many seminal works, *What is Life?* came along at the right time and opened up exciting new research possibilities at the interface of two scientific disciplines: physics and

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biology. For Wilkins, it started a journey along the path to unravelling the complexity of living processes.

Harvesting data

In 1950, after being a lecturer in Physics at St Andrews University (UK), Wilkins followed Randall to King's College, London (UK), where he eventually became Assistant Director of the Medical Research Council Biophysics Unit and, in 1955, its Deputy Director. In his early days at King's, Wilkins had the freedom to switch from trying (unsuccessfully) to cause mutations in fruit flies with ultrasonic radiation to 'mucking about with tobacco-mosaic virus', a reference to structural work on this popular study organism.

'Wilkins was a polite, intensely private and self-effacing man.'

Eventually, Wilkins arrived at studying DNA using X-ray diffraction techniques. DNA purification techniques had been greatly improved by the Swiss scientist Rudolf Signer. The breakthrough came with the use of calf thymus cells as the source of DNA, which could be extracted as long fragile threads suitable for structural examination. Working with Ray Gosling, who is currently Professor Emeritus at the University of London, Wilkins found that the addition of water to DNA obtained using this method enabled the production of a gel from which fibres could be extracted. Gosling wound 35 such fibres around a paperclip, examined them by X-ray diffraction and obtained '…these wonderful spots', which demonstrated that DNA had been crystallized. Amazingly, the work was not immediately pursued because of a lack of instrumentation in the laboratory.

Once a new X-ray tube with a beam of sufficient intensity became available, the project had become the responsibility of Wilkins' new research assistant, Rosalind Franklin. The intricacies of the relationship that developed between Wilkins and Franklin have been well-documented. Through Wilkins, the information that DNA was a 'monoclinic, face-centred unit cell' eventually reached the fertile mind of Francis Harry Crompton Crick. The rest is history and the double-helical structure of DNA soon followed in 1953.

Public opinion, social responsibility

Wilkins was a polite, intensely private and self-effacing man. He had a strong dislike of pompous ideas or actions and was particularly proud of his involvement in the Campaign for Nuclear Disarmament. For 22 years, Wilkins was president of the British Society for Social Responsibility in Science. He was also an active undergraduate lecturer on the social impact of the biological sciences. These activities grew out of his lifetime experiences and the strength of conviction he felt towards the need for scientific undertakings to reflect social responsibility. He will be remembered for having taken part in perhaps the greatest biomedical discovery of the 20th century.

Maurice Wilkins died on 5th October 2004. He was 87.

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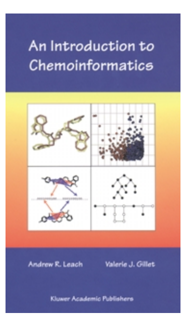

Chemo-informatics: Concepts, Methods and Tools for Drug Discovery

Methods in Molecular Biology, Volume 275, Edited by Jürgen Bajorath, Humana Press, US$125.00, 524 pages, ISBN 1-58829-261-4

Chemoinformatics: Concepts, Methods and Tools for Drug Discovery is a timely review of current chemoinformatics trends within both academia and industry. Jürgen Bajorath, renowned for his work in this field, has edited this latest addition to the *Methods in Molecular Biology Series* and has drawn upon the vision and practices of over 40 leaders within the field to yield a weighty tome dedicated to this rapidly evolving discipline.

In almost every chapter, the contributors discuss the raison d'etre for chemoinformatics. The emergence of both combinatorial chemistry and HTS has led to compound library profiling at a hitherto unknown rate. As a consequence, the bottleneck of drug discovery was shifted from the practicalities of screening, to the sifting of many millions of datapoints. Many