

THE HUMAN GENOME PROJECT: FROM BENCHTOP TO BEDSIDE



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The turn of the millennium has slipped by almost unnoticed, but it is certain to become known as the era when a critical revolution in medicine occurred. As the early 19th century heralded a major shift from a Newtonian to an Einsteinian explanation of the physical world, so the advent of the Human Genome Project (HGP) early in this millennium will usher in a profound new understanding of human disease.

From the outset, the immense potential of the knowledge gained by this project has been trumpeted — usually by researchers who by their enthusiasm often slipped into hyperbole to foresee the promised revolution in clinical care. That the HGP will become essential to the management of most human disease is beyond dispute. Unfortunately the scale, speed and complexity of the information generated by the Project, coupled with the near-messianic delivery of this information from the genetic laboratory to the medical arena, has left most clinicians bewildered and unsure of its current clinical applications. This issue of *CME* attempts to place the HGP in clinical context, with some hints at its future clinical importance.

Professor Raj Ramesar, describing the HGP as 'humankind's greatest adventure', and placing it within the context of man's journeys of discovery, outlines the historical background, scope and astounding results of the Project. He explains how its ramifications will be felt far beyond clinical medicine. His review exemplifies the enthusiastic promise of the new genomics.

The HGP is then placed in clinical context, and the extravagant claims of its research leaders scrutinised in light of current clinical practice. Some have wondered if the HGP may prove to be the 'Emperor's new clothes' for the clinician. This question is addressed in my first article where I attempt to explain the complex course from benchtop to bedside.

A genetic test is unlike any other clinical investigation. All other clinical tests reveal data at a given time, yet are dated as soon as done. A genetic test may be explanatory or predictive, uniquely personal yet often shared; it may be problematical in clinical and psychosociological terms, and it therefore demands counselling. Professor Jacquie Greenberg's article eloquently explores these issues and highlights the unique sensitivity of genetic testing.

Two articles introduce us to the practical applications of human genomics. Professor Bongani Mayosi dissects the molecular underpinnings of cardiomyopathy and reveals how a symbiotic relationship between research geneticist and clinician (he is both) may lead to wider insights of human disease pathogenesis and rationally directed management. The astounding story of long QT syndrome and cot death illustrates the power of a large study that after 19 years, and more than 34 000 subjects, managed to provide the first concrete — genetic — cause for cot death. The story does not end there, however, and continues to provide some of the first examples of management strategies derived directly from genomic knowledge.

For further perspective, 3 short articles provide insights into aspects of clinical genomics: the burgeoning field of genetic databases (a lighthearted introduction by Dr George Rebello), the difficulties surrounding investigation of fragile X (unravelling by Dr Karen Fieggen) and, finally, a moving essay by Mrs Jeanette Thorpe providing us with a mother's perspective of the life of her son, Ben, who has Barth syndrome.

The Human Genome Project is no more than a tool. Nevertheless it is a remarkably complex one with profound implications for human health and disease. Yet, as a tool its utility is only as relevant as its need, a need which should be determined by the patient and clinician.