
EDITORIAL

The human genome project

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The human genome invites our attention. The Human Genome Project (HGP), a collaborative international project between academic institutions to read or sequence the entire genetic code, was conceived and commenced in the mid-1990s. It has received a dramatic boost under the stimulus of a competing commercial project, such that the timescale for completion of the programme has been telescoped from the middle of this decade to the next year or so. Both projects will represent a staggering intellectual and technical achievement in documenting and ordering the billions of adenine, cytosine, thymine and guanine (A, C, T and G) nucleotide bases in 23 chromosomes that make up the human genetic code. The human genome is perhaps the ultimate information technology challenge in biology.

Great as this achievement will be, sequencing the genetic code in itself will not be enough. There are some 80 000 genes hidden in this linear puzzle in simple, multiple and disjointed copies, each of which will need to be identified, classified and a function assigned. This process is known as annotation. This is itself a massive exercise in computing power and intellectual judgement, as long lengths of DNA code are interpreted and compared against the large data bases of known genes from all species.

An even greater challenge will be to study the interactions and regulations of genes and gene complexes, and their protein products. Ultimately we will need to understand the controls and workings of our cells from embryogenesis to old age, across the spectrum of tissues and organs, and in health and disease. This study will be a complex interplay of computer modelling and *in vivo* experimentation with index organisms such as bacteria, yeast, the fruit fly and cultured cell lines. We could ultimately conceive of the

recreation of human biology in digital space, but it will suffice for us better to understand the processes of disease in the medium term.

Why should this matter to cancer surgeons and to the *European Journal of Surgical Oncology*? The human genome will never be accessible to the surgical knife, and the benefits of the HGP to cancer therapy may be many decades away. The language of molecular biology is arcane and its tools and techniques, despite their elegance, demand much attention for their understanding.

Surgeons have always been at the forefront of innovation in clinical medicine. The language of biological science and the literature will be full of the HGP in the coming years. The technical jargon of molecular biology renders the specialist literature impenetrable to the lay or casual reader. It is thus important that we have a grasp of the terms, concepts and opportunities which the HGP generates if we are to influence the coming debates about resources and treatment strategies with our oncological colleagues.

The *European Journal of Surgical Oncology* aims to educate its audience about important issues in oncology which inform professional debate. We hope to publish a series of articles over the next few years which will highlight important aspects of the emerging human genome story in a digestible way. We trust that these will prove to be of interest to busy surgical cancer specialists, and are pleased to invite further contributions to this subject. We are living in a period of extraordinary intellectual ferment in the biological sciences. We are a privileged generation to be able to witness and report matters which will have a profound bearing on human health, disease and society in the coming years.