



## About the Tutor

Guy Sutton's primary research interests are the genetics of neural development and the interactive nature of biological, behavioural and genetic factors in disease processes.

He is Honorary (Consultant) Assistant Professor in the Division of Psychiatry at University of Nottingham and has held previous academic appointments at Manchester, Manchester Metropolitan and Cambridge Universities. Guy has lectured in neuroscience and genetics to a range of undergraduate and postgraduate students, including medical, biological and psychologists. He has conducted research projects and data analysis for various organisations, including the Department of Health and the Medical Research Council. In addition to presenting research at various international conferences and writing for academic publications, Guy has talked about the theoretical and clinical aspects of his research on television and radio. He sat on the advisory board for the Wellcome Trust's 2013 'Inside The Brain' publication. Recent articles include 'Methods For Exploring The Brain' and 'The Epigenetic Brain' in Psychology Review.

He has tutored on 'A' level reading parties for students and teachers for several years. He is an associate tutor with Villiers Park Educational Trust, Cambridge and has written and delivered courses for Young, Gifted & Talented.

## About MBI

MBI (Medical Biology Interactive) delivers one-day and half-day courses, seminars and tutorials in epidemiology, occupational health and the human sciences to the health service, industry and education. All MBI seminars are written and run by academics and health specialists, each of whom has considerable experience in research and its practical applications. Seminars are delivered at the hospital, workplace or school, based on cutting-edge research and current practice benchmarks, and tailored to the needs and concerns of the client.

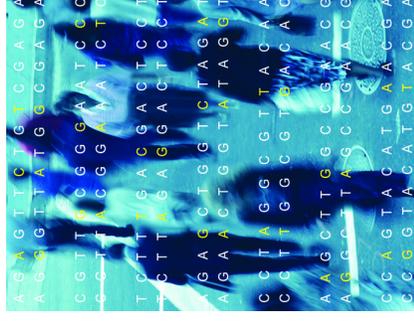
For further information and full programmes, please refer to the contact details on the back of this pamphlet.



**MBI**  
MEDICAL  
BIOLOGY  
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PRESENTS

# DNA A.M.



## *A Half-Day Tutorial For A-Level Students In Molecular Genetics - Delivered At Your School*

TUTOR:

**Dr. Guy M. Sutton**

Director, MBI &

Honorary (Consultant) Assistant Professor,  
University of Nottingham Medical School

## **Seminars & Tutorials For The Health Service, Industry & Education**

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## WHY A DNA MORNING?

These are exciting times for the field of genetics. The Human Genome Project (HGP) and subsequent research have established that the human genome comprises around 20,000 genes, accounting for around 1.5% of our DNA. However, we are now in the era of post-HGP molecular genetics in which large-scale, big-data international research consortiums such as ENCODE (Encyclopaedia of DNA Elements) are changing the landscape of genetic science. The ultimate aim of ENCODE is to assemble a library of the functional elements in the human genome, ascribing roles to components of what has been traditionally thought "junk DNA". Early findings indicated that over 80% of the genome "is involved in at least one biochemical RNA and/or chromatin associated event in at least one cell type, effectively controlling the expression levels of coding DNA. In years to come, many commentators predict that genomics and proteomics will revolutionise the practice of medicine and dramatically increase our knowledge of preventing and treating many diseases. Genomics will also impact on academic disciplines from the life sciences to economics.

In addition to reviewing elementary principles of medical genetics, the tutorial introduces the student to modern theories of disease development, with a focus on cancer genetics and epigenetics. The field of cancer epigenetics is evolving rapidly as a function of advances in our understanding of chromatin structure, transcriptional activity and DNA methylation and these processes will be overviewed. To further emphasise the rapid developments being made, students will learn about new pharmacological epigenetic therapies such as DNA methyltransferase inhibitors. Future treatment and prevention of a large number of genetic diseases will depend on a deeper understanding of the relationship between genes, environment and other disease variables and this relationship will be emphasised.

## WHICH STUDENTS WILL BENEFIT?

This tutorial is designed primarily for very able A-level biology students but will also be useful to:

- any students with an interest in the principles and applications of genetics and its contribution to medicine and society.
- those students considering a university degree and/or career in the following subjects:

**Medicine**  
**Biochemistry**  
**Dentistry**

**Biology**  
**Genetics**  
**Nursing**

**Neuroscience**  
**Psychology**  
**Philosophy**

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## AIMS OF THE TUTORIAL

There are three main aims to this tutorial:

- to provide the student with an overview of elementary and advanced genetic principles, including contemporary issues and recent developments in epigenetics.
- to examine various types of genetic and chromosomal disorders, also considering complex genetic disorders.
- to focus on cancer biology and genetics, providing the student with an insight into gene classes and their roles in cellular control processes.

## TOPICS TO BE COVERED

A variety of topics and issues relating to genetics will be covered. The tutorial can be tailored to your specific requirements; an exemplar programme is provided below:

- **9.00-10.15: Introduction to Genetics**

*Aims & introduction. From DNA, genes and chromosomes to transcription, translation and gene regulation. The Human Genome Project, ENCODE and proteomics.*

- **10.15-10.50: DNAWeb**

*Internet-based session exploring genetics. Explore A Stretch of DNA. Transcriptional regulation and transcription factors. Chromosome mapping. Epigenetic methylation.*

- **11.05-11.40: Medical Genetics**

*Genetic, chromosomal, mitochondrial and multifactorial disorders. From polydactyly and neural tube defects to complex disorders such as autism and schizophrenia.*

- **11.40-12.30: Focus: Cancer Genetics**

*The molecular basis of cancer, considering cancer gene families, impaired cellular DNA repair, apoptosis and telomere shortening, cancer epigenetics.*

- **12.30-12.45: Epigenetics & Disease**

*Methylation and histone deacetylation, gene expression and gene silencing in health and illness.*

- **12.45-12.50: Conclusions**

## FORMAT

The tutorial is delivered in your school and runs throughout the school morning. Tutorial date can be arranged by contacting MBI. Format is varied, with interactive, multimedia lectures, computer-based work and group discussions.

Each school receives a comprehensive pdf tutorial school together with Genes & Disease software, designed to complement material and issues introduced in the tutorial.

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## WHAT PEOPLE SAY

**"An excellent tutorial. Our girls thoroughly enjoyed and appreciated the experience."**

Mrs Vandervord,  
Colchester County High School for Girls

**"Thank you for planning and delivering such a wonderful day. The student evaluations show just how much the students appreciated all your hard work and enthusiasm."**

Ms S. Brady,  
Villiers Park Educational Trust, Cambridge

**"Thanks! A fantastic session thoroughly enjoyed by our students. They were inspired by the material you covered and continue to talk about it."**

Mr I. Smith,  
St Anselm's College, Wirral

**"Thanks for the session you did with the girls the feedback as always was excellent, really positive and a great incentive to them just before they go off to university."**

Mrs J. Stubbs,  
Loughborough Endowed Schools

**"A brilliant day which was very interesting to me too. I would definitely recommend this day to other schools."**

Ms T. Wilkinson,  
The Oldershaw School