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 lecturer 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 medics, biologists 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*, and 'The Brain and Crime' in *Catalyst*.

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.

Some of the courses and tutorials that MBI currently offers are listed in this pamphlet.

For further information and full programmes, please contact Dr. Guy Sutton; tel. 07941 039670,
e-mail: gmsutton@mbi-consultancy.co.uk

M B I
MEDICAL
BIOLOGY
INTERACTIVE

Seminars & Tutorials For
The Health Service, Industry & Education

Director Dr. Guy Sutton

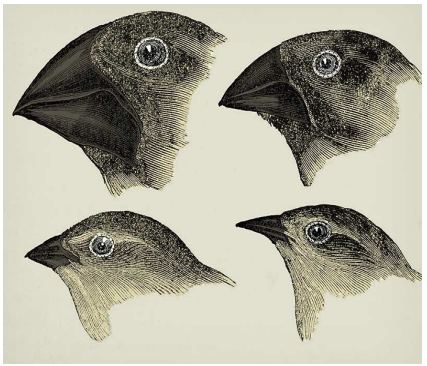
7 Gloucester Road
Wallasey
Wirral
CH45 3JS

Tel. 07941 039670
E-mail: gmsutton@mbi-consultancy.co.uk
Web site: www.medicalbiology.co.uk

M B I
MEDICAL
BIOLOGY
INTERACTIVE

PRESENTS

EVOLUTION



A Half-Day Tutorial
On The Biology
& Genetics of Change -
Delivered At Your School

TUTOR:

Dr Guy Sutton

Director, MBI &
Honorary (Consultant) Assistant Professor,
University of Nottingham School of Medicine

INTRODUCTION TO THE TUTORIAL

Life on earth is thought to have evolved from a single lifeform approximately 3,900 million years ago. Chemical evolution is theorised to have preceded biological evolution, ribonucleic acid worlds leading to protein worlds. This tutorial is intended as a comprehensive primer on evolution with a focus on hominization and the emergence of *Homo sapiens*.

We will tell a story that begins with the earliest likely lifeforms and the evolution of amino acids, phospholipids, nucleotides and the basic biomolecules of life forms progressing through the beautiful history of our genus. We encounter australoithicines, *Homo rudolfensis*, *Homo erectus* and *Homo ergaster* along the way. Our travels take us from North Ethiopia, Kenya and South Africa, to Georgia, Israel and Southern Europe we address some of the big debates and questions within paleoanthropology. When did humans diverge from the other great apes? What patterns of temporal and geographical distribution have occurred within Homo populations over the past 2 million years? What is the link between intracranial volume expansion and use of stone tools between 400,000 and 250,000 years ago? We conclude by considering the recent evolution of our species: how blue eyes arose from a single genetic mutation some 6,000-10,000 years ago; how our current behavioural patterns evolved; and how natural selection is still at work in modern human populations, providing examples of identified gene variants.

WHICH STUDENTS WILL BENEFIT?

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

- *any* A-level students with an interest in evolution and how we came to be what we are.
- those students considering a university degree and/or career in the following subjects:

Biological Sciences	Genetics	Zoology
Philosophy	Anthropology	Archaeology
Veterinary Science	Life Sciences	Neuroscience

AIMS OF THE TUTORIAL

There are three main aims to this tutorial:

- to study the mechanisms of evolutionary diversity from molecules to species and the transmission of hereditable characteristics across generations.
- to evaluate Darwinian theory in the 21st century and to consider species biodiversity.
- to focus on human evolution from australopithecus and the evolution of disease through gene mutation.

SPECIMEN PROGRAMME

A variety of topics and issues relating to evolution will be covered. Topics can, to some extent, be tailored to the requirements of the teacher:

- 9.00-9.10: Introduction & Aims
- 9.10-10.00: Beginnings

Fossilised microorganisms in hydrothermal vents. Fossilised cyanobacteria and stromatolites. Stanley Miller and the Miller-Urey experiments with ammonia, hydrogen and methane. Sidney Fox's experiments in abiogenesis, peptides and the "primordial soup". Thomas Gold and the deep-hot biosphere model. Decoding ancient genomes: Yersinia pestis. Molecular genetics and parasitology. The Last Universal Common Ancestor.

- 9.10-10.00: EvolutionWeb

Computer-based exercises. Darwinian evolution. Mechanisms of evolution.

- 10.35-11.00: Higher Level Evolution

Evolutionary principles and DNA variation. Darwin: On the Origin of Species By Means of Natural Selection. How many species are there and how many are yet to be discovered? How did flight evolve? Epigenetic regulation.

- 11.20-12.10: Human Evolution

Life, 7 million years ago. Sahelanthropus tchadensis and bipedal ancestors of later hominins. From australopithicines to the Homo genus. Homo habilis, Homo rudolfensis, Homo erectus and Homo ergaster. When did humans diverge from the other great apes? Similarities and differences in human and gorilla genomes. What patterns of change have occurred within Homo populations over the past 2 million years?

- 12.15-12.50: Evolution of Disease

A focus on phenotypic connections and comorbidity among genetic diseases. Mutation and molecular connections of disease modules. The diversity of evolutionary mutation in genes linked to disease.

- 12.50-1.00: Questions & Conclusions

FORMAT

The tutorial is delivered in your school and would usually run during the morning. The tutorial date can be arranged by contacting MBI. Format is varied, with interactive, multimedia lectures, microscopy, computer-based work and group discussions.

Each school receives interactive Comparative Biology software featuring activities and web links, plus a comprehensive pdf tutorial pack.

Praise for Brain Day

"It was amazing that the day passed so quickly and it was lovely to see our students so enthusiastic, asking stimulating questions and receiving such interesting answers. Like many teachers, I have sometimes come away from conferences feeling rather disappointed in the speakers, however Brain Day was truly excellent."
Margaret Highet,
Tadcaster Grammar School

"Spot on! The day took the students' knowledge to another level... it has also greatly improved my knowledge and understanding of the brain."
Mr. A. Harper,
Oldershaw School, Wirral.

"This was the best whole day tutorial that I have experienced in 20 years of teaching."
Mrs N. Williams
Worth School

"Fantastic - brings it alive. Great tutorial pack, fantastic resources."
Mr. Peters,
Horsforth School, Leeds.

"A very high standard of presentation. Even the most reluctant students were engaged and fascinated."
Mrs. V. Sweeting,
Enfield County High School, London.

"The students are still buzzing (to use their terminology) and the AS students are already asking if we will do it again next year – to which the answer is a resounding 'yes'!"
Mrs. K. Higgins,
Wyke College, Hull.

"Superb, stimulating and challenging for even the most able students. I found many of the topics inspiring and really cutting edge. I would not hesitate to recommend this to other schools."
Ms. C. Nicholls,
The Lady Eleanor Holles School, Hampton.

"An excellent tutorial, delivered with real enthusiasm and verve. The students went away inspired and are still talking about it!"
Mr. P. Lucas,
Queen Elizabeth School, Kirkby Lonsdale.

"A thoroughly stimulating day for both students and staff, exceeding all our expectations."
Ms. K. Smith,
St Albans Girls' School, Hertfordshire.

" Students enjoyed the tutorial enormously and loved the sheep brain dissection. The day had been presented as an "Enrichment" opportunity and it certainly was."
Mrs. J. Hardy,
Ashville College, Harrogate.