

Biology Book Review

My Beautiful Genome, Lone Frank, Oneworld Publications, Oxford, 2011

This book is suitable for students either taking or planning to take Higher Human Biology or Higher Biology. The book has a strong human interest theme as it follows the author's quest to find out the details of her own genome. This captures the reader's interest while also describing the underlying science at a level appropriate for school students. It should also stimulate thought and discussion about the consequences of citizens being able to find out the details of their own genome; as the author states – 'We have now entered the era of consumer genetics'.

The author volunteers to participate in a research project to examine the connection between specific genes and personality – in her case depression for which she has a family history. As part of her research for the book, she meets and interviews James Watson which gives her the opportunity to describe the biology of DNA and genomics covered in the Higher courses. She also describes the nature of the personal gene profiling services that can now be purchased. Chapter 2 is devoted to tracing ethnic origins and ancestry through profiling SNP (single nucleotide polymorphisms) markers for the maternal line through mitochondrial DNA and for the male line through the Y chromosome. The author's next step is to purchase gene profiling that involves testing her entire genome for SNP markers linked to health and disease. Here she briefly describes amplifying marker sequences with PCR and identifying the markers present using a gene chip microarray. The results are basically an association study which gives a risk assessment of various conditions based on markers that have been linked to genetic conditions.

The author then goes on to discuss the practicalities of how individuals may use such personal genetic information particularly when it is shared in the public domain. By adding their personal genomic information to publically available genomic databases provided by the genetic profiling company, risk assessments can be refined and more markers can be added covering a wider range of conditions. This means the individuals risk profile can be continually updated. Because the genomic database is publically available it can be used to carry out research by interested individuals and special interest groups as well as professional researchers.

The links between genes and behaviour (behavioural genetics) is examined through gene association studies and also by looking at the influence of proteins coded for by genes on behaviour. For example, how different levels of neurotransmitter and/or different variants of a neurotransmitter influence behaviour. Gene variants known to have an effect on brain biochemistry that are linked to behaviour are also examined for correlation to personality measures. The capacity for wilful actions to counteract genetic predispositions for personality characteristics and social behaviour are explored. From there the author progresses to tests that measure the number of RNA

molecules transcribed from selected genes of interest (the transcriptome). This gives an indication of which genes are expressed; that is have been switched on or off by gene regulation mechanisms or epigenetics. This leads to the conclusion that although we may have genes that predispose us to a particular condition (and that is generally a statistical chance) any outcome is not predetermined due to epigenetic effects. The author takes this further by looking at commercial gene profiling services that provide information on social compatibility between individuals – almost a sort of genetic dating site. This provokes discussion on the potential for genetic selection of embryos from practical, philosophical and ethical standpoints.

In conclusion this is a thought provoking book in which students can use the scientific knowledge they acquire. It is similarly thought provoking for teachers who in addition may reflect if the way we teach about DNA throughout the student's school experience is the best approach to prepare people for the era of consumer genomics.