

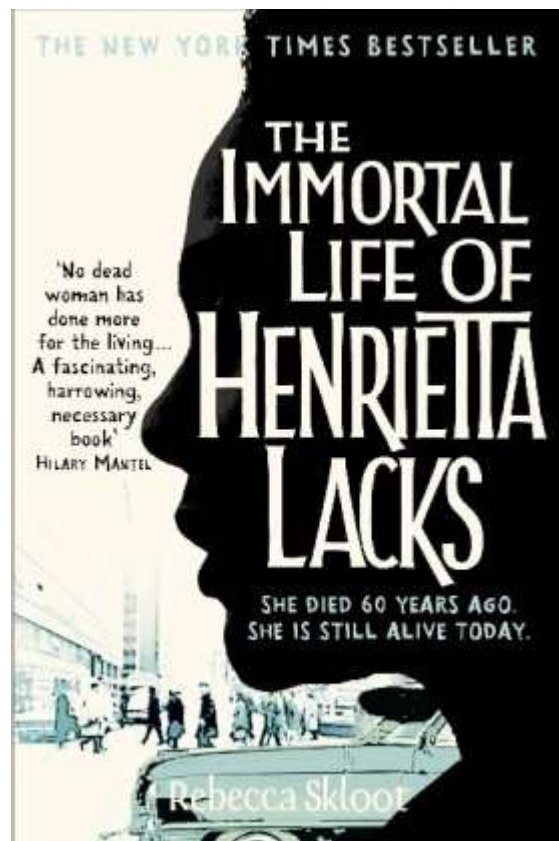
Biology Book Review

The Immortal Life of Henrietta Lacks, Rebecca Skloot, McMillan, London, 2010.

This book is a result of the author's investigative journalism into the life and family of Henrietta Lacks. Henrietta Lacks died of cervical cancer in 1951. A biopsy of cells from her tumour were cultured and became the first immortal human cell line – the HeLa cell line. Unlike many animal cell lines HeLa cells proliferate rapidly and are particularly durable, growing readily in culture. It is estimated that there are more HeLa cells in research labs across the world than there were cells in Henrietta Lacks' body. HeLa cells have been extensively used in scientific research contributing to studies of the understanding of cell biology, cancer and viruses, including the development of polio vaccine.

"Henrietta Lacks has achieved true immortality, both in the test tube and in the hearts and minds of scientists the world over, since the value of HeLa cells in research, diagnosis etc is inestimable." J Douglas, Nature, 1973.

Although primarily a human interest story of Henrietta' life, her daughter and the Author's quest to tell their story; the book also raises issues of medical and scientific ethics. There is no doubt that it is these elements of the book that have led to its popular appeal. However the science content of the book is explained in a straightforward manner and is relevant to the Revised and CfE Highers in Biology and Human Biology and to Revised and CfE Advanced Higher Biology; in particular to stem cells and cancer in the *DNA and the Genome* Unit of Higher Biology and the *Human Cells* unit of Higher Human Biology and to protein control of cell division in the *Cells and Proteins* Unit of Advanced Higher Biology. The ethical issues raised in the book also reflect the emphasis placed on these issues in Biology courses. The book also emphasises scientific method when giving an account of the scientific research associated with HeLa cells. The level of treatment of the science makes it suitable for pre course reading or as further reading for interest during course work. It could be used as recommended reading in earlier years as a 'trailer' for Higher and Advanced Higher courses.



The American cable TV company HBO have purchased the film rights to Rebecca Skloot's book and plan to make a feature film based on it in the near future. The story of Henrietta Lacks and her cells is told in the 1997 BBC documentary *The Way of all Flesh* and can be viewed/downloaded from <http://archive.org/details/AdamCurtisTheWayofAllFlesh> or

http://www.bbc.co.uk/blogs/adamcurtis/posts/the_undead_henrietta_lacks_and

Cell culture laboratory methods are described including the importance of aseptic techniques, the critical importance of culture media and growth conditions and the requirement to have results that can be reproduced by others. Techniques such as cloning and karyotyping are explained and the use of cell culture lines as an alternative to laboratory animals for experimental work on disease and therapeutic and other chemical and environmental agents discussed. The history of informed consent becoming part of medical research in the USA is described in the context of ethical research. Gene mapping and monoclonal antibodies are mentioned although not explained in any great detail. The contamination of cell lines with HeLa cells makes for an interesting case history of sceptical scientific investigation (chapter 20). The role of Human Papilloma Virus (HPV) in cervical cancer is explained as is the action of telomeres and telomerase in determining the life of cells.

Post review update

In March 2013 the first genomic sequence of a HeLa cell line was published [1]. Different cell lines may have different sequences to each other and to the original sample of cervical cells due to mutation in culture. These sequences showed a number of interesting features. Evidence was found of the insertion of the human papillomavirus (HPV) often associated with cervical cancer in chromosome 8. Massive rearrangements were noted on Chromosome 11 typical of chromothripsis, a process where parts of the chromosome are shattered and rearranged. Potential cervical cancer suppressing genes have been mapped to chromosome 11 and the mutation of these genes to a non functioning form as a result of chromothripsis are likely to be responsible for the aggressive proliferation phenotype of HeLa cells. Chromothripsis is a single catastrophic event in a cells history and occurs in 2% to 3% of all cancers. Most cancers are thought to be due to the gradual acquisition of mutations over time, hence why cancers are more common later in life. Henrietta Lacks died age 31.

Reference:

[1] Jonathan Landry, Paul Theodor Pyl, Tobias Rausch, Thomas Zichner, Manu M. Tekkedil, Adrian M. Stütz, Anna Jauch, Raeka S. Aiyar, Gregoire Pau, Nicolas Delhomme, Julien Gagneur, Jan O. Korbel, Wolfgang Huber, Lars M. Steinmetz (2013), The genomic and transcriptomic landscape of a HeLa cell line, G3: Genes|Genomes|Genetics Early Online.

