

**AQA Biology GCE AS and A Level Specification Curriculum links (2015 onwards)**

<b>SciberBrain Topic</b>	<b>Unit</b>		<b>Statement linked to SciberBrain Topic</b>
<b>Stem cells</b>	AS	3.2.6	Cell differentiation
	A2	3.8.2.1	Totipotent cells are cells that can mature into any body-cell. During development, totipotent cells translate only part of their DNA, resulting in cell specialisation. Totipotent cells occur only for a limited time in mammalian embryos. Multipotent cells are found in mature mammals. They can divide to form only a limited number of different cell types. Totipotent and multipotent stem cells can be used in treating some genetic disorders. Induced pluripotent stem cells (iPS cells) can be produced from adult somatic cells using appropriate protein transcription factors.
	HSW		Evaluate the use of stem cells in treating human disorders.
<b>Vaccinations</b>	AS	3.2.4	Identifying pathogens, cells from other organisms of the same species, abnormal body cells and toxins. Principles of immunology. Phagocytosis of pathogens. Definition of antigen and antibody. The essential difference between humoral and cellular responses as shown by B cells and T cells. The use of vaccines to provide protection for individuals and populations against disease. The differences between active and passive immunity.
	HSW		Discuss ethical issues associated with the use of vaccines and monoclonal antibodies
<b>Brain chemistry</b>	A2	3.6.2	The passage of an action potential along non-myelinated and myelinated axons, resulting in nerve impulses. Changes in membrane permeability lead to depolarisation and the generation of an action potential. The all-or-nothing principle. The detailed structure of a synapse When provided with information, candidates should be able to predict and explain the effects of specific drugs on a synapse.
	HSW		Appreciate how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society.
<b>Genetic engineering</b>	AS	3.2.1	Causes of variation
		3.4.1	Structure of DNA Genes and polypeptides DNA and chromosomes
		3.4.3	Similarities and differences in DNA result in genetic diversity
		3.1.5	Replication of DNA
		3.8.4	The impact of agriculture on species diversity.
	A2	3.4.2	The genetic code as base triplets in mRNA which code for specific amino acids and polypeptide synthesis
		3.8.4	Fragments of DNA can be produced by <ul style="list-style-type: none"> <li>• conversion of mRNA to cDNA, using reverse transcriptase</li> </ul>

			<ul style="list-style-type: none"> <li>cutting DNA at specific, palindromic recognition sequences using restriction endonucleases</li> <li>the polymerase chain reaction (PCR).</li> </ul> <p>Fragments of DNA produced by any of the above methods can be used to clone genes by in vivo and in vitro techniques.</p> <p>In vivo cloning. The use of restriction endonucleases and ligases to insert a gene into vectors, which are then transferred into host cells. The identification and growth of transformed host cells to clone the desired DNA fragments.</p> <p>In vitro cloning. The use of the polymerase chain reaction (PCR) to clone directly.</p>
	HSW		<p>Interpret information relating to the use of recombinant DNA technology.</p> <p>Evaluate the ethical, financial and social issues associated with the use and ownership of recombinant DNA technology in agriculture, in industry and in medicine</p> <p>Balance the humanitarian aspects of recombinant DNA technology with the opposition from environmentalists and antiglobalisation activists.</p>
<b>Clinical trials</b>	HSW		Appreciate the ways in which society uses science to inform decision-making
<b>Evolution</b>	AS	3.1	Nucleic acids carry the genetic code for the production of proteins. The genetic code is common to viruses and to all living organisms, providing evidence for evolution.
		3.4	Causes of variation
		3.4	Similarities and differences in DNA result in genetic diversity
		3.2.8	The phylogenetic groups are based on patterns of evolutionary history
		3.4.4	Genetic comparisons can be made between different species Comparison of DNA base sequences is used to elucidate relationships between organisms Comparisons of amino acid sequences in specific proteins can be used to elucidate relationships between organisms.
	A2	3.7	Within a habitat a species occupies a niche governed by adaptation to both biotic and abiotic conditions.
		3.7.3	Genetic variation within a species and geographic isolation lead to the accumulation of different genetic information in populations and the potential formation of new species Selection and speciation
	HSW		Appreciate the role of the scientific community in validating new knowledge and ensuring integrity.