

Timeline For Core Biology: Microbiology and Genetics Discoveries†

500 B.C. – 1500A.D.

- 350 B.C. - Aristotle founds zoology.
- 300 B.C. - Herophilus dissects the human body.
- 300 B.C. - Diocles wrote the first known anatomy book and was the first to use the term anatomy.
- 130-200 - Claudius Galen writes treatises on human anatomy.

1500A.D. – 1800A.D.

- 1628 - William Harvey publishes *An Anatomical Exercise on the Motion of the Heart and Blood in Animals*.
- 1651 - William Harvey concludes that all animals, including mammals, develop from eggs.
- 1663 - Robert Hooke sees cells in cork using a microscope.
- **1673 – Anton van Leeuwenhoek describes microscopic life.**
- 1683 - Anton van Leeuwenhoek observes bacteria.
- 1735 – Carlos Linnaeus begins the modern description of life
- 1796 – Baron Georges Cuvier founds the science of comparative anatomy.

1800A.D. to Present

- 1800 - The term biology in its modern sense is coined by Karl Friedrich Burdach
- 1802 – The term biology is used independently by Gottfried Reinhold Treviranus and Jean Baptiste Lamarck.
- 1809 – Jean Baptiste Lamarck proposes a modern theory of evolution based on the inheritance of acquired characteristics.
- 1826 - Karl von Baer shows that all animal life begins with an egg.
- **1838 - Matthias Schleiden proposes that all plants are composed of cells.**
- **1839 - Theodor Schwann proposes that all animal tissues are composed of cells.**
- 1856 - Louis Pasteur states that microorganisms produce fermentation.
- 1858 - Rudolf Virchow proposes that cells can only arise from pre-existing cells;
- 1864 - Louis Pasteur disproves the spontaneous generation of cellular life.
- **1866 - Gregor Mendel formulates his Laws of Inheritance.**
- 1869 - Friedrich Miescher discovers nucleic acids in the nuclei of cells.
- 1876 - Oskar Hertwig and Hermann Fol independently describe the entry of sperm into the egg and the subsequent fusion of the egg and sperm nuclei to form a single new nucleus.
- **1878 – Louis Pasteur proves germ theory of disease.**
- **1884 - Walther Fleming coins the term mitosis to describe mitosis.**

- **1884 - Edward Strasbourg coins the term cytoplasm to describe the cell's central fluid and establishes the cell's structure.**
- 1898 - Martinus Beijerinck uses filtering experiments to show that tobacco mosaic disease is caused by something smaller than a bacterium, which he names a virus.
- 1902 - Walter Sutton and Theodor Boveri, independently propose that the chromosomes carry the hereditary information.
- 1905 - William Bateson coins the term "genetics" to describe the study of biological inheritance.
- **1905 – Scientists discover how specialized sex cells come about and describe meiosis.**
- 1909 - Wilhelm Johannsen coins the word "gene."
- **1911 - Thomas Hunt Morgan proposes that genes are arranged in a line on the chromosomes.**
- 1929 - Phoebus Levene discovers the sugar deoxyribose in nucleic acids.
- 1944 - Oswald Avery shows that DNA carries the genetic code in pneumococcus bacteria.
- 1952 - Alfred Hershey and Martha Chase show that DNA is the genetic material in bacteriophage viruses.
- 1952 - Rosalind Franklin concludes that DNA is a double helix
- 1953 - After examining Franklin's unpublished data, James D. Watson and Francis Crick publish a double-helix structure for DNA.
- 1955 - Marianne Grunberg-Manago and Severo Ochoa discover the first nucleic-acid-synthesizing enzyme (polynucleotide phosphorylase), which links nucleotides together into polynucleotides.
- 1955 - Arthur Kornberg discovers DNA polymerase enzymes.
- **1967 - American biologist Lynn Margulis describes the symbiotic cell and how cooperation is one of the bases for all life on the planet.**
- 1995 - Publication of the first complete genome of a free-living organism.
- 1996 - Dolly the sheep is first clone of an adult mammal.
- 2001 - Publication of the first drafts of the complete human genome.
- 2002 - First virus produced 'from scratch,' an artificial polio virus that paralyzes and kills

† Bold indicates segments in Program Core Biology: Microbiology and Genetics