The characteristic symptoms of malaria are first described in Chinese medical writings.

Hindu physicians exhibit broad clinical knowledge of tuberculosis. In India, the Laws of Manu consider it to be an unclean, incurable disease and an impediment to marriage.

Plague of Athens caused by unknown infectious agent. One third of the population (increased by those fleeing the Spartan army) die.

Hippocrates (460–370 BC), Greek physician, and his disciples found their medical practice based on reason and experiment. They attribute disease to natural causes and use diet and medication to restore the body's balance of humors.

Hippocratic texts recommend irrigation with fresh water as a treatment for septic wounds.

A medical school is set up in Alexandria where the first accurate anatomical observations using dissection are made. The principal exponents of the school are Greek physician Herophilus (c.335–c.280 BC) and Greek physician Erasistratus (c.304–c.250 BC).

Herophilus, Greek anatomist, establishes himself as the first systemic anatomist and the first to perform human dissections.

Greek scientific medicine takes hold in Rome when the physician Asclepiades (c.130–40 BC) of Bithynia settles in the West.

Aulus Cornelius Celsus, Roman encyclopedist, writes his influential book De Re Medicina. This work On Medicine contains descriptions of many conditions and operations, and is probably drawn mostly from the collection of writings of the school of Hippocrates. It is rediscovered during the fifteenth century and becomes highly influential. (See 1426)

Dioscorides, Greek physician, writes the first systematic pharmocopoeia. His De Materia Medica in five volumes provides accurate botanical and pharmacological information. It is preserved by the Arabs and, when translated into Latin and printed in 1478, becomes a standard botanical reference.

Cladius Galen says that pus formation is required for wound healing. This proves to be incorrect and hinders the treatment of wounds for centuries.

Bubonic plague (termed “barbarian boils”) sweeps China.

Galen (c.130–c.200), Greek physician, in his De Usu Partium describes the pineal gland as a secretory organ that is important to thinking. He names it the pineal because it resembles a pine cone.

Plague in Rome (possibly smallpox or bubonic plague) eventually kills millions throughout the weakening Roman empire.

Stabiae, a popular health resort for tuberculosis sufferers, is established near Naples.
Italy. It is believed that the fumes from nearby Mt. Vesuvius are beneficial for lung ulcers.

170 Galen, the Greek physician, first describes gonorrhea.

c.200 Galen describes internal inflammations as caused by personal factors.

c.370 Basil of Caesarea (330–379) founds and organizes a large hospital at Caesarea (near Palestine).

c.400 Fabiola, a Christian noblewoman, founds the first nosocomium or hospital in Western Europe. After establishing the first hospital in Rome, she founds a hospice for pilgrims in Porto, Italy.

430 Earliest recorded plague in Europe is an epidemic that breaks out in Athens, Greece.

c.500 During this century, the "plague of Justinian" kills about one million people.

529 Benedict of Nursia founds the monastery at Monte Cassino in central Italy. It becomes, if not an actual medical school, at least an important center of scholarship in which medicine played a great part. It also acquires great fame throughout the West and its medical teachings are spread by the Benedictines to their monasteries scattered all over Europe.

610 In China, Ch’ao Yuan-fang writes a treatise on the causes and symptoms of diseases. Medical knowledge spreads from China to Japan via the Korean peninsula.

644 Rotharuss, King of Lombardy also called Rotari, issues his Edict ordering the segregation of all lepers.

700 Benedictus Crispus, archbishop of Milan from 681 to about 730, writes his Commentarius Medicinalis, an elementary practical manual in verse. It describes the use of medicinal plants for curing illnesses.

750 Christian physician Sabur ibn Sahl of Junnishapur compiles a twenty-two volume work on antidotes that dominates Islamic pharmacopoeia for the next 400 years.

850 Islamic philosopher al-Kindi (813–873) writes his De Medicinarum Compositarum Gradibus, which attempts to base dosages of medicine on mathematical measurements.

857 Bertharius, the abbot of Monte cassino from 857 to 884, writes two treatises, De Innumeris Remediorum Utilitatisibus and De Innumeris Morbis that give insight into the kind of medicine practiced in the monasteries.

896 Abu Bakr al-Razi (also known as Rhazes (c.845-c.930), Persian physician and alchemist, distinguishes between the specific characteristics of measles and smallpox. He is also believed to be the first to classify all substances into the great classification of animal, vegetable, and mineral. (See 918)

900 First medical books written in Anglo-Saxon appear. Lacnunga and the Leech Book of Bald appear and have some botanical sections.

955 Jewish "prince of medicine," Isaac Israeli, dies. He writes classic works on fever and uroscopy, as well as a Guide of the Physicians.

980 Abu Al-Qasim Al-Zahravi (Abucasis) creates a system and method of human dissection along with the first formal specific surgical techniques.

1000 Ibn Sina, or Avicenna, publishes Al-Qanun, or Canon of Medicine, where he held that medicines could be discovered and tried by experiment or by reasoning.

1137 St. Bartholomew’s hospital is founded in London.

1140 Bologna, Italy, begins to develop as a major European medical center. In the next century, the Italian physician Taddeo Alderotti (c.1233–1303) opens a school of medicine there.

1200 Physicians in Italy begin to write case-histories that describe symptoms and observable pathology of diseases.

1267 Roger Bacon (1214–1292), English philosopher and scientist, asserts that natural phenomena should be studied empirically.

1302 First formally recorded post-mortem or judicial autopsy is performed in Bologna, Italy, by Italian physician Bartolomeo da Varignana. A postmortem is ordered by the court in a case of suspected poisoning.

1333 Public botanical garden is established in Venice, Italy, to grow herbs that have medical uses.

1345 First apothecary shop or drug store opens in London, England.
1348 The beginning of a three-year epidemic caused by *Yersinia pestis* kills almost one-third of the population of urban Europe. In the aftermath of the epidemic, measures are introduced by the Italian government to improve public sanitation, marking the origin of public health.

1374 As the plague spreads, the Republic of Ragusa places the first quarantines on crews of ships thought to be infected.


1489 Typhus is first brought to Europe by soldiers who had been fighting in Cyprus.

1491 First anatomical book to contain printed illustrations is German physician Johannes de Ketham’s *Fasciculus Medicinae*.

1492 Venereal diseases, smallpox, and influenza are brought by the Columbus expedition (and subsequent European explorers) to the New World. Millions of native peoples eventually die from these diseases because of a lack of prior exposure to stimulate immunity. In some regions, whole villages succumb, and across broader regions up to 95% of the native population dies.

1525 Paracelsus (1493–1541), Swiss physician and alchemist, publishes his surgical treatise, *Chirurgia Magna*.

1543 Andreas Vesalius (1514–1564), Dutch anatomist, publishes his *De Corporis Humani Corporis Fabrica*, the first accurate book on human anatomy. Its illustrations are of the highest level of both realism and art, and the result revolutionizes biology.

1546 Girolamo Fracastoro (1478–1553), Italian physician, writes his *De Contagione et Contagiosis Morbis*, which contains new ideas on the transmission of contagious diseases and is considered as the scientific beginning of that study.

1563 Epidemic cholera is described by Garcia del Huerto, working in Goa, India.

1567 A book on miner's tuberculosis by Swiss physician and alchemist Paracelsus (1493–1541) is posthumously published.

1621 Johannes Baptista van Helmont (1577–1635), Dutch physician and alchemist, writes his *Ortus Medicinae* in which he becomes one of the founders of modern pathology. He studies the anatomical changes that occur in disease.

1642 Juan del Vigo introduces cinchona into Spain. Native to the Andes, the bark of this tree is processed to obtain quinine, used in the treatment of malaria.

1648 Willem Piso (1611–1678), Dutch physician and botanist (also called Le Pois),
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1660</td>
<td>The Royal Society of London is founded in England with Henry Oldenburg (c.1618–1677) Secretary and Robert Hooke (1635–1702) Curator of Experiments. Two years later (1662), King Charles II (1630–1685) grants it a royal charter, and it becomes known as the “Royal Society of London for the Promotion of Natural Knowledge.”</td>
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<td>1665</td>
<td>Bubonic plague epidemic in London kills 75,000 people. It is during this scourge that English scientist and mathematician Isaac Newton (1642–1727) leaves school in London and stays at his mother’s farm in the country. There he formulates his laws of motion.</td>
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<td>1665</td>
<td>First drawing of the cell is made by Robert Hooke (1635–1703), English physicist. While observing a sliver of cork under a microscope, Hooke notices it is composed of a pattern of tiny rectangular holes he calls “cells” because each looks like a small, empty room. Although he does not observe living cells, the name is retained.</td>
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<tr>
<td>1665</td>
<td>Robert Boyle (1627–1703), English physicist, publishes his landmark book on microscopy called <em>Micrographia</em>. Containing some of the most beautiful drawings of microscopic observations ever made, his book led to many discoveries in related fields.</td>
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<tr>
<td>1668</td>
<td>Robert Boyle (1627–1691), English physicist and chemist, publishes <em>The Origin of Forms and Qualities</em> in which he begins to explain all chemical reactions and physical properties through the existence of small, indivisible particles or atoms.</td>
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<td>1668</td>
<td>Francesco Redi (1626–1697), Italian physician, conducts experiments to disprove spontaneous generation and shows that maggots are not born spontaneously, but come from eggs laid by flies. He publishes <em>Esperienze Intorno all Generazione degli Insetti</em>.</td>
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<td>1671</td>
<td>Michael Ettmüller (1644–1683), German physician, attributes the contagiousness of tuberculosis to sputum.</td>
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<td>1672</td>
<td>French physician Le Gras introduces ipecac into Europe as he brings it to Paris this year. The root of the Brazilian plant ipecacuanha is used to cure dysentery. (See 1625)</td>
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<td>1674</td>
<td>Antoni van Leeuwenhoek (1632–1723), Dutch biologist and microscopist, observes “animacules” in lake water viewed through a ground glass lens. This observation of what will eventually be known as bacteria represents the start of the formal study of microbiology.</td>
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<td>1675</td>
<td>John Josselyn, English botanist, publishes an account of the plants and animals he encounters while living in America and indicates that tuberculosis existed among the Native Americans before the coming of the Europeans.</td>
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<td>1677</td>
<td>Bernardino Ramazzini (1633–1714), Italian physician, publishes the first systematic treatment on occupational diseases. His book, <em>De Morbis Artificum</em>, opens up an entirely new department of modern medicine—diseases of trade or occupation and industrial hygiene.</td>
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<td>1677</td>
<td>The word “antiseptic” first appears in print.</td>
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<td>1679</td>
<td>George Martine performs the first tracheostomy on a patient with diphtheria.</td>
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<tr>
<td>1679</td>
<td>Botulism first described.</td>
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<td>1700</td>
<td>John Fothergill describes diphtheria in “Account of the Putrid Sore Throat.”</td>
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<tr>
<td>1700</td>
<td>Marcus Anton von Plenzer, Sr. (1705–1786), Austrian physician, expresses the idea that all infectious diseases are caused by living organisms and that there is a specific organism for each disease.</td>
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1767 William Heberden demonstrates that chickenpox is not a mild form of smallpox, but a different disease.

1770 George Adams (1750–1795), English engineer, devises the first microtome. This mechanical instrument cuts thin slices for examination under a microscope, thus replacing the imprecise procedure of cutting by hand-held razor.

1780 Polio is first described by Michael Underwood in England.

1789 Edward Jenner (1749–1823) uses cowpox virus to develop a smallpox vaccine. By modern standards, this was human experimentation as Jenner injected healthy eight-year-old James Phillips with cowpox and then after a period of months with smallpox.

1796 Government legislation is passed to establish hospitals in the United States devoted to the care of ill mariners. This initiative leads to the establishment of a Hygienic Laboratory that eventually grows to become the National Institutes of Health.

1800 Marie-François-Xavier Bichat publishes his first major work, *Treatise on Tissues*, which founds histology, distinguishing 21 kinds of tissue and relating diseases to them.

1801 A hospital is established in London, England, to treat the victims of typhus.

1802 John Dalton introduces modern atomic theory into the science of chemistry.

1814 The Royal Hospital for Diseases of the Chest is founded in London, England, in an attempt to keep consumptive patients (people with tuberculosis) segregated.

1816 The stethoscope, which is an important tool for diagnosing pneumonia, is introduced by Rene Laennec.

1817 Start of first cholera pandemic, which spreads from Bengal to China in the east and to Egypt in the west.

1818 Xavier Bichat (1771–1802), French physician, publishes his first major work, *Traité des membraneux en général*, in which he propounds the notion of tissues. This work also founds histology, distinguishing 21 kinds of tissue and relating disease to them.

1820 First United States Pharmacopoeia is published.

1824 Start of second cholera pandemic, which penetrates as far as Russia and also reaches England, North America, the Caribbean, and Latin America.

1825 Pierre Bretonneau (1778–1862), French physician, describes and names diptheria in his specification of diseases.

1826 Salcin, the precursor of aspirin, is purified from the bark of the willow tree.

1829 Jacob Bigelow (1787–1879), American physician, publishes his book *On Self-Limited Diseases* in which he states the commonsense idea that some diseases will simply run their course and subside without the benefit of any treatment from a physician.

1831 Charles Robert Darwin (1809–1882) begins his historic voyage on the H.M.S. *Beagle* (1831–1836). His observations during the voyage lead to his theory of evolution by means of natural selection.

1835 Theodor Schwann carries out experiments that refute the theory of the spontaneous generation. He also demonstrates that alcoholic fermentation depends on the action of living yeast cells. The same conclusion is reached independently by Charles Cagnard de la Tour.

1836 Matthias Jakob Schleiden notes that the nucleus first described by Robert Brown is a characteristic of all plant cells. Schleiden makes similar suggestions, but do not develop their ideas into a coherent and convincing theory of evolution.
describes plants as a community of cells and cell products. He helps establish cell theory and stimulates Theodor Schwann’s recognition that animals are also composed of cells and cell products.

1839 Third cholera pandemic begins with entry of British troops in Afghanistan and travels to Persia, Central Asia, Europe, and the Americas.

1841 Friedrich Gustav Jacob Henle (1809–1885), German pathologist and anatomist, publishes his *Allgemeine Anatomie*, which becomes the first systematic textbook of histology (the study of minute tissue structure and includes the first statement of the germ theory of communicable disease).

1842 Edwin Chadwick, a pioneer in sanitary reform, reports that deaths from typhus in 1838 and 1839 in England exceeded those from smallpox.

1843 Gabriel Andral (1797–1876), French physician, is the first to urge that blood be examined in cases of disease.

1846 American Medical Association establishes a code of ethics for physicians which declares their obligation to treat victims of epidemic diseases even at a risk to their own lives. (See 1912)

1847 A series of yellow fever epidemics sweeps the American Southern states. The epidemics recur for more than thirty years.

1847 The first sexually transmitted disease clinic is opened at the London Docks Hospital.

1849 John Snow (1813–1858), English physician, first states the theory that cholera is a water-borne disease. During a cholera epidemic in London in 1854, Snow breaks the handle of the Broad Street Pump, thereby shutting down the main source of disease transmission during the outbreak.

1849 John Snow publishes the groundbreaking paper “On the Transmission of Cholera.”

1855 Third, or Modern, pandemic of plague probably begins in Yunnan province, China.

1857 Louis Pasteur demonstrates that lactic acid fermentation is caused by a living organism. Between 1857 and 1880, he performs a series of experiments that refute the doctrine of spontaneous generation. He also introduces vaccines for fowl cholera, anthrax, and rabies, based on attenuated strains of viruses and bacteria.

1858 Rudolf Ludwig Carl Virchow publishes his landmark paper “Cellular Pathology” and establishes the field of cellular pathology. Virchow asserts that all cells arise from pre-existing cells (*Omnis cellula e cellula*). He argues that the cell is the ultimate locus of all disease.


1861 Carl Gegenbaur confirms Theodor Schwann’s suggestion that all vertebrate eggs are single cells.

1862 First demonstration of pasteurization.

1864 Fourth cholera pandemic starts and revisits locations of previous pandemics.

1865 An epidemic of rinderpest kills 500,000 cattle in Great Britain. Government inquiries into the outbreak pave the way for the development of contemporary theories of epidemiology and the germ theory of disease.

1865 French physiologist Claude Bernard publishes *Introduction to the Study of Human Experimentation*, which advocates “Never perform an experiment which might be harmful to the patient even if advantageous to science…”

1866 The Austrian botanist and monk Johann Gregor Mendel (1822–1884) discovers the laws of heredity and writes the first of a series of papers on heredity (1866–1869). The papers formulate the laws of hybridization. Mendel’s work is disregarded until 1900, when Hugo de Vries rediscovers it. Unbeknownst to both Darwin and Mendel, Mendelian laws provide the scientific framework for the concepts of gradual evolution and continuous variation.

1867 Joseph Lister publishes a study that implicates microorganisms with infection. Based on this, his use of early disinfectants during