

## Timeline of Major Hematology Landmarks

Ancient Egypt	“Blood letting” instruments are used.	1910	The first clinical description of sickle cell published in medical literature.
460–377 BC	Hippocrates teaches the <i>humoral</i> theory, a hypothetical system to explain illness in which balance equals health. Excess or deficiency equals illness.	1914	Sodium citrate is found to prevent blood from clotting, allowing blood to be stored between collection and transfusion.
1628	William Harvey introduces the controversial concept of circulation.	1924	<i>Pediatrics</i> is the first comprehensive American publication on pediatric hematology.
1642	Anthony van Leeuwenhoek constructs a microscope and distinguishes blood cells.	1925	Alfred P. Hart performs the first exchange transfusion.
1656	Christopher Wren gives the first intravenous (IV) injection in animals.	1925	Thomas Cooley describes a Mediterranean hematologic syndrome of anemia, erythroblastosis, skeletal disorders, and splenomegaly that is later called Cooley’s anemia and now thalassemia.
1662	J. C. Major gives the first IV injection in humans.	1936	Chicago’s Cook County Hospital establishes the first true “blood bank” in the United States.
1665	Richard Lower performs the first documented blood transfusion using dogs and notes a color difference between veins and arteries.	1938	Dr. Louis Diamond (known as the “father of American pediatric hematology”) along with Dr. Kenneth Blackfan describes the anemia still known as Diamond-Blackfan anemia.
1667	Jean Baptist Denis in France and Richard Lower in England separately report giving the first human blood transfusion with blood from lambs. Within 10 years, transfusing the blood of animals to humans becomes prohibited by law, delaying transfusion advances for about 150 years.	1941	The <i>Atlas of the Blood of Children</i> is published by Blackfan, Diamond, and Leister.
1770	William Hewson describes leukocytes and some essential clotting factors and becomes known as “the father of hematology.”	1945	Coombs, Mourant, and Race describe the use of antihuman globulin (later known as the “Coombs Test”) to identify “incomplete” antibodies.
1795	Philip Syng Physick, an American physician, claims to perform the first human-to-human blood transfusion, although he does not publish this information.	1954	The blood product cryoprecipitate is developed to treat bleeds in people with hemophilia.
1818	James Blundell performs the first successful transfusion of human blood to a patient. Between 1825 and 1830, he performs ten transfusions, five of which prove beneficial to his patients, and publishes these results. He also devises various instruments for performing transfusions and proposed rational indications.	1950s	The “butterfly” needle and intercath are developed, making IV access easier and safer.
1840	At St. George’s School in London, Samuel Armstrong Lane performs the first successful whole blood transfusion to treat hemophilia.	1961	The role of platelet concentrates in reducing mortality from hemorrhage in cancer patients is recognized.
1842	Alexandre Donne identifies platelets.	1962	The first antihemophilic factor concentrate to treat coagulation disorders in hemophilia patients is developed through fractionation.
1867	English surgeon Joseph Lister uses antiseptics to control infection during transfusions.	1969	S. Murphy and F. Gardner demonstrate the feasibility of storing platelets at room temperature, revolutionizing platelet transfusion therapy.
1877	Paul Ehrlich develops techniques to stain blood cells to improve microscopic visualization.	1971	Hepatitis B surface antigen testing of blood begins in the United States.
1897	<i>The Diseases of Infancy and Childhood</i> contains a 20-page chapter on diseases of the blood and is the first American pediatric medical textbook to provide significant hematologic information.	1972	Apheresis is used to extract one cellular component, returning the rest of the blood to the donor.
1821–1902	Rudolph Virchow, during a long and illustrious career, demonstrates the importance of fibrin in the blood coagulation process, coins the terms embolism and thrombosis, identifies the disease leukemia, and theorizes that leukocytes are made in response to inflammation.	1974	<i>Hematology of Infancy and Childhood</i> is published by Nathan and Oski.
1901	Karl Landsteiner and colleagues identify blood groups of A, B, AB, and O.	1980s	HIV is identified, but the virus has already decimated the hemophilic population.
1907	Ludvig Hektoen suggests that the safety of transfusion might be improved by crossmatching blood between donors and patients to exclude incompatible mixtures. Reuben Ottenberg performs the first blood transfusion using blood typing and crossmatching in New York. Ottenberg also observes the Mendelian inheritance of blood groups and recognizes the “universal” utility of group O donors.	1985–1986	Blood can be tested for HIV, and heat-treated factor becomes available, making it safe to treat hemophilic patients again without fear of patients contracting AIDS.
		1990s	G-CSF, GM-CSF, Epogen®, and Neumega® (IL <sub>3</sub> ) become clinically available.
		1990s	Recombinant factor replacement products become clinically available.
		2000s	The possibilities are endless... ■