William Thornton Mustard (1914-1987) [1]

By: Caudle, Daniella

William Thornton Mustard was a surgeon in Canada during the twentieth century who developed surgical techniques to treat children who had congenital heart defects. Mustard has two surgeries named after him, both of which he helped to develop. The first of these surgeries replaces damaged or paralyzed muscles in individuals who have polio, a virus that can cause paralysis. The other technique corrects a condition called the transposition of the great arteries (TGA) that is noticed at birth. Surgeons worldwide adopted that technique, leading to increased survival rates in infants afflicted with the condition. Mustard also published over 100 articles on congenital heart defects, surgical techniques, and the preparation of an artificial heart lung machine. Mustard helped perform the first blood transfusion of a newborn whose red blood cells (RBCs) had degraded, a condition called hemolytic anemia [2]. Throughout his career, Mustard developed surgical techniques that increased the survival rates of infants and children with congenital and developmental disorders.

Mustard was born in Clinton, Canada, on 8 August 1914. He was the fourth of five children born to Pearl Mustard and Thornton Mustard, both schoolteachers. During his childhood, Mustard collected butterflies and identified birds [3]. During high school, Mustard met Elise Howe, who he later married. In 1930, at the age of fifteen, Mustard graduated from high school at the University of Toronto in Toronto, Canada, which offered high school diplomas, though Mustard was too young to begin the application process for university, so he stayed another year before beginning university.

Mustard began his university education in 1931 at the University of Toronto, with a focus in forestry. However, his older brother Donald, already in medical school, persuaded Mustard to pursue medicine at the University of Toronto Medical School. In 1937, the youngest in his class at the age of twenty-two, Mustard graduated with his medical degree. Shortly after, he worked as an intern at the Toronto General Hospital in Toronto, and then he moved to the New York Orthopedic Hospital in New York City, New York.

At the beginning of World War II, in 1939, Mustard's parents boarded the British passenger ship Athenia to visit their eldest son in England. When they returned to Canada, Britain declared war on Germany. And Germany torpedoed the Athenia. Both of Mustard's parents survived the initial attack, but they were trapped on the sinking ship. Mustard's mother survived the ordeal, but his father drowned that night. The death of his father left Mustard's younger brother with no money to finish his last year of school, so Mustard began working at a general practice in Northern Ontario, Canada, to pay for his brother's tuition. In 1940, Mustard returned to Toronto to continue his own education, and he received six additional months of training in surgery before he joined the Royal Canadian Medical Corps in 1941. During that year, Mustard married Elise Howe and the couple would have three children.

During his time in the Royal Canadian Medical Corps, Mustard developed his first surgical technique. In 1944, Mustard preserved the leg of Captain Graham Dixon, whose main artery was injured. Doctors often amputated legs after such injuries. Instead, Mustard inserted a tube to function as a bridge between the two ends of the severed artery until a vein graft could be transplanted to replace the glass tubing a few days later. Mustard's intervention was an early prosthetic tube used to mend a damaged artery, and it helped save the limb from amputation. For performing that surgery, Mustard became a member of the Order of the British Empire, an honor society that recognizes an individual's contribution to the arts and sciences. Despite the initial success of the prosthetic glass technique, the success rate of similar attempts was low. Between 1950 and 1953, doctors in the US improved the technique during the Korean War.

In 1948, Mustard and John Fraser, another doctor at the Hospital for Sick Children [4] in Toronto, Canada performed the first successful total blood transfusion on a newborn infant suffering from hemolytic disease, which leads to hemolytic anemia [2], a condition for which red blood cells are abnormally broken down and removed from the blood stream. Hemolytic anemia [2] in newborns occurs when a pregnant woman's body recognizes the fetus [5]'s blood as foreign. This condition is called Rh incompatibility [6] and occurs when the mother is Rh negative and the baby is Rh positive.

The Rh designates the presence or absence of the D antigen, which is a type of marker on the surface of red blood cells. Rh positive red blood cells have the D antigen present on the surface of their cells while Rh negative red blood cells lack the D antigen. When a pregnant woman's blood comes in contact with a fetus [5]'s blood, the woman's immune system produces antibodies against the blood of the fetus [5], namely the D antigen on the red blood cell. Typically, the placenta [7] prevents the crossing of blood between pregnant woman and the developing fetus [5]. However, during childbirth or traumatic injuries during pregnancy [8],
Sources

William Thornton Mustard was a surgeon in Canada during the twentieth century who developed surgical techniques to treat children who had congenital heart defects. Mustard has two surgeries named after him, both of which he helped to develop. The first of these surgeries replaces damaged or paralyzed muscles in individuals who have polio, a virus that can cause paralysis. The other technique corrects a condition called the transposition of the great arteries (TGA) that is noticed at birth. Surgeons worldwide adopted that technique, leading to increased survival rates in infants afflicted with the condition. Mustard also published over 100 articles on congenital heart defects, surgical techniques, and the preparation of an artificial heart lung machine. Mustard helped perform the first blood transfusion of a newborn whose red blood cells (RBCs) had degraded, a condition called hemolytic anemia. Throughout his career, Mustard developed surgical techniques that increased the survival rates of infants and children with congenital and developmental disorders.

Subject

Topic
People [36] Disorders [37] Disorders [38]