Andreas Vesalius (1514–1564) [1]

By: Erjavic, Nicole

Andreas Vesalius, also called Andries van Wesel, studied anatomy during the sixteenth century in Europe. Throughout his career, Vesalius dissected numerous human cadavers, and took detailed notes and drawings of the human anatomy. Compiling his research, Vesalius published an anatomy work titled *De humani corporis fabrica libri septem* ("On the fabric of the human body in seven books"). The *Fabrica* included illustrations of male and female anatomy. It also included diagrams of uteruses with intact fetuses. Vesalius was one of the first physicians to accurately record and illustrate human anatomy based on his findings from autopsies and dissections, which led to improved understanding of the human body and enhanced surgery techniques.

On 31 December 1514, Vesalius was born to Isabella Crabbe and Anders van Wesel in Brussels, Duchy of Brabant, later known as Brussels, Belgium. Vesalius's father served as an apothecary to Maximilian I, the Holy Roman Emperor, and later served Maximilian I's successor, Charles V, as a valet de chambre. Vesalius studied medicinal texts in his family's library and, according to professor of anatomy John Saunders, was encouraged to pursue medicine by his mother. At the age of fourteen, Vesalius enrolled at the University of Louvain in Louvain, Brabant, later known as Leuven, Belgium, for his primary education. In 1531, he transferred to Collegium Trilingue at Louvain, where he was trained in Latin, Greek, and Hebrew. In 1533, Vesalius entered the medical department at the University of Paris [2], in Paris, France, which later was incorporated into Paris Descartes University.

While in Paris, Vesalius studied Galenic medicine, the widely accepted techniques of the time. Galen [3] of Pergamon was a second-century Greek physician who wrote many texts on the observations he had made in his dissections of animals, primarily primates, dogs, and pigs. For over 1300 years physicians employed Galen [3]'s texts, which contained inaccuracies, for treatment. For example, many medieval physicians utilized bloodletting to treat numerous conditions, a practice that was based on Galen [3]'s incorrect depiction of the cardiovascular system. In the sixteenth century medical students, including those at the University of Paris [2], studied Galenic texts and Galenic medicine. According to Saunders, the University of Paris [2] was a conservative school that did not emphasize learning anatomy through dissection. Consequently, Vesalius likely observed only three to four human dissections during his time there. Vesalius later criticized how infrequently the university taught students anatomy through human dissection, how dissections lasted less than three days, and how the dissections did not allow for thorough investigation of intestines and muscles.

Nevertheless, Vesalius assisted with dissections at the University of Paris [2]. In 1535 during the second human anatomy demonstration he observed, his teacher request that he and his peers assist in the dissection. The following year he conducted his third human anatomical dissection nearly single-handedly. In addition to learning anatomy through the university, Vesalius also frequented a cemetery where the bones of the dead had been removed from the corpses. According to Saunders, Vesalius studied the bones until he was able to identify them blindfolded by touch.

In 1536, war broke out between France and Spain, and Vesalius left Paris before he could graduate. He returned to the University of Louvain, and in 1537 transferred to the University of Padua [4] in Padua, Republic of Venice, later known as Padua, Italy. At Padua, Vesalius performed several human anatomical dissections and analyzed at least two skeletons over the course of one year. On 5 December 1537, Vesalius graduated with a medical degree *cum ultima diminution*, Latin for with highest distinction. The next day, the senate of Venice in Venice, Republic of Venice, later known as Venice, Italy, nominated Vesalius professor of surgery at the University of Padua [4]. Vesalius accepted the position.

Within the first year of his professorship, Vesalius undertook his own personal dissections and employed his students as assistants. By the end of 1538, he had assembled a collection of anatomical information on which to base his drawings of the internal human anatomy. Vesalius made detailed, composite illustrations of human anatomical structures, including the skeletal system, blood circulation system, organ systems, muscular systems, nervous system, and reproductive system.

During his time in Padua, Vesalius traveled to Venice, where he met Jan Stephan van Calcar, an apprentice of Renascence painter Titian. Calcar transferred at least some of Vesalius's drawings into woodblock prints. When creating a wood block, artists carve the surface of a wooden block to remove the undesired spaces, leaving only the parts to be printed level with the surface. Vesalius sent the woodblocks of his anatomical drawings to printer Johannes Oporinus in Basel, Switzerland, to mass reproduce the images.

The following year, Vesalius used his woodblocks to illustrate his book *De humani corporis fabrica libri septem* ("On the fabric of

the human body in seven books"). Published in 1543, the textbook contained detailed depictions of the human anatomy and over 270 illustrations. According to Arnaldo Benini, a neurosurgeon at Schulthess Clinic in Zürich, Switzerland, the *Fabrica* was the first anatomical book based on first-hand dissections of human cadavers.

Throughout the *Fabrica*, Vesalius noted the inconsistencies between his own observations and Galenic descriptions of human anatomy. For example, Vesalius noted the uterus [5] as having a single cavity, but Galen [3] had claimed it had many small compartments. Throughout the *Fabrica*, Vesalius frequently praised Galen [3], but also corrected Galen [3] when Vesalius's observations were inconsistent with those of Galen [3]'s. According to historian of science and medicine William Richardson, some people in the medical field condemned Vesalius's *Fabrica* for questioning and criticizing Galenic teachings, while others praised it.

Two weeks after publishing the *Fabrica*, Vesalius published *De humani corporis fabrica librorum epitome* ("Abridgement of the Structure of the Human Body"). The *Epitome* consisted of eleven woodblock prints that included illustrations of the skeleton, muscles, nerves, veins, and arteries and an illustration from the *Fabrica*. The *Epitome* differed from the *Fabrica* in that the muscles were drawn in layers, from superficial to deep, in their natural resting position, which assisted surgeons in operating and treating wounds.

Following the release of the *Epitome*, in 1544 Vesalius resigned as professor of surgery at Padua and burned all his notes and sketches. According to Saunders, some historians believe he destroyed his work in a fit of disappointment due to the negative reception of the *Fabrica*. After leaving Padua, Vesalius moved to Madrid, Spain, to act as court physician of Charles V, Holy Roman Emperor and king of Spain, and later his son Philip II of Spain. Even so, Vesalius continued to edit and refine his old work. For example, he had originally illustrated the annular placenta [6] of a dog [7] as that of a human, but he later corrected his mistake because he originally did not have the opportunity to examine a human fetus [8]. That and other observations compiled the second version of the *Fabrica*, which was published in 1555. The Spanish ways of medicine differed from what Vesalius had practiced, as they forbade dissection of human cadavers. According to medical historian James Ball, Vesalius could not even touch a dried skull.

In the spring of 1564, Vesalius left the Spanish court on a pilgrimage to Jerusalem, Israel. He became ill in a storm while sailing back to Venice, and died on 15 October 1564, at the age of forty-nine on the island of Zakynthos, Greece.

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Subject

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