RENAISSANCE OF VESALIUS

May 12, 2008 John M. Tew

For a number of reasons, which will become apparent during the course of this paper, I recently began giving systematic thought to the evolution of our understanding of the history and role of human anatomical dissection in education, culture, art and religion. While the topic is one that some in our post-modern culture may wish to turn away from, it has been of central importance throughout history. Indeed, up until this very moment, civilization's health and welfare have, in large part, depended on the study of anatomy.

I was fortunate to grow up in central North Carolina near the middle of the 20th century. North Carolina was a region of farms and small villages. I grew up on one of those typical small farms during the deprivations of WWII following the Great Depression. We lived with my parents and grandparents in a rambling farmhouse until my grandparents' death in 1946. My education was typical of most farm youth and, as such, I became an early student of animal anatomy.

Some 60 years later I am conscious of the irony that as a surgeon anatomist who has spent much of his life studying, teaching and writing about anatomy and surgical approaches to disorders of the body and brain, I spent the first years of my life learning the most important details of kitchen dissection and anatomy from my paternal grandfather. A very precise and scholarly man who had no more than a high school education, Mr. Jimmy Tew, taught me to care for injured animals of all varieties. He demonstrated the skilled technique of relieving pigs and young bulls of their masculinity by the knife. More importantly, he taught me the art of preparing wild and domesticated animals for preservation. Under his tutelage, I learned the meticulous and frugal techniques of preparing every part of an animal's anatomy, all of which were saved and preserved for human consumption.

During the war, my father operated a country store in which we prepared and sold all forms of edible meats. Because virtually all pork and beef were required to feed the troops at nearby Fort Bragg, we did a bang-up business in squirrel, raccoon, goat and, occasionally, opossum. To the best of my knowledge, we never served dog.

There were no surgeons in our family or immediate community of less than 100 people. The nearest doctor was 10 miles away in Buies Creek, the site of Campbell, a small junior college. Perhaps as a result of my early knowledge of anatomical dissection and a desire for education, a family physician from Campbell took an interest in me and gave me my first exposure to the delivery of babies and minor surgery.

During my college years at Wake Forest University, I spent vacations, weekends and summers working as an orderly and suture technician at local emergency rooms. (Yes, you may be surprised to learn that in 1955 one needed little more than an interest in medicine to qualify for work in the emergency room at the local hospitals!) Furthermore, I felt destined for a career in surgery. This passion was strong even before I met my first human cadaver. The embalmed body was presented to me and three of my friends and classmates during anatomy class in our first year of medical school.

Upon carefully pulling back the heavy black plastic cover on our cadaver, each of us was relieved to discover that he was not one of our relatives . Simultaneously, we also experienced a collective sense of awe at the gentleman who had bequeathed his body to medical science. He had died of myocardial infarction and lung cancer, diseases that caught up with almost everyone in eastern North Carolina, what with our dependence on tobacco and pork. Our specimen was anonymous, but we agreed to give him a name -- “Mr. Jimmy” -- in honor of my grandfather, who had exerted the major influence in my decision to choose a profession in medicine. I felt sure that using a revered relative’s name would insure the proper respect deserved for the gift made by our deceased benefactor.

In beginning the process of cutting apart a human body, our class joined a long line of medical students and pioneers who, in studying the body’s mysteries, plunged into this forbidding terrain. We soon recognized that the history of human dissection is a long and controversial one. As we began, it was logical to wonder what it must have been like for the first scientists and artists who, as pioneers, dared to look beneath the body’s skin.

Anatomy is the science of investigating the body’s internal structures. The early interest in human anatomy may have originated with cannibals, whose motives were largely ritual in nature. They may have believed that by consuming body parts from their enemies or heroes, they could absorb their strength or virtues. More advanced cultures developed procedures for preserving and immortalizing bodies of the famous dead. Ritual burial, as practiced by the Egyptians as late as 1800BC, did little to advance anatomical knowledge, because their focus was largely on preservation of the skin and bones.

The major stimulus for acquiring anatomical knowledge has largely come from those interested in the study of medicine, although artists like da Vinci and Michelangelo near the beginning of the Renaissance performed or used dissections to study the structure of the human body. Much earlier, around 500 B.C., the Greeks founded medical schools in Crotona (lower Italy) and Cyrene (Africa), where they studied the anatomy of animals. Aristotle (384-327 B.C.), known as the first anatomist, is better remembered for his philosophical writings. A student of Plato and teacher of Alexander the Great, Aristotle provided the foundation of thought on the duality of the body and soul. His conviction that the soul exists independently of the body made it permissible to open up the body once the soul had departed after death.

The philosophical premise of duality of body and soul, later found its way into the Bible, where the Apostle Paul taught that the dead would receive a new body gifted by God upon resurrection (Corinthians 1, 15:35-38). A story of great artistic beauty documented in The Last Judgment by Michelangelo in the Sistine Chapel depicts the resurrection of the martyred St Bartholomew, restored in a new body with the skin of his old form draped over his outstretched arm.

Herophilos performed the first public dissection of the human body in Alexandria, where King Ptolemy established a medical school in 320 BC. The bodies were those of executed prisoners.

Following the Roman conquest of Egypt in 30 B.C., medical progress suffered a setback, and the medical school of Alexandria went into decline. It was revived by the teachings of Galen of Pergamum (131-201 A.D.), a physician who studied in Alexandria and based his conclusions on the dissection of animals. His ideas gained wide acceptance in Rome, where he published more than 200 books elaborating a comprehensive explanation of all diseases and personalities. A towering figure, he would influence thought in medicine for the next 1,300 years. Nevertheless, dissections of the human body during this time remained an exception because Roman law proscribed the practice.

Galen gained considerable experience as surgeon to the Gladiators. When performed, dissections served mainly to identify the medical profession rather than to stimulate the development of new information or knowledge. Typically, the professor would read from Galen's books while his assistant dissected and read the words of the ancient master. Little significance was attributed to any anatomical findings or anomalies revealed by opening the body. Drawings were correspondingly faulty.

A change in attitude toward the teaching of anatomy first appeared toward the end of the Middle Ages, when artists began to investigate the structure of the human body. The best known artist and scientist of that time was Leonardo da Vinci (1452-1519), who privately performed anatomical

dissections on human corpses. These studies formed the basis of his historic and highly detailed anatomical sketches – the first realistic, correctly proportioned illustrations of the human body's interior. Leonardo da Vinci's work, historical in and of itself, was also ground-breaking in its contribution to society's acceptance of the study of human bodies.

Much of the prior animosity toward human dissection had been attributed to a papal bull issued by Pope Boniface VIII in 1300. The original purpose of this decree was to put an end to the practice, adopted by crusaders traveling to the Holy Lands, of dismembering the corpses of fallen comrades, boiling their bones, and sending the bones back home for burial on consecrated ground in their native land. Allegedly the Pope presumed that this time-consuming practice weakened the troops' fighting ability. The papal bull was intended to stop this practice rather than to have a specific impact on anatomical study in the Papal States.

Subsequently, overzealous clerics interpreted the bull as a general ban on human dissection for any purpose. But this was not the church's intent. We can find evidence of the Church's favorable disposition toward anatomy in that Pope Sixtus IV, 1470, as a patron of Sciences issued a Bull which allowed Bishops to provide bodies of criminals and unclaimed corpses of paupers to physician and artists in Padua. The museum of anatomy founded in Bologna, in 1740, owes its existence to support of Pope Benedict XIV.

Without the Christian belief of separation of soul from the body at the time of death, anatomical dissection would never have gained a measure of acceptance in Italy, a region ruled by the papacy.

The Renaissance, which marked the arrival of new scientific attitudes, began in Tuscany in the 14th century. Historians attributed the geographic origin of this rebirth to a variety of factors, including the religious and civic peculiarities of Florence at the time, its political structure, and the patronage of the dominant Florentine family, de Medici. The Renaissance movement accelerated in the 15th century when the Fall of Constantinople and the closing of its university by the Ottoman Turks forced thousands of Greek scholars to flee to Italy, bringing with them the majority of the great books of Hellenic and Roman literature and law. Leonardo da Vinci, Sandro Botticelli and Michelangelo were all born in Tuscany and were able to rise to prominence because of their brilliance and the favorable religious and cultural conditions of the time.

The time was a period of almost universal intellectual upheaval. It marked the beginning of a scientific revolution and an evolution away from the Medieval European mistrust of human perception and the belief that the center of all truth and experience was in God. The period saw the introduction of

humanism and the idea that human intellect and creativity were valued. Gradually, the concept of empirical thought also emerged. The question, "what should we believe?" began to have more than one answer. One might well believe what the Church and Bible told one to believe. Or, for the first time, one might believe what one's experience had shown to be true.

Scholars point to da Vinci's treatise on painting as the first unambiguous example of this tectonic shift in the history of ideas. "Here, right here in the eye, here forms, here colors, right here the character of every part and everything of the universe, concentrated to a single point," he writes. "How marvelous that point is… In this small space, the universe can be completely reproduced and rearranged in its entire vastness."

Leonardo da Vinci opened a new scientific door through his art. One of the distinguishing features of the Renaissance art was its development of highly realistic prospective, as painters developed new techniques in the study of light, shadow and, famously in the case of da Vinci, human anatomy. Between 1487 and 1489, da Vinci performed, then drew, human dissections, applying the same systematic effort to these studies as to his architectural drawings. Indeed, he often adopted the same terminology, referring, for example, to the top of the skull as the "dome of the cranium". Moreover, in this period, he undertook rigorous studies of the proportions of the human body that reflect meticulous concern for uniformity and accuracy.

Other dynamic changes in science occurred as well, as philosophers sought to explain natural phenomena and the universe with newly altered views and methods. The new, revolutionary ways of learning focused on empirical evidence and the importance of mathematics and mechanical theories. Early influential proponents were Copernicus a Polish Church man and Galileo an Italian, both, educated in Tuscany.

Long before Copernicus and Galileo were famous, however, the remarkable University of Padua, situated in the Palazzo del Bo, began its unparalleled academic history. Italy's original university was founded in Bologna in 1182. Forty years later, in 1222, a group of students in Bologna grew frustrated with increasing restrictions of academic freedom, which, while imposed by the Pope and the government, were accepted by the university.

Padua's new university was founded by students as a place of independent learning, designed to remain unaffected by the ordinances of any pope, emperor or king. The open university attracted scholars from across Europe who had felt constricted by regulations imposed on their work. The list of names is fabulous and spans centuries: Copernicus, Galileo, and the great British physician William

Harvey, who discovered the system of circulation of human blood. The significance of Padua as a stimulus for informed thought may be best documented by the subject of tonight's paper. Padua's university became the professional home of Andreas Vesalius, the father of human dissection and modern anatomy.

Andreas Vesalius was born in 1514 in Brussels to a father of the same name who was court-apothecary to Emperor Charles V. Young Vesalius, who showed great interest in the dissection of animals, began his formal studies at Louvain and the University of Paris, where Quinterus and Sylvius taught medicine. Andreas was more interested in anatomy than medicine, however. He was especially intrigued by bones that he found in cemeteries and at places of execution. He dissected animals of many sizes and some body parts of humans. These activities led him to begin comparison of the anatomical doctrines perpetuated by Galen followers for 1,300 years.

These provocative practices ignited an inflammatory response, prompting Vesalius to move to Padua, where he was undoubtedly attracted to the Renaissance spirit in art, philosophy and science that was being nurtured by the university's leaders. Moreover, he was likely aware of the patronage of science by Pope Sixtus who had studies at Padua. Here, in Padua, within the walls of youth and learning guaranteed by the care and privileges of the Veneto government, the university had become the one of the most important centers of independent studies in Europe. Vesalius took the degree of Doctor of Medicine in 1537 and was soon appointed Professor of Surgery and Anatomy.

Vesalius was audacious, a man of insatiable curiosity. His intense commitment to unraveling the body's mystery is best illustrated by his comparative anatomy dissections in which he conducted simultaneous demonstrations of human and animal anatomy. He was thus able to document that Galen had based his teachings on the dissection of apes and various mammals rather than humans.

These early demonstrations were based on the study of the human skeleton, which at the time was a rare and precious possession. Vesalius was, in fact, the first anatomist to reconstruct a human skeleton from its individual parts. Hoping to procure some bones, he visited the place where criminals were hanged and placed in a gibbet to be displayed until the birds and maggots picked the body clean. Having found such a hanging specimen, its bones completely bare and bound together only by ligaments, he climbed the stake and pulled away a femur from the hip. Arms, hands and scapula came in pieces. Several secret journeys were required for retrieval of the trunk and head. Vesalius writes: "I allowed myself to be shut outside the city at nightfall; so eager was I to obtain these bones that I did not flinch from going at midnight amongst all those corpses and pulling down what I wanted. I had to climb

the stake with an assistant, and it took great effort and hard work. Having pulled down the bones, I took them away a certain distance and hid them in a secret place and later brought them home the next day through another city gate." A skeleton reassembled by Vesalius can be found at the Institute of Anatomy at the University of Basel today.

As his academic status and reputation grew, so did his confidence. Vesalius began public dissections in Padua and Bologna, where a carnival-like atmosphere was evident. Thereafter, He was able to procure fresh subjects provided by legal authorities from his choice of executed prisoners.

In 1540 Vesalius began his monumental work, De Fabrica Humani Corporis, and in 1542 he spent months in Basel supervising its printing. Known as the Fabrica, Vesalius describes the anatomy of the human body according to observations recorded and drawn at public dissection in the "theater of anatomy."

The writings, recorded in seven books, were accompanied by a breathtaking set of woodcut engravings by Johann Stephan van Kalkar, who studied under Titian and was undoubtedly influenced by the seminal works of da Vinci 50 years earlier. The most famous of the illustrations, called the "Muscle Men," featured male figures standing in classical poses amid the Roman landscape. Their bodies are in various stages of dissection and their positions and expressions appear to be arrested in mid-breath. Some muscles are flayed and hang from joints and bones as their eyes gaze in wonderment and hands stretch out to extend a living touch. The woodcuts are beautiful, precise and provocative, yet macabre as life and death seem to collide and hang in eternal balance. For centuries the Vesalian woodcuts have been a source of fascination among aspiring physicians and scientists, and they remain, ensconced in the great libraries of the world today, the most treasured anatomical illustrations of all time.

Regrettably, the subsequent life of Vesalius was less celebrated. As one might have expected, the loyal followers of Galenic doctrine began a bitter struggle against the daring dissector, seeking to turn his own colleagues in Padua into enemies. His teacher in Paris, Sylvius, called Vesalius a mad man and declared that any advance beyond the knowledge of Galen was impossible. Bartholomew Eustachus of Rome declared that he would rather err with Galen than accept the truth from an innovator. Despondent in response to these slanderous attacks, Vesalius set fire to a large volume of his unfinished manuscripts and sought protection as a court physician to the Emperor Charles V. For 12 years he accompanied Charles on all of his campaigns and journeys. Following the abdication of Charles, Vesalius entered the service of King Philip II of Spain and under mysterious circumstances

died while on a pilgrimage to the Holy Land. Several rumors swirled around the circumstance of the master's final years. But there is no doubting his legacy: the founder of the science of anatomy is memorialized by the ancient anatomical theater built at the University of Padua in 1594, situated near the desk where Galileo taught decades later.

Today, when one stands as I did a few years ago, in the great restored Anatomical Theater of the University of Padua, one senses the presence and power of the great dissector/anatomist. Here, in the world's oldest continuing medical school, one can appreciate the boldness and courage that empowered a 24 year old student to defy the legacy of 1300 years of tradition, tempt laws against grave robbing, to create the study of human tissue and record the findings in an evolutionary art form, The Fabrica.

Vesalius was a revolutionary in that he pulled the dead from their graves and gave their bodies the appearance of life. Inevitably, the publicly observed specimens decayed, and only the bones and artistic creations remained for others to study. The public theater thus created an appetite among students, artists and the public for greater knowledge and exposition based on a need for personal observation of the mechanics of the human body. This renaissance of anatomical study unbridled by Vesalius would continue for the ensuing 450 years.

In the 16th century, corpses of executed prisoners were consigned over to anatomists. Codified in 1752 as the Murder Act, eventually even this source proved insufficient. Dabbling in anatomy became so popular that dissectors began robbing cemeteries. The practice became an established profession, and those engaged were known as resurrectionists.

Because of societal interest in the education of physicians, the public accepted the practice until 1828, when two Scots named Burke and Hare began suffocating the occupants of their flop house and selling warm bodies to the local anatomy school. Arrested and convicted, Burke was hanged. Hare provided state evidence and was sparred the gallows. Ironically, the penal codes of Great Britain permitted Burke's body to be publicly dissected. Tickets were sold for the event, and the remains were viewed by thousands of onlookers. Today, Burke's bones are preserved in Edinburgh's Royal College of Surgeons, and a set of books whose bound covers were made from Burke's skin can be viewed.

The climate of public furor over Burke and Hare and resurrecting in general pressed Parliament to look for new sources of bodies. The solution was the Anatomy Act of 1832. The new measure authorized the possession and transfer of the bodies of dead paupers directly to medical colleges for dissection. Consequently, the bodies of paupers or unclaimed persons might be given an opportunity to

repay some debt to society while also avoiding the cost of burial. Despite the enactment of the Anatomy Act, illegal acquisition of bodies continued in Europe and the United States well into the 20th century.

In 1960 the passage of the Uniform Anatomical Gift Act and the emerging success of organ transplantation raised awareness of the need for organs for transplantation and of the donation of bodies to science as a legitimate societal option. Bequeathment of one's body to science became an acceptable and altruistic alternative to cremation or burial. To these factors, one must add the popularization of science and the general understanding of biology as motivation.

Until recently, artificial preservation techniques undertaken by science have not been effective in providing enduring specimens capable of imparting the knowledge thought to be indispensable to the foundation of medical education.

Thin-sliced specimens embedded in plastic and larger anatomical parts preserved in jars filled with formaldehyde form the platform of most permanent collections. Preservation of full-body specimens with formaldehyde, ethanol, phenol and glycerin through arterial injection has changed little in the 20th century.

Embalming for burial and anatomic preservation are similar procedures. The process is satisfactory for mortuary science but provides limited opportunity for prolonged use for education and the mastery of anatomical detail. This problem changed radically with the advent of plastination, which led to the development of an innovative preservation and aesthetic presentation technology.

Seventy percent of our body consists of fluids, which are indispensable for living and responsible largely for decomposition. In the plastination process, fluids in the body tissues are replaced by reactive plastics such as silicone rubber and epoxy resin in a special vacuum process. Body cells and natural anatomy remain identical to their living condition down to the microscopic level. The specimens are dry and odorless. With the invention of plastination, which stops decomposition and dehydration completely, scientists for the first time were able to preserve natural anatomical specimens in a durable, realistic and aesthetic manner for instructional and research purposes. The dissected human body could now be studied, viewed and observed in three-dimensional preparations for an unlimited time.

The inventor and developer of the plastination process, Gunther Liebchen, was born in Poland in 1945. His family left what was then Germany and moved west in advance of the approaching Russians. Young Liebchen, which means "little darling," was reared in the German Democratic Republic and attended medical school at Frederick Schiller University in Jena. Over the years he became an increasingly reluctant member of the German Socialist Party. He was arrested while

attempting to leave East Germany and sentenced to two years' imprisonment for attempted unlawful crossing of the border to Austria.

While serving he learned of an opportunity to be traded to the Republic of Germany for 40,000 marks. The exchange purchased his freedom. He continued his medical studies at Lübeck University and, soon after passing his medical exams in 1973, began a job as an intern in anesthesiology at the University of Heidelberg. He married and chose the family name of his spouse, von Hagens. He was sick of being teased as a "little darling."

The young doctor soon became bored with the ritual of anesthesia. He procured a position with the Anatomical Institute of Heidelberg as an assistant anatomist. Here, he was stimulated with the challenges of embedding specimens in plastic blocks. He began extracting the acetone bubbles and impregnating the specimens with liquid silicon rubber. Von Hagens produced and patented in Germany and the United States a first: "Animal and Vegetal Tissues Permanently Preserved by Synthetic Resin Impregnation."

Von Hagens was apparently alone in recognizing the importance of the invention. During the next 20 years, while employed at the Anatomical Institute as a lecturer and scientist, he pursued his creative ideas on a part-time basis, usually with the help of friends and interested colleagues who had connections in commercial chemical laboratories. Additional discoveries followed. Professional conferences, the availability of commercial supplies, and international scientific workshops resulted in increasing stature for the German inventor. In 1993 he founded the Institute for Plastination in Heidelberg.

At the Plastination Institute and in a small company called BIODUR, von Hagens worked continuously to develop and market new polymers for colleagues and universities around the world. This period of his career as chemist and inventor was characterized by the knowledge that he had discovered something absolutely novel. Then, after nearly 20 years of endless toil as a part-time chemist and full-time anatomical scientist, von Hagens entered a surprising entrepreneurial phase that led to the rebirth of anatomical theater. This period began quite uniquely in Japan, where the plastinated specimens were first publicly displayed.

Shintoism and Buddhism, Japan's state and ancient religions, are characterized by a reverence for ancestors and are historically opposed to body dissection or donation of body parts. However, Japan has an eye for technology and all things new. Hence the invitation to von Hagens to exhibit at the 100th anniversary of the National Science Museum. The event drew more than 450,000 people in

less than four months. Von Hagens was amazed by the public's appetite for knowledge about the human body and its appreciation for his specimens, which were mostly presented in thin slices. Seizing the opportunity, he broadened the magnitude of the specimens to include full-body preparations, and "Body Worlds" was born.

The first large public showing of Body Worlds in Europe premiered at the State Museum of Technology and Labor in Mannheim, Germany, in 1997. Many of the whole-body exhibits left no room for doubt that von Hagen's artistic ambitions were equal to his passion for scientific enlightenment. The specimens included an exhibit entitled "The Runner," a photo of which was featured on posters all over Germany. The "Fragmented Man," in three sections, was shown on television nightly. A body whose skin was draped over one arm was reminiscent of Michelangelo's "Last Judgment," in which the resurrected body of St. Bartholomew is displayed with his flayed skin draped over his hand. And an exhibit featured internal body parts hanging by nylon cords as if fashioned into a mobile. Scientific education was also an intention in the display of embryo and fetuses of multiple ages. Many specimens of diseased and cancerous organs were dissected to illustrate the vagaries of ill health and bad behavior such as smoking and gluttony.

Not unexpectedly, an avalanche of controversy ensued, spawning great media arousal, expressions of religious concern, and political reaction. No small number of critics, many of them outside the church, accused von Hagens of "shredding" the dead and perverting enlightened thinking. Criticism seems to have come largely from academics – theologians, pathologists and anatomists.

The general public, in contrast, responded to the Mannheim exhibition with immense interest and with a predominantly positive response. But in the aftermath von Hagens was no longer able to maintain his academic position at the Anatomical Institute in Heidelberg. Amidst warring factions, he was forced to leave the University in 1997. At the same time, the private Heidelberg Institute of Plastination lost its recognition as a research institution accredited by the German government. Consequently, von Hagens accepted a professorship at Dalian Medical University in China, where he established an Institute for Plastination.

Highly artistic dissections that included large animals and body poses were soon created in order to launch multiple new exhibits. And in the years since, Body Worlds has been shown in more than eight Japanese cities, several Korean and Chinese cities, Singapore, Taiwan, eight German cities, and many others, including Vienna, Basel, Brussels and London.

More than 20 million people have expressed overwhelming approval despite bitter debates conducted among the public at large, many of whom have not viewed the exhibits. Von Hagens and his colleagues have conducted extensive surveys of the visitors and registered consignment of many bequeaths of bodies by patrons of the exhibitions.

During the last three years Body Worlds has appeared in multiple U.S. cities to critical acclaim and large crowds. Other exhibits also have been developed to meet the perceived demand for knowledge about the human body in health and disease.

Simultaneously, communities have engaged in considerable dialogue concerning the value of the educational versus the theatrical and artistic aspects of Body Worlds and similar exhibitions. As in past history, observers have raised valid concerns about the origin of the bodies, the consent process, and the appropriateness of public display of these bodies, each of which is a sacred creation. In most communities, the debate has been productive and constructive, aimed toward better understanding of and respect for the uniqueness and sacredness of the human body.

I first experienced Body Worlds at the Museum of Science in Chicago in 2005 and was convinced that we should provide this opportunity for our community through the leadership of our Cincinnati Museum Center. For various reasons, another program, rather than Body Worlds, was chosen for our exhibit. The human bodies in the displays of permanently preserved anatomical dissections present a dramatic breakthrough in the teaching of anatomy for physicians and both novice and learned anatomists. Perhaps an even more remarkable precedent has been established in that a cultural breakthrough, not unlike the Internet, now provides a new point of entry for information, publicly available throughout the world, about the human body, its function and its vulnerability to disease.

Andreas Vesalius, who has lain buried for some 450 years in an unknown repository somewhere in Mesopotamia, is reborn today through the work of Gunther von Hagens and his colleagues. Nearly five centuries after Vesalius broke with tradition and released a passion for understanding anatomy, anatomy that defines the uniqueness of man.

The legacy of Vesalius, the knowledge of anatomy, continues to illuminate cultural issues as diverse as religion, art, ethics, politics, and science. The power of knowledge to demythologize allows people of the world to study, consecrate and yes, condemn the legacy.

Sources:

Leonardo Da Vinci-The Complete Paintings, Petro C. Marani, Harry N. Abrams, Inc. (New York); 2000.

Michelangelo and Raphael in the Vatican, Ufficio Vendita Pubblicazioni, (VaticanCity), 1999.

Padua-Art and Hisotry, Camillo Semenzato, Manfrini, (Trento), 1981.

Murder after Death-Literature and Anatomy in Early Modern England. Richard Sugg, Cornell Univ. Press, (Ithaca), 2007.

Soul Made Flesh-the Discovery of the Brain and How it Changed the World, Carl Zimmer, Free Press, (New York), 2004.

The Scientific Revolution, Steven Shapin, University Chicago Press, (Chicago), 1996.

The Idea of the Renaissance, Richard Hooker, Washington State University Website, May 2007;

The Discovery of the Body: Human Dissection. Yale J. Biol. Med. May-June, 1992.

The Italian Renaissance-Culture and Society in Italy, Princeton University Press, (Princeton), 1999.

Colored Atlas of Slice Anatomy, G. von Hagens et al, Schaer, (Stuttgart), 1991.

Crossing over-Where Art and Science Meet, S.J. Gould, R.P. Wolff, Three Rivers Press, (New York), 2000.

The Fabric of the "Body- European Traditions of Anatomical Illustration, KB Roberts, JDW Tomlinson, Clarendon Press, (Oxford), 1992.

Body Worlds-The Anatomical Exhibition of Real Human Bodies, Gunther von Hagens, Angelina Whalley Institute for the Plastination, (Heidelberg), 2005.

Pushing the Limits-encounters with Body Worlds Creator-Gunther Von Hagens, Angelina Whalley, Arts and Sciences,
(Heidelberg), 2005.

The Knife Man-The Extraordinary Life and Times of John Hunter-Father of Modern Surgery, Wendy Moore, Random House, (New York), 2005.

Stiff-The Curious Lives of Human Cadavers, Mary Roach., Norton , (New York). 2003.

De Humani Corporis Fabrica, Andreas Vesalius ex officina Joahannis Oporini, (Basileae), 1543.

Vesalius, Andreas. De Humani Corporis Fabrica.
http://versalius.northwestern.edu/flash.html

Versailius, Andreas, De Humani Corporis Fabrica.
http://archive.nim.nih.gov/proj/ttp/flash/versalius/vesalius.html

.