Recent medical investigations have worked to decode some of the great mysteries surrounding the life of various Ancient Egyptians. The research has sparked debate over this mysterious civilization; debates that range from the genetic makeup of the Pharaohs to whether or not they were murdered. The scientific and historical knowledge gained from such research has opened the doors for medicine to unravel some of the great mysteries of Ancient Egypt and other past civilizations. Tutankhamun, better known as King Tut, became Pharaoh at the tender age of nine and died after ten years of reign when he was only nineteen. It had long been suspected that he had been murdered, as evidenced by X-ray images from the late 1960s indicating a blow to the lower base of his skull. However, a series of CT scans in 2005 have shown no evidence of this suspected blow but do implicate a large fracture in the Pharaoh’s left femur as the cause of death. Thus the most recent theory is that this Ancient Egyptian ruler was not murdered for his throne, but rather likely died due to an infection secondary to his broken leg.

Ancient Egypt – Mummification and Beyond
For over three millennia, ancient Egyptian civilizations have awed society with their unparalleled development and innovation. From the complex hieroglyphics found etched intricately into stone walls, the fine art of mummification, and the mysteries that remain regarding pyramid development and architecture, this era was replete with scientific and historical masterpieces.

With the infamous discovery of Tutankhamun’s tomb in 1922 by English archaeologist Howard Carter, the first tomb to be discovered completely intact, came rejuvenated excitement in academic circles as to the potential that these relics had in deciphering many mysteries from the Egyptian era. The discovery provided new insight into the process of mummification, the lives of the pharaohs of the 18th Dynasty, artistic practices of the time, and many other areas of history. It turns out that medicine has played an enormous role in deciphering this complex story.

Tutankhamun - King Tut
The ancient boy king Tutankhamun has captivated the interest of the entire world since the discovery of his intact tomb by Howard Carter in 1922. Ascending the thrown as a mere nine year old boy in 1334 BC, Tutankhamun is possibly a son of the heretical Akhenaten and has been given credit for the reversion of Egypt back to its ancient polytheistic beliefs and traditions. His reign lasted just over nine years as Tutankhamun died as a young nineteen year old in 1325 BC. His premature death as a nineteen year-old has led many Egyptologists to speculate as to the cause and numerous theories involve a murder in their explanation.

Tutankhamun rests in piece(s)
Carter and his staff, which included Derry and Saleh, two forensic specialists, began their investigations of Tutankhamun’s body in November of 1925. The mummy had been stuck to the inside of the coffin by the unguent that had been used to preserve Tutankhamun’s body. His body adhered to the base of the coffin and his skull remained fitted inside a golden helmet. Carter’s team removed Tutankhamun from his coffin in pieces. They chose to cut the head off at the neck, used heated knives to remove the skull from the mask, detached the arms and legs, separated the pelvis and trunk, and effectively dismembered the body to facilitate their analysis. Derry and Saleh predicted an age of death between 18 to 22 based on Tutankhamun’s bony epiphyses and partially erupted molars.

X-ray Vision
Tutankhamun’s body was left untouched until 1968 when a team led by anatomy professor R.G. Harrison of the University of Liverpool began their investigations. The first thing that was
discovered was that rather than leaving Tutankhamun to rest in peace, Carter and his team had left him resting in pieces, a fact that was omitted from Carter’s report and documentation. Harrison’s goal was to image the body of Tutankhamun but they found it to be in poor and fragile condition. The team did manage to perform X-rays on the skull of Tutankhamun. Their analysis showed two thick deposits of opaque material, later determined to be solidified embalming fluid, in the skull as well as a fragment of bone near the occiput. Several historians and Egyptologists have since suggested that the bone chip is concrete evidence in favour of the theory that Tutankhamun was murdered by a deadly physical injury to his head.5

The 1968 X-ray series also demonstrated that the sternum and some of Tutankhamun’s frontal ribs were missing6 which then led to various medical and historical theories. Egyptologist Dennis Forbes theorized that perhaps Tutankhamun died in a chariot accident that crushed his sternal area7 and the sternum and ribs were subsequently removed by embalmers in order to facilitate the embalming. Others claim that Tutankhamun may have been pigeon-chested, a birth defect, and note that his spine shows pronounced scoliosis to support this theory.8

Astounding Discoveries
The latest medical investigation of Tutankhamun was followed closely by many historians and gave rise to a strong sense of anticipation. World renowned Egyptologist Zahi Hawass performed a full-body CT scan of Tutankhamun on January 5, 2005. With a team of radiologists, anatomists, and forensic specialists from the Faculty of Medicine at Cairo University, Hawass and his team spent the next two months analyzing the 1,700 images that were taken on that historical night. Upon reaching their conclusions, the team confirmed their results with a variety of foreign consultants including paleopathologists and radiologists from several European countries. In March of 2005, the stunning results were published to an anxiously awaiting community of historians and Egyptologists.

Through a more detailed examination of Tutankhamun’s epiphyses and partially erupted third molars, Hawass and his team fixed the king’s age of death at nineteen years. They confirmed his height of 170cm and noted that Tutankhamun showed no signs of malnutrition or chronic disease. The team confirmed the elongated nature Tutankhamun’s skull, as had been noted previously6, but added that there was no premature fusion of the cranial sutures, thus confirming that the elongated skull was not a developmental abnormality but rather a normal anthropological variation.

The detailed analysis also indicates that Tutankhamun did not suffer from scoliosis as previously claimed by some historians.2 The vertebra did not display any rotation or deformation and thus the medical team concluded that the curvature of the spine was likely a result of the manner in which the embalmers placed the body, and not scoliosis.

Another extraordinary finding involves the suspicious missing ribs and sternum. The CT scans reveal that the ends of the ribs have been cut with a sharp instrument. Hawass and his team believe that the removal may have been by the embalmers, however evidence fails to show any signs of serious chest trauma as has been suggested by some historians7 as the vertebrae remain undamaged. One cannot rule out a minor chest injury, although there is an alternate theory that is favoured by many. It seems difficult to conceive that Derry and Saleh, the two forensic pathologists who made detailed notes on their observations in the 1925 uncovering of Tutankhamun’s body, would fail to mention the obvious missing ribs and sternum – and fail to mention it they did. It would also make sense that the ribs, if removed by embalmers, would have been wrapped and kept within the sarcophagus of Tutankhamun, as was the Egyptian custom2. This indicates that the frontal ribs and sternum may have been removed by Carter’s team and simply never replaced. These missing items would be in addition to the right
thumb and other body parts which were reported missing by Harrison’s team in 1968 but are evident in images taken by Carter’s team in the 1925 investigations.6

The most striking conclusion that has resulted from the CT scans involves the cause of death of Tutankhamun. It turns out that the team of investigators has been able to conclude that Tutankhamun did not die from a blow to the head, as previously theorized. The loose pieces of cranium could not have come from an injury prior to death as they remain outside of the solidified embalming fluid. The team is unanimous in their agreement that the cranial injuries constitute postmortem damage however there is some debate as to whether the injuries were due to the embalmers over three millennia ago or Carter’s team in the early twentieth century.2

A fracture of the lower left femur, at approximately the level of the epiphyseal plate, was also found in the full-body CT results. Although there are many fractures in the body caused by the (mis)handling of Carter’s team, this one is unique in several respects. Firstly, one of Carter’s forensic specialists, Derry, actually recorded this fracture in his notes as an observation, something which is not seen for the various additional fractures caused by the handling at the time.9 As well, the break has ragged, rather than sharp, edges and also has two thin layers of embalming fluid that have entered the injury site2. Furthermore, Derry had also reported a loose left kneecap which may be used as additional evidence for an injury to the left lower limb.9

The theory that Hawass has proposed based on these findings is that Tutankhamun died not of a malicious attack to dethrone him but rather due to a severe fracture in his left femur. A fracture of this size could have easily led to infection and even caused gangrene, thus resulting in an infectious death secondary to the injury.2 Critics argue that although the blow to the head may not have been the cause of death, this still does not rule out the possibility of Tutankhamun’s murder by poisoning or other, less conspicuous, methods of murder.10

Medicine in the future of Ancient Egypt
We can thus see how medicine has played a variety of roles in the uncovering and decoding of some of history’s great mysteries. Traditional medical analyses may be used to analyze the life and death of historical figures from a variety of eras and medical technology may be used to objectively analyze the physical remains of these historical figures. Ancient Egypt lends itself perfectly to this type of analysis due to the unparalleled preservation of bodies attained due to the process of mummification. The benefits that the history of Ancient Egypt has already seen due to medicine’s contribution will soon carry over into various other ancient civilizations as the investigative power of medicine continues to expand. Advances in DNA analysis and recovery, fields that are still in their infancy, as well as the potential of future imaging techniques as computers continue to improve, expand, and surpass all previous expectations, will all continue to demonstrate the unlimited potential of the medicine to solve many of history’s great mysteries.

References
6. Harrison RG, Abdalla AB. The remains of Tutankhamun. Antiquity 1972; XLVI.