King Tutankhaten—whose remains are one of the most famous Egyptian mummies—died in 1323 B.C.E. He was 18 or 19 years old. For a long time, archaeologists wondered how the young pharaoh had died. In January 2005, for the first time in 80 years, a team of scientists took “King Tut” from his tomb. They used new technologies to reexamine the mummy, searching for answers to age-old questions about the lives and deaths of ancient Egyptians.

The team of scientists removed the stone lid from King Tut’s sarcophagus, or stone coffin. They lifted the wooden box containing the mummy and carefully carried it outside. A van holding a CT (or CAT) scanner was waiting near the tomb. This scanner is a large, specialized X-ray machine that uses a computer to show three-dimensional images of a body.

Inside the van, the scientists pulled back layers of cloth surrounding the king. Still in its box, the mummy was placed in the CT scanner for about 15 minutes. The machine took around 1,700 images. Scanning King Tut was the first act of the members of the Egyptian Mummy Project. Scientists from around the world took part in this five-year project to study and preserve the ancient mummies of Egypt.

Ancient Embalmers

The ancient Egyptians turned their dead into mummies to prevent decay and to preserve their bodies. The Egyptians believed that a person would need his or her body in the afterlife.

The process of making a mummy was complex. First, the embalmers took the internal organs out of the body. They dried the organs and the body with natron, a type of salt that they found in the desert. The organs were then wrapped in linen and stored in jars or placed back inside the body. Sometimes the body was stuffed and decorated with makeup, jewelry, and clothing. Finally, it was wrapped in long strips of linen and put in a coffin.

Two British scientists, named Richard Evershed and Stephen Buckley, studied 13 mummies that had been created over a 2,300-year period. They concluded that the ancient Egyptian embalmers used very advanced methods in their work.

Studying Mummies, Then and Now

In 1922, Englishman Howard Carter made one of the most important discoveries in Egyptian archaeology—he found the tomb of Tutankhaten in the Valley of the Kings. This was important because Tutankhaten’s mummy was found exactly as the priests had left it more than 3,000 years earlier. In most other tombs, the mummies were missing. This kept archaeologists from studying the details about how ancient Egyptians were buried.

In Carter’s time, the study of mummies was a simpler process than it is today. Back then, archaeologists would remove the bandages from a mummy to examine the remains. But after a time, scientists began to realize that their actions were causing damage to the
bodies. Often, mummies fell apart when taken out of their wrappings. Today, it’s sometimes hard to tell if damage to a mummy dates from a king’s lifetime, the embalming process, or the way archaeologists treated mummies that were discovered in the 1920s.

Modern scientists use all sorts of technology to study mummies. One technique is to X-ray the body. As people age, their bones become thinner and weaker. By examining X-rays of bones, scientists can tell how old people are. In this way, archaeologists have discovered that ancient Egyptians lived short lives, at least by modern standards. Most rich Egyptians lived no longer than about 35 years. For poor Egyptians, life was even shorter. Most did not live much beyond about 25 years.

Since 1926, the year Carter returned King Tut to his tomb, the young pharaoh’s remains have been X-rayed twice. The first time was in 1968. Those X-rays showed a bone fragment inside the king’s skull. The finding prompted the idea that King Tut might have died as a result of a blow to the head.

Was Tutankhaten murdered? Scientists from the Egyptian Mummy Project set out to answer that question. This time, rather than rely on a one-dimensional X-ray, scientists used the CT scan. They created three-dimensional images that would show more information.

**CT Scan Findings**

Did the young pharaoh die from a blow to the head? Definitely not, say the nine doctors who studied the CT images.

Scientists believe that the bone fragment discovered in the king’s head, in 1968, occurred after his death. It is likely that this damage was caused by the team of archaeologist Howard Carter. Scientists reached this conclusion because they found no traces of embalming fluid in the wound.

Scientists have agreed that there is no evidence of head injury. But they also found a broken bone in the mummy’s left leg. Some experts thought that the broken bone was a serious injury Tut suffered shortly before death. They wondered whether the break led to a life-threatening infection. From the CT scans, scientists concluded that Tut died from complications from a broken leg, made worse by disease, probably malaria.

**Reconstructing King Tut’s Face**

Scientists also used the three-dimensional CT scans to create the first busts of the Egyptian king. A bust is a three-dimensional sculpture of a head. Three separate teams—from France, the United States, and Egypt—created busts of King Tut.

The National Geographic Society chose a French team to create the first bust. A CT–scan–based skull model was made for forensic anthropologist Jean-Noël Vignal. Vignal often works with police to reconstruct the heads of victims of violent crimes. Using the CT images, Vignal created a rough plastic skull.

Vignal gave the plastic skull to sculptor Elisabeth Daynès. Using Vignal’s data and two wooden sculptures of Tutankhaten for reference, she created a lifelike clay face. She then created a plaster mold with a silicone “skin,” and covered it with a flesh color based on an average shade for modern Egyptians. Next, Daynès added hair, makeup, and glass eyes. The bust was meant to show what Tut had looked like on the day of his death. It is the most lifelike image ever seen of the long-dead ruler.

The National Geographic Society then asked a group of experts from the United States to make a second bust. This time the experts weren’t told who their famous subject was.

Susan Antón, an associate professor of anthropology at New York University, and Bradley Adams, of New York City’s Chief Medical Examiner’s office, both studied the CT scans. At first, Antón thought that the unusual-looking skull was that of a female. But after further study, she determined that her subject was an 18- to 19-year-old male, most likely of North African origin. Forensic artist Michael Anderson, of Yale University’s Peabody Museum, used the CT scans and Antón’s data to create his own bust of the mystery subject’s head.

Finally, Egypt’s Supreme Council of Antiquities selected an Egyptian team to make a third bust. Like the French team, the Egyptians knew who their famous subject was. The Egyptian team used the same CT scan data to build a plastic skull model. They added clay features inspired by ancient portraits of Tut.

Archaeologists have not been able to solve all the mysteries of King Tut’s death, but they did solve some. First they asked key questions, and then they used the latest technology to gather information. In what other ways might archaeologists use CT scans? What questions do you have about ancient mummies?