

# TB the culprit in the great mummy whodunnit

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A Egyptian worker sits next to a sarcophagus which contains a mummy in 2002. Around 2,600 years ago, on the banks of the Nile, a bed-ridden lady of high rank coughed and wheezed as tuberculosis ravaged her body, driving her ruthlessly towards the afterlife.

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The snapshot comes courtesy of a hi-tech molecular probe into "Dr. Granville's mummy," one of the most celebrated and debated mummies of ancient [Egypt](#).

Its name is owed to a British physician and obstetrician, Augustus Bozzi Granville, who in 1825 carried out the first scientific autopsy of a

mummy.

Eager to shed the light of reason and empiricism on the mysteries of mummification, Granville unwrapped, measured, dissected and recorded a mummy unearthed six years earlier at the necropolis at Thebes.

"I determined, perfect and beautiful as it was, to make it the object of further research by subjecting it to the anatomical knife, and thus to sacrifice a most complete specimen of the art of Egyptian embalming, in hopes of eliciting some new facts illustrative of so curious and interesting a subject," Granville said.

His meticulous six-week investigation showed a female body that was once corpulent, with folds of skin on the belly, yet beautifully preserved.

Most of the soft organs were intact and, unusually, still in place rather than transferred to a funeral jar.

Granville estimated that the woman had borne children and, by the thinning of the pelvic bones, was aged between 50 and 55 when she died.

What caught his eye was a large growth around her right ovary, which he described as "ovarian dropsy," or cancer. This, he concluded, was the cause of her death.

Amid sensational interest -- this was the height of "mummy mania" in Britain -- Granville presented his findings to the great minds of the Royal Society.

In an atmospheric touch, he made candles from a waxy substance he scraped from the mummy and lit them for the spellbound audience as he showed off specimens and carried out experiments. (Later research suggests Granville had unwittingly used body fat, or "grave wax," for the

illumination.)

Hieroglyphics on the wooden coffin lid describe the [mummy](#) as Irtyersenu, "lady of the house." She lived in the 26th dynasty, or around 600 B.C.

In 1994, scientists carried out a second autopsy on Irtyersenu's surviving pieces, which had been sold to the British Museum.

Contrary to Granville's own conclusion, the ovarian tumour was more likely to have been a non-fatal cyst, a pathologist reported.

Another possibility for her demise was malaria, a diagnosis later ruled out after the test proved unreliable.

Intriguingly, though, the mummy's rib cage suggested a condition called pulmonary exudate, in which fluid builds up dangerously in the cavity surrounding the lungs.

Reporting on Wednesday in the Royal Society journal Proceedings B, scientists led by Helen Donoghue, a specialist in infectious disease at University College London, used hi-tech analysis to explore what might have happened.

Thwarted by the difficulty of obtaining a well-preserved sample of DNA, they took material from the bones and soft tissues and tested it with liquid chromatography, analysing it for chemical telltales.

The signatures point to biomarkers of the cell wall of Mycobacterium tuberculosis -- the germ which causes TB. It was found in the lung tissue, pleura, diaphragm and femur.

The fat, interspersed with skeletal muscle, that had been noted in 1825

and 1994 is consistent with a protracted, terminal illness like TB, in which a patient literally withers away, say the authors.

"We are able to enhance the original paper by Granville to the Royal Society by concluding that there is evidence of an active of tuberculosis infection in the lady Irtyersenu and that this, rather than a benign ovarian cystadenoma, was likely to be a major cause of her death," they declare.

"Palaeopathology" -- the science of investigating ancient causes of death -- has previously suggested that TB was widespread in the land of the Pharaohs.

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