

“Perfectly Preserved” Neurons Found In Brain Baked By Mount Vesuvius Eruption

By Tom Hale

“Perfectly preserved” neurons have been discovered in a brain that was baked into glass following the shower of heat and scolding ash from Mount Vesuvius almost 2,000 years ago.

Earlier this year, Italian scientists detailed the discovery of brain tissue that had been turned into a black glassy material from the scorchingly hot temperatures of Mount Vesuvius’ infamous eruption in 79 CE. Now, a new study has taken a deeper look at this incredible specimen and discovered the presence of ancient preserved neurons.

In a new study, published in the journal PLOS One today, researchers led by Dr Pier Paolo Petrone of the University Federico II of Naples have reported what they claim might be the best example of preserved central nervous system tissue ever discovered in human archaeological remains. Using scanning electron microscopy and advanced image processing tools, the team closely studied the vitrified brain to discover a number of distinct structures that appear to be “exceptionally well-preserved” neurons and axons from a human brain and spinal cord.

“The discovery of a vitrified brain was really exceptional, but the finding in it of an entire central nervous system made up of neurons and axons was absolutely astonishing,” Dr Pier Paolo Petrone, lead study author and a forensic anthropologist at University Federico II of Naples, told IFLScience.

On top of this, they also found a number of proteins from human brain tissue, further confirming that this is not simply a random shiny black rock. By identifying the specific proteins, the team were even able to gain insight into which parts of the brain were included in this specimen.

“Analysis of this black glassy material showed the preservation of several proteins highly expressed in the various parts of the human brain: cerebral cortex, basal ganglia, midbrain, pituitary gland, amygdala, cerebellum, hippocampus, hypothalamus, and spinal cord,” explained Dr Petrone.

“These genes are exceptionally significant for neuronal functions since their mutations were detected in patients with brain pathologies. For example, MED13L, whose related protein was found in the glassy brain, was found particularly abundant in adult cerebellum and its mutations were detected in patients with intellectual disability,” he added.

The 79 CE eruption of Vesuvius is one of history’s most notorious volcanic eruptions, decimating the nearby towns of Pompeii and Herculumen, along with thousands of human casualties. Many of these victims were buried in a blanket of volcanic ash, allowing archeologists to later pour plaster into the cavities to reveal the outlines of bodies and their unfortunate last moments of life. Other victims were simply annihilated by the searing volcanic heat, followed by rapid cooling.

For brain tissue to undergo the process of vitrification seen here, the tissue must have been quickly burned at a scorchingly high temperature – perhaps as high as 520°C (968°F) – and then rapidly cooled. Similar archaeological finds are extremely rare, although the team previously remarked that a similar process occurred for victims of the bombing of Dresden in World War II.

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