



## Zombie 'sludge' brings back lifeless organs in the lab but raises huge ethical questions about use in humans

### Description

Fans of "The Walking Dead" take heed: There may be a new 'concoction' under development that will create what many will see as zombie-like conditions in humans who have passed away.

According to *The New York Times*, scientists at Yale University injected the bodies of dead pigs with a new sludge-type of serum that actually brought the organs of those dead animals back to some semblance of life.

"The pigs had been lying dead in the lab for an hour — no blood was circulating in their bodies, their hearts were still, their brain waves flat. Then a group of Yale scientists pumped a custom-made solution into the dead pigs' bodies with a device similar to a heart-lung machine," the Times story began.

"What happened next adds questions to what science considers the wall between life and death. Although the pigs were not considered conscious in any way, their seemingly dead cells revived. Their hearts began to beat as the solution, which the scientists called OrganEx, circulated in veins and arteries," the report continued. "Cells in their organs, including the heart, liver, kidneys and brain, were functioning again, and the animals never got stiff like a typical dead pig."

Meanwhile, researchers pumped other pigs that had been dead for an hour with ECMO, a machine that pumped actual blood through their bodies. But those pigs stiffened as their organs became swollen and damaged while blood vessels collapsed and they developed purple spots on their backs from pooled blood, the Times reported.

Researchers reported their results last week in the journal *Nature*.

The research team said the primary objective of their work is to someday dramatically increase the supply of human organs that can be transplanted by developing a process that allows surgeons to obtain organs long after a person dies. Also, the team said that they would like for their technology to be utilized in a way that prevents severe, lasting damage to hearts following a heart attack or brains

after a significant stroke, the Times noted further.

Stephen Lathan, a bioethicist at Yale University who was closely associated with the research, said that the findings are only a first step. The technology, he made sure to emphasize, is “very far away from use in humans.”

Led by Dr. Nenad Sestan, a professor of neuroscience, of comparative medicine, of genetics and of psychiatry at the Yale School of Medicine, the group of researchers were nevertheless stunned by the ability to revive cells following death.

Dr. David Andrijevic, also a neuroscientist at Yale and a co-author of the paper, noted: “We did not know what to expect. Everything we restored was incredible to us.”

Other researchers who were not involved in the work also expressed surprise and amazement at the results.

“It’s unbelievable, mind-blowing,” Nita Farahany, a Duke law professor who studies ethical, legal and social implications of emerging technologies, said, according to the Times.

That said, Farahany noted that the results also raise new ethical questions about when death actually occurs.

“We presume death is a thing, it is a state of being,” she said. “Are there forms of death that are reversible? Or not?”

The Times notes:

*The work began a few years ago when the group did a similar experiment with brains from dead pigs from a slaughterhouse. Four hours after the pigs died, the group infused a solution similar to OrganEx that they called BrainEx and saw that brain cells that should be dead could be revived.*

*That led them to ask if they could revive an entire body, said Dr. Zvonimir Vrselja, another member of the Yale team.*

The university has filed for a patent on the technology, with Sestan noting that next, researchers will attempt to determine if the organs could function properly and then be successfully transplanted. After that, they want to see if the method is effective at repairing damaged brains and hearts.

by: JD Heyes

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