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Brain Death and Beyond

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Abstract

Death has long been understood as the final, inescapable line which we all have to cross – with no return –when the heart stops and the brain ceases to function. but recent research presents a new understanding of death, not so much as a line which we cross, as a potentially reversible process.

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THE HUMAN BRAIN

The human brain has been described as the most complex object in the universe. Certainly, a lot goes on in this warm fist-sized ball of meat. Various exotic fluids pour, soak and trickle through its channels and crevices. A veritable drugstore of chemicals is synthesised there, put to strange uses, then broken down and recycled for further use. Legions of brain cells are born (in the early months of life), connect up to other cells, and carry out their mysterious cellular tasks in various neural communities before they die. Trillions of electric signals travel through the brain's wet electrical networks, each impulse inducing a weak electrical and magnetic field that races across the cranium at the speed of light. Torrents of electrically charged ions escape through suddenly opened cellular gates only to be captured one by one and sequestered again inside a brain cell. –*Nick Herbert, Elemental Mind* [1].

CLINICAL DEATH AND RESUSCITATION

For the human being, death has long been seen as final–the end–inescapable and irreversible, a binary moment when the heart stops and the brain ceases to function. For almost all people at all times in history, cardiac arrest was basically the end of life. In a medical setting, "clinical death" is said to occur at the moment the heart stops pumping blood, and the pulse stops. Yet as resuscitation specialist Sam Parnia has pointed out, "We are now at the point where we have both the tools and the means to scientifically answer the age-old question: What happens when we die?" [2]–*Sam Parnia. What happens when we die*? [2], Parnia is an intensive care doctor, whose area of expertise is looking at the brain, how to restart the heart after people die, and how to preserve the brain so that they can come back to life and enjoy a meaningful life. Parnia has not only been pushing the boundaries of our understanding of death as director of the Human Consciousness Project at the University of Southampton, he also conducted the largest study of people who recalled experiences of death and used AI technology to reveal some extraordinary findings. He is an associate Professor of Medicine at New York University Langoe and is author of *Lucid Dying*: *The New Science Revolutionising How We Understand Life and Death.* He is optimistic and enthusiast about the value of his research: the field of resuscitation, think of how huge this is. Think of all the people that you read in the news who are declared dead on the scene because of an accident, because of an unfortunate sudden heart attack. Ambulance crews arrive, they try to resuscitate, they declare the person dead on the scene. If they knew that this kind of technology was available and we could implement it, then many of those people who are otherwise healthy who died, youngish people, healthy people could have their lives restored to them. –Sam Parnia. *What happens when we die?* [2] "Clinical death" is said to occur at the moment the heart stops pumping blood and the pulse stops. That began to change in 1960, when mouth-to-mouth ventilation, combined with chest compressions and external defibrillation known as CardioPulmonary Resuscitation, CPR, became widely available. A massive campaign was launched to educate doctors and the public on CPR's basic techniques, and soon people were being revived in previously unthinkable, if still modest, numbers [3]. *Alex Blasdel. The new science of death* as more and more people were resuscitated, scientists learned that, even in its final stages, death is not a point but a process. After cardiac arrest, blood and oxygen stop circulating through the body, cells begin to break down, and normal activity in the brain gets disrupted. But the organs don't fail irreversibly right away, and the brain doesn't necessarily cease functioning altogether. There is

often still the possibility of a return to life. In some cases, cell death can be stopped or significantly slowed, the heart can be restarted, and brain function can be restored. In other words, the process of death can be reversed…and people have been known to be revived even six hours after being declared clinically dead [3]. *Alex Blasdel. The new science of death*

DYING AND BRAIN DEATH: NO CLEAR LINE

Almost all doctors, including even most neuroscientists and scientists who are trained, are taught that after about 5, maybe 10 minutes of oxygen deprivation to the brain, the brain is irreversibly damaged and dies. And that is actually not true.–Sam Parnia. *What happens when we die*? [2]. For more than two decades now that has been shown to be not quite the whole truth of the story. As Parnia points out, even after a person dies, the cells inside the body do not suddenly decompose or degrade, and there is a fairly long period of time in which even the brain can be preserved even after people have died. The reality is once you go into the person's body and look at it more biologically, *there's no clear line (Emphasis added) –Sam Parnia*. *What happens when we die?* It would be a "leap for humankind" if you can "take a person who has been dead for many hours and if you know what to do, what medications to give them, you can in principle restore life and restore an activity to the brain, and, importantly, without any brain damage." –*Sam Parnia. What happens when we die?* [2].

PATIENT ONE: A SURGE OF ACTIVITY

Jimo Borjigin is a professor of neurology at the University of Michigan. She has said: "To die is such an essential part of life but we knew almost nothing about the dying brain." Her research together with several colleagues took the first close look at the record of electrical activity in the brain of a patient known as Patient One. After three days lying in a coma, Patient One's family took the decision to take her off life support. It was at that point – after her oxygen was turned off and nurses pulled the breathing tube from her throat–that Patient One became "one of the most intriguing scientific subjects in recent history. For Jimo Borjigin "the process of dying is far stranger than scientists ever suspected" [3]. *Alex Blasdel. The new science of death* in the moments after Patient One was taken off oxygen, there was a surge of activity in her dying brain. Areas that had been nearly silent while she was on life support suddenly thrummed with high frequency with high-frequency electrical signals called gamma waves. In particular, the parts of the brain that scientists consider a "hot zone" for consciousness became dramatically alive. In one section, the signals remained detectable for more than six minutes. In another, they were 11 to 12 times higher than they had been before Patient One's ventilator was removed [3]. *Alex Blasdel. The new science of death* "As she died, Patient One's brain was functioning in a kind of hyperdrive…" Borjigin reported. "Even as she slipped irrevocably deeper into death, something that looked astonishingly like life was taking place over several minutes in Patient One's brain." Those "glimmers and flashes" of something like life contradict the expectations of almost everyone working in the field of resuscitation and near-death studies [3]. Alex Blasdel. *The new science of death* "The brain, contrary to everybody's belief, is actually super active," Borjigin said. She believes it's likely that Patient One had a profound near-death experience with many of its major features: out- of-body sensations, visions of light, feelings of joy and serenity, and moral evaluations of one's life [3]. *Alex Blasdel. The new science of death*

AN EXPANSION OF CONSCIOUSNESS

And what we now know which is fascinating is that as people go through death, either just before their hearts have stopped or after their hearts have stopped, that they go through an inner experience that is completely unique. So although from our perspective, they look like they are not conscious and they're at best in a coma or they're going through death, from the person who's dying perspective, they feel that their own consciousness is not annihilated, that it continues to exist but it actually expands [2] –Sam Parnia. *What happens when we die?* People describe this expansion of awareness and its unique inner experience as if consciousness suddenly becomes vast; it is not annihilated but is "something they've never experienced before." The experience appears to coincide with the classic life review which is characteristic of the passage out of mortal life: an assessment is presented to the dying person of their conduct during life. And then incredibly, what they undergo is an experience where they're able to relive every single moment of their life, everything that they have done What they're really experiencing is every interaction that they've had with other living beings, whether human or otherwise, and they're reliving what they did but also reliving how the other person or the other entity felt and what they experienced as a result of the interactions that were happening. So they're feeling both perspectives [2] –Sam Parnia. *What happens when we die*? Clearly this research into brain death is touching dimensions of existence which have yet to be explored scientifically, especially consciousness. Quantum physicist David Bohm suggested that "The results of modern natural sciences only make sense if we assume an inner, uniform, transcendent reality that is based on all external data and facts. The very depth of human consciousness is

one of them" [4]. *David Bohm, Scientists Find Hints for the Immortality of the Soul*

CONCLUSION

Brain death research is leading scientists towards new frontiers with seemingly mystical revelations arising from the revolution in their ability to resuscitate people who have suffered cardiac arrest. Sam Parnia holds out a view of the future: "I think in 50 or 100 years time we will have discovered the entity that is consciousness…It will be taken for granted that it wasn't produced by the brain, and it doesn't die when you die." [2]–Sam Parnia. What happens when we die?

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