

Sam Parnia argues that the dead brain is flat lined. Following death, you should not have the ability to dream or hallucinate. So if you do, something else must be going on. A large scale study, called AWARE, (AWAreness during Resuscitation) was launched in 2008 and is still running. It involves 25 major medical centers in Europe, Canada, and the U.S. The goal is to substantiate reports of veridical perception. Preliminary results were not encouraging. From 2060 cases of cardiac arrest, of 141 survivors, only one case shows a verifiable period of consciousness where none was expected. <sup>1</sup>

NDE Researcher Dr. Penny Sartori's research was more conclusive. She examined memories of resuscitation by ICU patients suffering cardiac arrest . She found that NDE's and OBE's recollection of resuscitation was really quite accurate, while those who did not have a NDE or OBE could not even guess what happened during resuscitation. <sup>2</sup>

### **Of Rats and Humans**

Researchers at the University of Michigan measured brain waves in nine rats, which were then sedated with anaesthetic, and killed. As you'd expect, after their hearts stopped, most of these brainwaves weakened with time. But after 30 seconds, one set—the low-gamma waves produced when neurons fire between 25-55 times per second—became stronger for a brief period, in all of the nine rodents. The activity in different parts of their brains also became more synchronized. These features have been linked to conscious perception in earlier studies. For example, low-gamma waves suddenly become synchronized across distant brain regions at the moment when people recognize a face among some arbitrary shapes.

Team leader Jimo Borjigin believes this helps to explain human NDEs. Coauthor of the study, George Mashour however, notes that the observed brain activity has not been correlated with experience. Steven Laureys, who leads the Coma Science Group at the University of Liege, cautions, "It's terribly hard to make strong claims about what these rats actually perceived, or about possible conscious experiences," but he admits the study shows very interesting brain activity.

Cardiologist and NDE researcher Sam Parnia believes comparing these rat results to human NDEs "is extremely premature and unsupported by evidence", and says that there could be other explanations for the results. For example, an influx of calcium inside brain cells due to stopped blood flow, which eventually leads to cell damage and death, would lead to measurable electroencephalography (EEG) activity. This would explain why Borjigin saw the same pattern in every dying rat, while only 20 percent of people experience NDEs after a heart attack.

Parnia also notes that other EEG studies of humans during cardiac arrest haven't found similar patterns, but Borjigin counters that other groups have mostly placed electrodes on their patients' scalps. Her team, however, surgically implanted their electrodes right on top of the rats' brains, making them more sensitive to subtle signals.

Borjigin notes "We didn't realise that brains can have heightened consciousness when oxygen and glucose are taken away." <sup>3</sup>

Studies show that moments before death dying patients sometimes experience a burst in brainwave activity lasting from 30 seconds to three minutes. The activity may be similar to that seen in people who are fully conscious, even though the patients appeared asleep and had no blood pressure. Soon after the surge abated, they were pronounced dead.<sup>4</sup>

Dying persons may also demonstrate a sudden revival in mental as well as physical functioning just before death.<sup>5</sup> Could these examples in humans relate to Borjigin's observation on the brain activity of dead rats ?

Regardless of what the signals mean in a rat's brain, Borjigin's study suggests that perhaps NDEs reported by patients during recorded flatliner EEGs may not have flatlined EEGs at all, but merely EEGs too weak to be recorded from outside the skull.

### **Differences in Interpretation of Data**

In the case of Pam Reynolds, however, there seems little doubt that the brain was flatlined. Reynolds underwent a procedure known as hypothermic cardiac arrest, in which body temperature is lowered to 50 °F, breathing and heartbeat stopped, and the blood drained from the head. Small ear plugs with speakers emitting audible clicks are placed in the ears to check the function of the brain stem to ensure a flat EEG — or non-responsive brain — before the operation proceeded. After the procedure, which was successful, Reynolds reported experiencing a vivid NDE.<sup>6</sup>

Anesthesiologist Gerald Woerlee analyzed the case, and concluded that Reynolds ability to perceive events during her surgery was the result of "anesthesia awareness."<sup>7</sup> He notes that Reynolds could only give a report of her experience some time after she recovered from the anesthetic. This would provide some opportunity for her to associate and elaborate upon the sensations she had experienced during the operation with her existing knowledge and expectation.<sup>8</sup> Still, why would there be any sensations at all if EEG and EKG were flatlined?

University of Toledo Neuroscience researcher and EEG expert Dr. John Greenfield states: "It's very unlikely that a hypoperfused brain [someone with no blood flow to the brain], with no evidence of electrical activity could generate NDEs. ... There are deep brain areas involved in generating memories that might still operate at some very reduced level during cardiac arrest, but of course any subcortically generated activity can't be brought to consciousness without at least one functioning cerebral hemisphere. So even if there were some way that NDEs were generated during the hypoxic state [while the brain is shut off from oxygen], you would not experience them until reperfusion [blood flow] allowed you to dream them or wake up and talk about them".<sup>9</sup> Although Woerlee and Greenfield are looking at the same phenomena, their interpretation is quite different.

Woerlee observes that an article by Mobbs, and Kevin Nelson's book *The Spiritual Doorway in the Brain*<sup>10</sup> both use the data, gathered by NDE researcher Dr. Pim van Lommel. The three researchers, however, interpret the data differently. While Lommel finds evidence for dualism (body and spirit), Mobbs and Nelson find evidence for materialism (body only)

Interestingly, Woerlee concurs with Chris Carter's assessment in *Science and the Near Death Experience*, that evidence presented for the mind-models of dualism and materialism equally adequately explains the physical experimental results and subjective experiences presented.

This includes brain activity. Just because there may be a flurry of brain activity at the time of death does not at all prove the materialist interpretation is correct.

Woerlee concludes: “The experimental results as revealed and interpreted by both sides of the dualism versus materialism argument, fail to clearly differentiate between the two belief systems. The virtue of materialism above dualism is that it makes use of provable physical evidence, making it more likely to be true than dualism. But that is all. The fact that something is more likely does not automatically mean it is true. Absolute proof is different from likelihood. So dualism and materialism remain alternative mind-models until definitive proof one way or the other is provided.”<sup>11</sup>

### **Peculiarities in Death Bed Experiences**

Dying people sometimes seem to see or converse with people who are not physically present, usually deceased persons, or to perceive some environment not physically evident to bystanders. Studies have shown that patients were less likely to see deathbed visions if they were on medications or had illness effecting consciousness.<sup>12</sup>

Wikipedia notes a high degree of similarity between deathbed visions and drug-induced hallucinations, which frequently contain images of otherworldly beings and deceased friends and relatives. Scientists who have studied cases of deathbed phenomena have described the visual, auditory, and sensed presences of deceased relatives or angelic beings during the dying process as hallucinations due to cerebral hypoxia.<sup>13</sup>

But it’s not that simple. In “Peak in Darien” cases, the dying person sees, and often expresses surprise at seeing, a person whom they thought was living, but who had died recently. Bruce Greyson notes that there are three varieties of “Peak in Darien” experiences. The first variety comprises cases in which the deceased person seen had died some time before the vision, although that death was unknown to the experiencer, as far as could be ascertained. The second includes cases in which the deceased person seen had died at the time of, or immediately before, the vision, thus not allowing any possibility for the experiencer to have learned of the death. The third type consists of cases in which the deceased person seen was someone whom the experiencer had never known. Greyson notes that reports of “Peak in Darien” cases are scattered throughout the literature, “and they are often inadequately documented; but there are enough of them to warrant giving them serious attention.”<sup>14</sup>

Carlos Alvarado, PhD from the University of Virginia, has noted that some bystanders at deathbeds have reported hearing voices, or seeing apparitions and a variety of emanations coming from the dying person’s body, such as mists, lights, or replicas of the dying person’s body. Physical phenomena such as breakage or falling of objects has also been documented.<sup>15</sup>

Closely related to Near Death Experiences (NDEs) and Near Death Visions (NDVs) are the phenomena of Shared Death Visions (SDVs), a term coined by Raymond Moody in his book *Glimpses of Eternity*.<sup>16</sup> In SDEs, healthy bystanders who are “close” to a dying person experience many of the aspects of the NDE along with the dying person, including leaving their bodies, meeting beings of light, and seeing the life review of the dying person.<sup>17</sup> Such experiences have been documented by the Society for Psychical Research in London since the late 1800s, and a program, the Shared Crossing Project, has been developed to explore them in more detail.<sup>18</sup>

Hypoxia of the dying brain could hardly account for such physical and communal peculiarities. And why should there be any similarity at all between deathbed visions and NDE experiences if the hallucinations are merely the chaotic firing of neurons in a deteriorating brain?

### **Can Hallucinations be Real in Some Sense?**

Interestingly, Gerald Woerlee quotes the following passage from psychologist Cyril Burt: “The brain is not an organ that generates consciousness, but rather an instrument evolved to transmit and limit the processes of consciousness and of conscious attention so as to restrict them to those aspects of the material environment which at any moment are crucial for the terrestrial success of the individual...”<sup>19</sup>

A very similar view is expressed by Aldous Huxley, in his book *The Doors of Perception*,<sup>20</sup> where he suggests that all around us is Mind at Large, (being an information field) which comprises everything. He proposed that the brain is a ‘reducing valve,’ narrowing that information to a small trickle, and suggested that drugs may temporarily open that valve.<sup>21</sup>

These views seem to be shared by some current researchers. A study by British researchers shows how psilocybin — the drug contained in certain mushrooms — affects the connectivity of the brain. Researchers found that the psychedelic chemical, which is known to trigger feelings of oneness with the universe and a trippy hyperconsciousness, does not work by ramping up the brain’s activity as they’d expected. Rather, under influence of psilocybin, overall brain activity drops, particularly in certain regions that are densely connected to sensory areas of the brain. “The results seem to imply that a lot of brain activity is actually dedicated to keeping the world very stable and ordinary and familiar and unsurprising,” says Robin Carhart-Harris, a postdoctoral student at Imperial College London and lead author of the study<sup>22</sup>

Perhaps the shutting down of the brain at death may also open the reducing valve, triggering feelings of oneness with the universe, known as a NDE. Interestingly, the human body produces a powerful endogenous “hallucinogenic”, di-methyl-tryptamine. Rick Strassman, who has dubbed DMT the “Spirit molecule” notes; “It is almost inconceivable that a chemical as simple as DMT could provide access to such an amazing array of experiences. From deep insights to encounters with aliens. Abject terror or nearly unbearable bliss. Near-death and rebirth. Enlightenment....It is just as fascinating to ponder why Nature made DMT to allow such experiences.”<sup>23</sup>

Dr Robert Speltzer, Neurosurgeon, attempts to explain why DMT does not explain NDEs: In the classic case of a NDE, all biological signals, all metabolic activity, especially of heart and brain, cease. However, DMT creates a chemical reaction in a functioning brain.<sup>24</sup> However, there is no reason why all NDEs are created equal. Since researchers have now determined that the human brain may function just prior and just after death, DMT may be implicated, Again, regardless of whether the brain is active or not neither during an NDE neither proves nor disproves a materialistic or dualistic (body and spirit) interpretation.

### **Secret Life of the Brain**

It has been found that the inactive brain consumes an incredible amount of energy. The work of Marcus Raichle, a neuroscientist at Washington University in St Louis, and others, has led to the discovery of a major system within the brain. This system fires up whenever the brain is

otherwise unoccupied and burns more oxygen, gram for gram, than the beating heart. What is the purpose of this system?<sup>25</sup> It was found that this neural activity in this ‘default network’ was present in heavily sedated monkeys, as well as in sedated humans. Other researchers found the network active and synchronized in early sleep.<sup>26</sup> What is the purpose of this “default network”?

Researchers have found that the default network’s pattern of activity is disrupted in patients with Alzheimer’s, depression, attention deficit hyperactivity disorder (ADHD) autism and schizophrenia. It also plays a mysterious role in victims of brain injury or stroke who hover in the grey netherworld between consciousness and brain death. You can see how the network breaks down as coma deepens.<sup>27</sup>

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<sup>1</sup> [www.recuscitationjournal.com](http://www.recuscitationjournal.com)

<sup>2</sup> <http://www.skeptiko.com/eeg-expert-on-near-death-experience/>

<sup>3</sup> <http://phenomena.nationalgeographic.com/2013/08/12/in-dying-brains-signs-of-heightened-consciousness/>

<sup>4</sup> <http://www.telegraph.co.uk/news/health/news/7785944/A-cascade-of-brain-activity-as-people-die-could-explain-near-death-experiences.html>

<sup>5</sup> *Irreducible Mind: Toward a psychology for the 21<sup>st</sup> century*  
Edward Kelly et al 2007 p. 408 f.

<sup>6</sup> <http://www.youtube.com/watch?v=fC48vZ3ssOU>

<sup>7</sup> [https://en.wikipedia.org/wiki/Pam\\_Reynolds\\_case](https://en.wikipedia.org/wiki/Pam_Reynolds_case)

<sup>8</sup> [https://en.wikipedia.org/wiki/Pam\\_Reynolds\\_case](https://en.wikipedia.org/wiki/Pam_Reynolds_case)

<sup>9</sup> <http://www.skeptiko.com/eeg-expert-on-near-death-experience/>

<sup>10</sup> *The Spiritual Doorway in the Brain* Kevin Nelson, Dutton 2011

<sup>11</sup> <http://www.nearth.com/setting-the-record-straight.php>

<sup>12</sup> Deathbed visions (p408 f) *Irreducible Mind: Toward a psychology for the 21<sup>st</sup> century*  
Edward Kelly et al 2007

<sup>13</sup> [https://en.wikipedia.org/wiki/Deathbed\\_phenomena](https://en.wikipedia.org/wiki/Deathbed_phenomena)

<sup>14</sup> Bruce Greyson *Anthropology and Humanism*, Vol. 35, Issue 2, pp 159–171, ISSN 1559-9167,  
online ISSN 1548-1409.© 2010

<sup>15</sup> Carlos Alvarado PhD University of Virginia Neglected Near Death Phenomena *Journal of near death studies* 24(3) Spring 2006  
<http://www.medicine.virginia.edu/clinical/departments/psychiatry/sections/cspp/dops/publicationslinks/Alvarado-Neglected-Near-Death-Phenomena-2006.pdf>

<sup>16</sup> *Glimpses of Eternity* Raymond Moody, Guideposts 2010

<sup>17</sup> <http://www.near-death.com/experiences/triggers/shared-death-experiences.html>

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<sup>18</sup> <http://www.sharedcrossing.com/shared-death-experience.html>

<sup>19</sup> *Science and the Near Death Experience* Chris Carter 2010, p. 18

<sup>20</sup> Huxley's book takes its title from a phrase in William Blake's poem *The Marriage of Heaven and Hell*.

<sup>21</sup> Huxley's exact words: <http://www.ianmack.com/aldous-huxley-dont-mistake-the-trickle-for-ultimate-reality/>

<sup>22</sup> published in *Proceedings of the National Academy of Sciences*.  
*Neural correlates of the psychedelic state as determined by fMRI studies with psilocybin*  
<http://www.pnas.org/content/109/6/2138>

<sup>23</sup> *DMT The Spirit Molecule* Rick Strassman MD Park Street Press 2001 p. 310.

<sup>24</sup> <http://www.youtube.com/watch?v=fC48vZ3ssOU>

<sup>25</sup> *Nothing: Surprising Insights Everywhere From Zero to Oblivion*  
Published by New Scientist 2013 P. 17.

<sup>26</sup> *Nothing: Surprising Insights Everywhere From Zero to Oblivion*  
Published by New Scientist 2013 p. 22.

<sup>27</sup> *Nothing: Surprising Insights Everywhere From Zero to Oblivion*  
Published by New Scientist 2013 p. 23-24 .