Recent health advances

Zoya Khan, Final year MBBS Candidate, Faculty of Medicine, Bundelkhand Medical College, Sagar, Madhya Pradesh, India.

Yale - lead study suggests there might be hope, even after death.

After cessation of blood flow or similar ischaemic exposures, deleterious molecular cascades commence in mammalian cells, eventually leading to their death.

However, with certain targeted interventions, these processes can be altered, deliberated, or reversed altogether, even hours after post-mortem.
"All cells do not die immediately, there is a more protracted series of events," said David Andrijevic, associate research scientist in neuroscience at Yale School of Medicine and co-lead author of the study. "It is a process in which you can intervene, stop, and restore some cellular function."

In the year 2019, in an experiment held by scientists at Yale University, a pig's extracted brain was treated with an experimental advent of technology, that came to be known as 'BrainEx', the results showed parts of the brain with circulation and cellular functions restored, which are usually thought to have ceased after post mortem.

"At no point did we observe the kind of organized electrical activity associated with perception, awareness, or consciousness," reported co-first author Zvonimir Vrselja, associate research scientist in neuroscience at Yale School of Medicine. Although on a cellular level, the brain cells were seemingly resurrected, but regain of consciousness or any other vital brain function was absent.

"If we were able to restore certain cellular functions in the dead brain, an organ known to be most susceptible to ischemia [inadequate blood supply], we hypothesized that something similar could also be achieved in other vital transplantable organs," Sestan said.

In this research, led by author Sestan and colleagues Andrijevic, Zvonimir Vrselja, Taras Lysyy, and Shupei Zhang, all from Yale, focused on a broader target, they used a modified version of 'BrainEx', called 'OrganEx' that focused on restoring organ function in the pig. OrganEx involves a perfusion device and a cryoprotective perfusate, a cold elixir containing synthetic hemoglobin, called HemoPure, to carry oxygen. The solution also includes antibiotics, anti-inflammatories, suppressors of cell death, and various molecules to keep cells safe and able to withstand freezing while curbing thrombus formation.

About an hour after their deaths, the pigs were subjected to OrganEx, which astonishingly and successfully restored perfusion throughout the body. Although microscopically, no difference could be inferred between healthy cells and those treated with OrganEx, and major organ function had been restored in vital organs such as the heart, liver and kidneys, no signs of resuscitation or consciousness could be observed.

There still needs to be hours and hours of rigorous research activity and reviews by researchers and bioethicists, before we can

utilise this ground-breaking discovery in organ transplantation, using it to substantially increase the number of donor organs, increase viability and reduce wastage of such organs due to various limitations, the most important one being time, as well as in organ resuscitation, that may result due to shock or extremely reduced blood flow.