Scientists' OPEN LETTER *on* CRYONICS

To whom it may concern,

Cryonics is a legitimate science-based endeavor that seeks to preserve human beings, especially the human brain, by the best technology available. Future technologies for resuscitation can be envisioned that involve molecular repair by nanomedicine, highly advanced computation, detailed control of cell growth, and tissue regeneration.

With a view toward these developments, there is a credible possibility that cryonics performed under the best conditions achievable today can preserve sufficient neurological information to permit eventual restoration of a person to full health.

The rights of people who choose cryonics are important, and should be respected.

Sincerely (61 Signatories)



Signatories encompass all disciplines relevant to cryonics, including Biology, Cryobiology, Neuroscience, Physical Science, Nanotechnology and Computing, Ethics and Theology. [Signature date in brackets]

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Selected Journal Articles Supporting Cryonics:

- **First paper showing recovery of brain electrical activity after freezing to -20°C.** Suda I, Kito K, Adachi C, in: Nature (1966, vol. 212), "Viability of long term frozen cat brain in vitro," pg. 268-270

- **First paper to propose cryonics by neuropreservation:** Martin G, in: Perspectives in Biology and Medicine (1971, vol. 14), "Brief proposal on immortality: an interim solution," pg. 339.

- **First paper showing recovery of a mammalian organ after cooling to -196°C (liquid nitrogen temperature) and subsequent transplantation:** Hamilton R, Holst HI, Lehr HB, in: Journal of Surgical Research (1973, vol 14), "Successful preservation of canine small intestine by freezing," pg. 527-531.

- **First paper showing partial recovery of brain electrical activity after 7 years of frozen storage:** Suda I, Kito K, Adachi C, in: Brain Research (1974, vol. 70), "Bioelectric discharges of isolated cat brain after revival from years of frozen storage," pg. 527-531.

- **First paper suggesting that nanotechnology could reverse freezing injury:** Drexler KE, in: Proceedings of the National Academy of Sciences (1981, vol. 78), "Molecular engineering: An approach to the development of general capabilities for molecular manipulation," pg. 5275-5278.

- **First paper showing that large organs can be cryopreserved without structural damage from ice:** Fahy GM, MacFarlane DR, Angell CA, Meryman HT, in: Cryobiology (1984, vol. 21), "Vitrification as an approach to cryopreservation," pg. 407-426.

- **First paper showing that dogs can be recovered after three hours of total circulatory arrest ("clinical death") at 0°C (32°F). This supports the reversibility of the hypothermic phase of cryonics:** Haneda K, Thomas R, Sands MP, Breazeale DG, Dillard DH, in: Cryobiology (1986, vol. 23), "Whole body protection during three hours of total circulatory arrest: an experimental study," pg. 483-494.

- **First detailed discussion of the application of nanotechnology to reverse human cryopreservation:** Merkle RC, in: Medical Hypotheses (1992, vol. 39), "The technical feasibility of cryonics," pg. 6-16.

- **First successful application of vitrification to a relatively large tissue of medical interest:** Song YC, Khirabadi BS, Lightfoot F, Brockbank KG, Taylor MJ, in: Nature Biotechnology (2000, vol. 18), "Vitreous cryopreservation maintains the function of vascular grafts," pg. 296-299.

- **First report of the consistent survival of transplanted kidneys after cooling to and rewarming from -45°C:** Fahy GM, Wowk B, Wu J, Phan J, Rasch C, Chang A, Zendejas E, in: Cryobiology (2004 vol. 48), "Cryopreservation of organs by vitrification: perspectives and recent advances," pg. 157-78.

- **First paper showing good ultrastructure of vitrified/rewarmed mammalian brains and the reversibility of prolonged warm ischemic injury in dogs without subsequent neurological deficits, and setting forth the present scientific evidence in support of cryonics:** Lemler J, Harris SB, Platt C, Huffman T, in: Annals of the New York Academy of Sciences, (2004 vol. 1019), "The Arrest of Biological Time as a Bridge to Engineered Negligible Senescence," pg. 559-563.

- **First discussion of cryonics in a major medical journal:** Whetstine L, Streat S, Darwin M, Crippen D, in: *Critical Care,* (2005, vol. 9), "Pro/con ethics debate: When is dead really dead?" in press.

- **First demonstration that both the viability and structure of complex neural networks can be well preserved by vitrification:** Pichugin Y, Fahy GM, Morin R, in: *Cryobiology,* (2006, vol. 52), "Cryopreservation of rat hippocampal slices by vitrification," pg. 228-240. PDF here.

- **Rigorous demonstration of memory retention following profound hypothermia, confirming theoretical expectation and clinical experience.** Alam HB, Bowyer MW, Koustova E, Gushchin V, Anderson D, Stanton K, Kreishman P, Cryer CM, Hancock T, Rhee P, in: Surgery (2002, vol. 132), "Learning and memory is preserved after induced asanguineous hyperkalemic hypothermic arrest in a swine model of traumatic exsanguination," pg. 278-88.

Note: Signing of this letter does not imply endorsement of any particular cryonics organization or its practices. Opinions on how much cerebral ischemic injury (delay after clinical death) and preservation injury may be reversible in the future vary widely among signatories.

This project was developed by The Immortality Institute in support of cryonics. Contact: support@imminst.org

For more information about cryonics please visit the Alcor Life Extension Foundation website: www.alcor.org