

Cryonics

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What is Cryonics?

- From www.alcor.org:
- “Cryonics is a **speculative life support technology** that seeks to **preserve human life** in a state that will be viable and treatable by **future medicine**”

Future medicine

- Nanotechnology
 - Heal at cellular and molecular levels
- Brain scans and mind uploads
 - No more need for squishy bodies

Preserve human life

- Chemical activity in a body stopped
- e.g. freezing bugs, human embryos, etc. and later reviving them



Speculative life support technology

- “Freezing” the brain
- Technical term: vitrification
 - Ice-free process
 - Replaces over 60% of the water inside cells with cryoprotectant chemicals, organs behave more like glass when cooled
 - Originally reported on in 1984
 - Protocol for the human brain developed in 2001



Who does it?

- [Http://alcor.org](http://alcor.org)



- [Http://cryonics.org](http://cryonics.org)



Cryonics process

- A standby team will wait at patient's bedside until legal death is declared, then apply cooling and cardiopulmonary support
- Transport to alternate facility if hospital can't support cryonics procedures
- Patient cooled to just above freezing, blood washed out and replaced with cryoprotectant



Cryonics process

- Over three hours cooled to -125°C
- Further monitored and cooled to -196°C over ~2 weeks
- Stored under liquid nitrogen in vacuum-insulated dewars that are refilled every few weeks



Can it work?

- Current state of the art
- Odds of a good preservation
- Future concerns

State of the art

- Dogs and monkeys have had blood replaced with cryoprotectant and cooled below 0°C, subsequently rewarmed and revived
- Nematode worms cryopreserved in liquid nitrogen (-196°C) and revived
- Rabbit kidney vitrified and cooled to -135°C, rewarmed and transplanted to a rabbit with complete viability

Good preservation

- Cryonics is useless if your head a'splode
- Also useless if brain decays
 - Cell death of neurons takes many hours
- Body is surprisingly durable
 - With the right medical practices to help it
 - CPR has only been around since the 50s, before that “stopped pulse” was considered legal death



Good preservation

- Leading causes of death in the US are:
- Heart disease, cancer, respiratory diseases, stroke, accidents, alzheimer's, diabetes, nephrosis, the flu and pneumonia, and suicide
 - Like sad stories? Google “suicide note of an LW user”
- Both Alcor and CI have Standby support
- Arrange to forgo cryonics if it would be done under poor conditions

Future concerns

- Company longevity
- US government or human civ. collapse
- Efficacy of current preservation methods vs. future revival methods
- Someone willing and able to pay for revival
- Sim life seems worth living enough not to prefer suicide
- Etc.

Future concerns

- Google “break cryonics down” for a fun Fermi Calculation
- “If you make 50K\$/yr now, and value life-years at twice your income, and discount future years at 2% from the moment you are revived for a long life, but only discount that future life based on the chance it will happen, times a factor of 1/2 because you only half identify with this future creature, then the **present value of a 5% chance of revival is \$125,000**, which is about the most expensive cryonics price now.”

Costs

- Cryonics Institute lifetime membership costs \$1,250 once and entitles you to a rate of \$28,000 once for full-body preservation
 - \$120/yr + \$75 initial + \$35k at time of 'death'
- Alcor charges \$620/yr for membership dues, \$200,000 for full-body preservation, \$80,000 for neuropreservation
 - Includes Standby and Transportation costs, which at CI would add another \$88k

Funding

- Almost all members have a life insurance policy with the cryonics company as beneficiary
- With general good health, paying for CI (including standby and transport) can cost less than \$300/yr
- Suggestion: talk to an insurance agent with prior experience setting up all the legal documents

Argument from authority

- http://www.imminst.org/cryonics_letter/
- Google “scientists' open letter on cryonics”
- Claim: “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.”
- 61 PhDs and MDs can't be wrong (right?)

Thank you

- And sign up!
- (Or at least consider it seriously and research the lot of information not covered here.)