Cryoethics: Seeking Life After Death

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Abstract

Cryonic suspension is a relatively new technology that offers those who can afford it the chance to be ‘frozen’ for future revival when they reach the ends of their lives. 86 people are already frozen, with 886 registered for suspension. This paper will examine the ethical status of this technology and whether its use can be justified.

Among the arguments against using this technology are: it is ‘against nature’, and would change the very concept of death; no friends or family of the ‘freezee’ will be left alive when he is revived; the considerable expense involved for both the freezee and the future society that will revive him (and the fact that his children will probably receive less inheritance); the environmental cost of maintaining suspension; those who wish to use cryonics might not live life to the full because they would economise in order to afford suspension; and cryonics could lead to premature euthanasia in order to maximise chances of success. Perhaps the most fundamental concern is the likely prospect of failure: science might not advance enough to ever permit revival, and reanimation might not take place due to socio-political or catastrophic reasons, or even simple equipment failure.

Arguments advanced by proponents of cryonics include: the potential benefit to society; the ability to cheat death for at least a few more years; the prospect of immortality if revival is successful; and all the associated benefits that delaying or avoiding dying would bring. It emerges that, despite the seemingly overwhelming force of the arguments against cryonics, it might well be imprudent not to use the technology, given the relatively minor expense involved and the potential payoff. An adapted and more persuasive version of Pascal’s Wager is presented, and offered as a conclusive argument in favour of utilising cryonic suspension.

Introduction

Cryonics is regarded with some bemusement by most people. When asked whether they would be interested in freezing their bodies or brains when they die for future reanimation, they reply that it’s science fiction, or that it’s grotesque, or that the author has too much time on his hands. These reactions, while understandable (except the last) are actually quite strange. One might expect that people would at least attempt to take seriously an alternative to burial and

cremation, particularly when that alternative offers a possibility, however slim, of cheating death. In the USA, at least, some people are taking this seriously: so far Alcor, the largest cryonics company, already has 86 people frozen, with 886 registered for suspension [1]. In essence, the procedure involves cooling the body to -196 degress Celsius while using cryopreservant to (attempt to) prevent preservation injury. The other option is neuropreservation, where only the brainstem is frozen. This paper will examine the arguments for and against opting for cryonic suspension. Some of these arguments have an ethical basis, while others appeal more to rational self-interest. Accordingly, the first section will examine prudential arguments against cryonics, the second ethical objections, and the third arguments of both types in favour of freezing.

Prudential arguments against cryonics

Once people's initial scepticism about cryonics has been overcome, and they accept for the sake of argument that it's not necessarily grotesque and is potentially technically feasible, the first practical objection offered is that there would be no point in being revived in a few hundred years, as all your family and friends would be dead, so you would be very much alone; let's call this the loneliness argument. There is some merit to this argument, but there are three potential objections to it. The first is that this 'loneliness' argument assumes that some of my family and friends won't also opt for cryonic storage. Were they to do so, I would have (some of) the same friends and family in the future that I do now. But let us grant that this is not the case and move on to the second objection: if you believe that the alternative is eternal oblivion, you are quite likely to prefer a friendless existence to none at all. Finally, there is nothing to prevent the thawed-out freezee from making new friends and perhaps contacting the descendants of his old family. The loneliness argument does not stand up to scrutiny.

The second practical objection is the cost of storage. It won't be cheap to keep the temperature of your body or brainstem close to absolute zero for hundreds of years. This argument is more powerful than the loneliness objection. Cryonics is indeed quite expensive, and many people will not be able to afford it. But in fact, it is not so expensive that it is only an option for millionaires. The two main costs are incurred in the long-term storage and in the preparation of the body or brainstem for storage. Most cryonics companies charge an up-front fee that covers the cost of initial preparation and an additional amount that will be sufficient to generate enough interest to meet the annual costs of continuing storage. This set-up is intended to avoid the problem of having to approach someone who is dead for more cash to ensure that they might yet be brought back to life. There might also be costs necessary prior to death, involving nursing and palliative care; as the website of one cryonics supplier puts it: "It is becoming increasingly difficult to die in a hospital in these days of medical cost containment."[2] This is a concern because it is important for the recently

deceased person to be frozen as quickly as possible, and round-the-clock care is expensive if not provided by a hospital (there is a related concern that it might be better to be frozen while still alive; see the section on ethical concerns for more on this). Of course, this is not an absolute requirement for cryonic storage, and many people will already have health insurance that covers them for round the clock care. For these reasons it seems legitimate to focus on the cost of storage itself. So how much does it actually cost to freeze one's body in perpetuity? In fact, most people pay using their life insurance policies. Alcor requires a minimum of $150,000 for whole-body storage, and $80,000 for neuropreservation.[3] These surprisingly low figures indicate that cryonic storage is well within the financial grasp of many citizens of developed countries. The ethical implications of using life insurance for this purpose are discussed in the next section. A related objection to the expense argument is that those who decide they want to be frozen will not live life to the full because they want to save their money in order to afford being frozen. This is a possibility, but people save their money for all sorts of reasons, and in so doing accept that they cannot spend that money on particular things; it is difficult to see why cryonics should be any different. A final linked objection is that those who are revived would have no money and possibly no transferable skills, but such potential challenges at least counter the old objection that living forever would be boring (related to this is the interesting question of the legal status of the revived person; see the next section for more on this).

The most obvious practical argument against cryonic storage is that the technology is unproven. In fact, it is not only unproven, it does not yet exist: although current science allows us to freeze bodies, the technology has not yet been invented that would allow thawing without severe tissue damage. Because of this, some people feel that investing in cryonics is like throwing money away. This criticism will be answered in depth in the third section of this paper. Here, it is worth stating the obvious reply to this criticism: the money will be no good to me anyway once I'm dead, so why not spend it on something that will at least offer a slim chance of life after death? (A rebuttal to this reply is that there are more ethical ways to use your money; this will also be dealt with in the next section.)

In fact, while the technology necessary for cryonic revival does not yet exist, it is certainly within the realm of theoretical possibility. Human embryos can already be frozen and thawed safely, and adult non-mammals have also undergone the process successfully. One of the main technical objections is that even if the body could be preserved perfectly after thawing, the mind and memories of the person would no longer exist. But this objection is based on a dualist attitude towards the mind and body; in fact, our consciousnesses are made up of physical structures like the rest of the body:

> It appears very unlikely that such structures will survive the lifetime of the individual only to be obliterated beyond recognition by freezing....The damage done by current freezing methods is likely to be reversible at some point in the

> future. In general, for cryonics to fail, one of the following 'failure criteria' must be met: 1. Pre-suspension and suspension injury would have to be sufficient to cause information theoretic death. In the case of the human brain, the damage would have to obliterate the structures encoding human memory and personality beyond recognition. 2. Repair technologies that are clearly feasible in principle based on our current understanding of physics and chemistry would have to prove impossible to develop in practice, even after several centuries of development. [4]

It is possible that those who object on grounds of technical feasibility are overlooking the fact that the necessary advances need not occur in the next century or so (the scale we are used to using in terms of self-interest); it hardly seems implausible that technology will be sufficiently advanced in 1000 years, and current cryonic technology is already capable of preserving bodies and brainstems for that long. There is obviously an element of risk-taking involved in opting for cryonic storage, but it is quite possible that technology will advance to the point where revival is feasible.

Perhaps a more powerful objection than the argument from inadequate technology is the possibility that revival will not take place *despite* the necessary technology being available. It might become available, but remain so expensive that the initial payment to the cryonics company remains insufficient for revival. This is possible in the short-term, but the technology would probably eventually become cheaper than the yearly maintenance fee. (A more prosaic worry is that the cryonics companies themselves might simply go out of business, although they take great pains to reassure customers that this is extremely unlikely.) More worrying is the point that it is unclear how any future society would react to the possibility of "refugees" from another time being revived. The government of the era might decide that it is unethical, for whatever reason, to bring people back to life, regardless of the contract they held with the cryonics companies. One possible reason for this is the complications that would ensue regarding the definition of death (see the next section of this paper). This argument is not without merit. Once again, though, it is not as if the dead person will be any worse off frozen and not revived than cremated. A related objection is the risk of the collapse of civilization, or some type of cataclysmic global event, either of which would probably lead to rapid uncontrolled thawing and irreversible death. This argument might seem weak, given that such an event would be bad for everyone alive anyway and the risk is very small, but given that we are talking about enough time passing for very advanced new technology to be developed, the risk of such a devastating event increases the longer it takes for the technology to come to fruition. The prospective user of cryonics is much more exposed to the risk of cataclysm than the normal citizen. Once again, though, it might well be a risk worth taking.

Two last practical objections are worth mentioning. First, it is possible that people will find themselves revived with the same pathology that killed them. However, it seems likely that cures for most pathologies will have been found by

the time revival becomes technologically feasible. If this is not the case, then the cryonics company will have on file what it was that 'killed' the cryonaut, and will not revive him or her until cure is possible. Of course, in the case of neuropresevation, a new body will have to be grown or cloned for the revivee in any case; if this level of technology is available, curing cancer might seem simple by comparison.

The final practical objection to cryonics is that, if it is successful and does lead to immortality, then the classic objection to eternal life comes into play: people might become bored with life. This argument has been debunked elsewhere, and even immortals could commit suicide if they did get bored with life.[5] But as an objection to cryonics, this argument has no force anyway: if the cryonaut is offered immortality on revival, it will be available to everyone in society anyway, regardless of whether they were ever frozen. This objection actually relates to immortality in general rather then cryonics specifically.

Ethical objections to cryonics

The arguments in the previous section attempted to provide prudential reasons not to attempt cryonic storage for oneself, and they addressed potentially harmful (or at least non-beneficial, given the status of the freezee) consequences for the person considering cryonics. Now we move on to arguments that claim people other than the prospective cryonaut might be harmed.

One objection is that opting for cryonic storage would be bad for the environment. Keeping one's body or brainstem cold over decades or centuries involves a lot more resources than burial or cremation. These two latter options are already regarded by some as unenvironmental, with the alternative of promession, where the body is frozen and then shattered into powder, being touted as a more ethical option.[6] Cryonics would certainly be the least environmental way of dealing with one's body after death. However, it should be borne in mind that the reason for this is that cryonics, unlike burial, cremation or promession, is not a means of disposing of a corpse, but a means of preserving a body. In this sense, a direct comparison with traditional body-disposal methods is unfair; only if revival proves to be impossible and cryonics is reduced to the status of mere body disposal does this objection have any ethical force. As we shall see, the other ethical objections to cryonics are also weakened when we bear in mind that successful cryonics does not involve death, but is merely a type of suspended animation; most, if not all of these objections are predicated on cryonics failing to prevent death.

Next, we have the argument that it is unethical to spend one's life insurance on cryonic storage rather than on one's children, family and friends or on charity. This argument seems to be more powerful. Is it not rather selfish to spend vast sums on a gamble rather than giving it to those who would more traditionally

receive it? Although it is intuitively more plausible than the environmental objection, the selfishness argument fails for the same reason. It is true that spending all one's remaining funds on cryonics would be selfish and wasteful if cryonics didn't work. The point, however, is that it might work. It is inappropriate to compare funding one's own cryonic storage with bequeathing an inheritance to friends and family, because inheritance and life insurance are sources of finance that only become an option at the end of one's life. If my father decides to splurge what would have been my inheritance on a donation to Battersea Dog's Home, I might well have legitimate grounds for complaint; the money is not going to be any more use to him, so I might expect that some of it would come my way. But just as comparing cryonics to cremation assumes that cryonics will fail, so does this argument. If my father is successfully reanimated, his earlier 'death' was only an interruption to his life, and I could hardly make a claim on any particular resources of his at any random point in his lifetime. In other words, it is fallacious to criticize someone who opts for cryonics as being selfish when they simply seek more time alive. Of course, it is true that people traditionally die and leave their estates and money to charity or their friends and family. But this is because they have to do something with the money as it can be of no further use to them; cryonics means that it could be. Rather than being selfish, opting for cryonics is at worst merely a failure of altruism; it is probably not even that, for who could argue that altruism demands that one die earlier than one otherwise could, regardless of the technological novelty of this particular life-extending option? (The issue of life insurance suggests one other potential practical problem: is it not possible that, upon reanimation, I might find a lawyer from my life insurance company demanding his money back as I am not dead? This point is discussed later in this section.)

Another argument against cryonics focuses on a different resource that might be squandered by opting for cryonics: organs. Just as those who use their life insurance to pay for storage deprive their descendants of cash, they also rob those in need of hearts, livers, kidneys and lungs of their organs. This is true to some extent, but there are several objection to this argument. First, many people refuse to donate their organs anyway, regardless of what is happening to their body after death. There is no generally recognized obligation to donate organs, although it is widely recognized as a good thing to do. Second, those who opt for neuropreservation will be able to surrender all of the organs normally donated except eyeballs; only those who choose whole-body preservation are vulnerable to this argument. And third, those who do choose whole-body storage and are successfully reanimated will still be alive and using their organs; once again, cryonics subverts the concept of death, forcing proponents of the organ-wasteage argument to acknowledge that we certainly can't complain that someone who was never really dead didn't donate their organs to other people. Only if cryonics fails does the organ argument have any force.

A further doubt is raised by the preceding discussion. If cryonics brings people back from the dead, were they really dead in the first place? This difficult

question raises both theoretical and practical issues. Theoretically, what should our definition of death be if cryonics works? And practically, to take two examples, should life insurance pay out and inheritance be distributed when someone is placed in cryonic storage? The practical question can only be answered if we can deal with the theoretical one. Certainly, by the current medical criterion of brain death, the person placed in cryonic storage is indeed dead: they have irreversibly lost brain function. However, if anyone is ever reanimated following cryonic suspension, this definition will no longer be sufficient, as the loss of brain function will have been reversed. A likely contender for the new definition is that of information theoretic death:

> A person is dead according to the information theoretic criterion if their memories, personality, hopes, dreams, etc have been destroyed in the information theoretic sense. If the structures in the brain that encode memory and personality have been so disrupted that it is no longer possible in principle to recover them, then the person is dead. If they are sufficiently intact that inference of the state of memory and personality are feasible in principle, and therefore restoration to an appropriate functional state is likewise feasible in principle, then the person is not dead. A simple example is in order. If a computer is fully functional, then its memory and 'personality' are completely intact. If we took an axe to the CPU, then the computer would no longer be functional. However, its memory and 'personality' would still be present on disk, and once we repaired the CPU we could fully restore the computer. [4]

This would certainly allow us to say that a person in cryonic storage was not dead. But should this also be adopted as the legal definition? This would probably be impractical, although it has been suggested that different definitions of death should be permitted for people with different beliefs; perhaps prospective cryonauts could also be catered for [7]. It is likely that new laws would be needed to allow those entering storage to be declared legally dead while allowing them to retain some of their estate on revival: thus life insurance might pay out (although the insurance companies probably wouldn't be too happy about it), but inheritance would not necessarily do so. In any case, such changes to the law would not be required until the first revival (except for the first revivee). A related ethical objection is that cryonics would change the meaning of death. As we have seen, this is true, but this is not really just another way of arguing that cryoethics is unnatural or against God's will, neither of which is either clear nor relevant. Similarly, it might be argued that people should just accept death, live their lives and accept what happens to them. But if cryonics works, the people who are revived will not actually have been dead; cryonics will have kept them alive. In this sense, cryonics is simply another type of medical intervention, like life-support. In fact, it is more like a typical resuscitation, where the patient comes very close to death but is brought back. Those who argue that cryonics is against God's will or unnatural would have to say the same of saving people from heart attacks.

Following on from this definitional discussion, there is another problem raised by cryonics: if those who wish to freeze themselves do so because they believe that

they will eventually be brought back to life, and that they therefore won't actually have died, why bother waiting until they die (in the old sense of the word) before being frozen? As stated earlier, it is vital that the body be cooled soon after death. Would it not be less risky to enter cryonic storage before death occurs? And this argument can be extended further. Although the success of cryonics is predicated on the ability of future technology to both revive the cryonaut and repair the underlying pathologies that led to their 'demise', some people might want to enter storage before a potentially lethal cancer takes hold, or at the first signs of the onset of dementia. (Dementia and other brain-related illnesses are particularly relevant here as they are likely to be the ones most difficult to repair even when cryonics revival becomes technically feasible.) These possibilities lead to the charge that cryonics could lead to premature suicide, euthanasia or assisted suicide. This is a powerful objection, but it can be overcome in two ways. First, it assumes that people shouldn't be permitted to choose when their lives should end, generally speaking. Although this assumption is true of the laws in most countries, it needs independent argument to back it up. And second, the way successful cryonics subverts the meaning of death comes into play again here: if cryonics works then almost everyone in storage will be brought back to life, so they won't have really died in the first place. The problem is that it is a big "if", and we certainly don't want a situation where people are choosing storage rather than enjoying a few more months with their loved ones. But there is no reason why existing legislation could not protect against this happening, and cryonic storage only be permitted after brain death. There might have to be new legislation in countries that permit euthanasia and assisted suicide, but ultimately this ethical objection can be overcome.

Arguments in favour of cryonics

Two minor arguments in favour of cryonics are worth mentioning before the main one. First, it is possible that some revived cryonauts might benefit the future society in which they find themselves, either through contributing particular skills or simply by being a novelty, like a living time capsule. (This in turn leads to one other potential argument against cryonics: the first few to be reanimated would be hounded by the press and become celebrities, which some might not like – assuming, of course, that the future world is still so obsessed with celebrity.) The second argument follows on from this last point: cryonics can be viewed not as a way of cheating death, but as a method of time travel into the future. For example, a person might have lived an excellent life and be happy to die, except for her extreme curiosity about what the world will look like in 500 years. Successful cryonics would make this a possibility, and might actually result in people asking to remain frozen beyond the point at which reanimation becomes possible in order to see the distant future (although this would further increase the risk of non-revival for cataclysmic or political reasons).

These arguments from benefit to society and opportunity to time travel are rather weak. The main argument in favour of cryonics is that it holds the prospect of more life – and perhaps a lot more. Despite the preponderance of arguments against cryonics, the fact remains that the potential benefits are virtually infinite. The revived cryonaut would not only live longer, but might live forever. Apart from anything else, he would experience more life than he would have done if he had died in the traditional sense. It is all very well for those who believe in a supernatural life after death to criticize cryonics, but for atheists who don't believe in an afterlife cryonics represents the only chance of life after 'death'. And those who say that the odds of reanimation being infinitesimally small should bear in mind that there is a lot more evidence that it will work than there is of a heaven or a hell.

This brings us on to the most convincing argument in favour of cryonics: a modified version of Pascal's Wager. Even today, many theists are embarrassed by Pascal's suggestion that the possible benefits of believing in God mean that it's worth the hassle of believing in him, or even trying to believe. Despite some rigorous defence [8], the Wager has been generally rejected. But let's swap reanimation for heaven and eternal oblivion for hell, and the $80,000 for a life of religious observance. It seems obvious that it makes sense from a self-interested point of view to accept the Cryonic Wager. If you're wrong, you've wasted a bit of money but you won't ever be able to regret it. If you're right, you will certainly live linger, and might well live forever. Here is Pascal's argument in his own words:

> Which will you choose then? Let us see. Since you must choose, let us see which interests you least. You have two things to lose, the true and the good; and two things to stake, your reason and your will, your knowledge and your happiness; and your nature has two things to shun, error and misery. Your reason is no more shocked in choosing one rather than the other, since you must of necessity choose. This is one point settled. But your happiness? Let us weigh the gain and the loss in wagering that God is. Let us estimate these two chances. If you gain, you gain all; if you lose, you lose nothing. Wager, then, without hesitation... [9]

If we replace "God is" with "cryonics works", we can see that the argumentation is the same in both cases. Stripped of its supernatural metaphysics, Pascal's Wager makes a lot more sense, and seems pragmatic reason enough to opt for cryonic storage. All the prospective cryonaut is really doing is hedging their bets by preserving their body, brain and hopefully personality and memories as well as is possible given current technology. Revival certainly seems less likely if one is cremated, buried or promessioned, as information theoretic death is bound to have taken place. Furthermore, it is obvious that those who opt for storage actually want to be revived: even if those who were buried did not deteriorate too much, there would be no evidence that they actually consented to reanimation.

Does this Cryonic Wager withstand the arguments deployed against Pascal? Let's look at each of these arguments in turn and see how investing in cryonics

compares with trying to believe in God. Lycan and Schlesinger set out the arguments well: the first objection to Pascal is that I can't try to believe in God because my beliefs are not under my control. This is simply not an issue for cryonics: it doesn't matter whether we believe it will work or not, so long as we choose to be frozen. Hope, desperation or boredom would be sufficient. The second objection is that the Wager is mercenary, and God wouldn't reward someone who made it. Again, this is not a problem for the Cryonic Wager. Third, it is objected that the probability of God's existence is infinitesimal, and it would be ridiculous to wager based on such odds. In the case of cryonics, it hardly seems fair to say the risk is so small; in the Cryonic Wager, we are merely being asked to hope that science might advance enough in the next few hundred years to permit safe thawing of frozen bodies, which sounds quite plausible when compared with believing in the eternal existence of an omnipotent deity. Furthermore, there is no actual cost other than financial to the cryonaut, which is certainly not true of the person who accepts Pascal's Wager. Even for someone who thinks successful cryonics is less likely than the existence of God could rationally opt for the Cryonic Wager. The fourth objection is that "if I bet on theism and in fact there is no God, my life will have been based on a lie".[8] Again, this is simply not true of cryonics: it doesn't involve a particular way of life in the same way that theism does. And the fifth objection fails for the same reason: those who accept Pascal's Wager have to give up sin, while those who go for cryonics can be as bad as they like as long as they can afford the fees.

We have seen that Lycan's and Schlesinger's "misguided arguments" against Pascal's Wager simply don't apply to the Cryonic Wager, with the possible exception of the probability one. But what about what they call "the two serious objections"? These are the martyrdom argument and the many-Gods argument, whose very titles suggest that they won't pose a problem for cryonics. Pascal's opponents argue that the Wager would require dying in the name of one's religion to show true faith; Pascal replies that it's still worth it if the payoff is infinite bliss. But cryonics doesn't require martyrdom at all. Similarly, you can opt for cryonics regardless of which particular deity you happen to believe in. Overall, none of the arguments used against Pascal's Wager succeed against the Cryonic Wager, except the prudential argument from probability which has already been dismissed earlier in this paper.

Ironically, there is one aspect of Pascal's Wager that would tell against cryonics if there were a God. The Cryonic Wager, although it is persuasive, can actually be countered by appealing to the original wager. If God does exist, and I opt for suspension, it might stop me from getting to heaven (i) because I won't actually be dead, and God will Know whether I will be revived or not, and (ii) the decision to try to extend my life beyond 'death' might well disbar from access on moral grounds. Just as the sinner who fails to accept Pascal's Wager will go to Hell, it might be that God forgives rational humanists and accepts them into heaven – unless, that is, they thwart his will and go for cryonics. Thus there is a very very slim risk that the soul of the dying person will rise up to the pearly gates at the

point of death, only to have them slammed in his face when his body is immersed in liquid nitrogen. Even if reanimation then takes place, the cryonaut will then be doomed to eternity on Earth rather than in heaven. I, for one, think that this is a risk worth taking. In a different context, Larry Temkin has argued that people might well prefer near-eternal life on earth to Heaven: "they want to survive with recognizably human forms, attachments and ends", as opposed to "basking in God's knowledge and glory". Indeed, such people would find the cryonic wager even more attractive, as they would *rather* continue living through cryonics than die and go to heaven.[10]

Conclusion

We have seen that many of the arguments against cryonic storage fail on their own terms, or because of the peculiar way in which successful reanimation would change our very conception of death: in essence, successful cryonics would be a form of life-support that delays, rather than returns the user from, death. It is true that there is only one convincing argument in favour of cryonics. But the point is that this positive argument is so very strong, both practically and ethically, that it would trump all the self-interested arguments against cryonics, and the ethical objections are not strong enough to prohibit the practice. At worst, cryonics offers a slim chance of living for a few more years. At best, it offers a slim chance of living forever. Ultimately, the Cryonic Wager is overwhelmingly attractive for the rational humanist, even without the prospect of eternal life.

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