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Cover Photo: *The Alcor Staff*
Back Row (l to r): *Aaron Drake, Michael Perry, Max More, Steve Graber, Hugh Hixon*
Front Row (l to r): *Diane Cremeens, D'Bora Tarrant, Bonnie Magee, Lisa Shock*

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Ray Kurzweil on Memory and Cryonics

Cryonics researcher and writer Michael Darwin uses an exchange between Ray Kurzweil and Eric Drexler as a starting point for a technical treatment about what components of the brain need to be preserved in cryonics for meaningful resuscitation of the individual in the future. In particular, he takes aim at the (in his eyes) mistaken idea that preservation of the exact concentration and location of neurotransmitters is important for long-term memory and identity.

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Gifts have played a fundamental role in the cryonics movement since its earliest days. Dr. James Bedford, a man whose extraordinary vision led him to become the first person to be cryopreserved, and the first to make a bequest to a cryonics organization, exemplified the determination of the early pioneers of cryonics. We invite you to follow in his footsteps, and join the James Bedford Society.

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If you'd like to learn more about setting up a bequest, send an email to lisa@alcor.org or call 877-462-5267 x115 to discuss your gift. ■

JAMES BEDFORD SOCIETY

QUOD INCEPIMUS CONFICIEMUS

Photo: Cryo-Care Equipment Corporation on Indian School Road in Phoenix, AZ. Dr. Bedford's "home" from 1967 to 1969.

A PATHOGRAPHY OF AGING

By Aschwin de Wolf

In her book *Reconstructing Illness: Studies in Pathography,* Anne Hunsaker Hawkins proposes that the modern pathography is replacing the accounts of religious conversion that were popular in earlier eras. What is a pathography? One definition that I found is "the study of the life of an individual or the history of a community with regard to the influence of a particular disease or psychological disorder." *Reconstructing Illness* is an extensive study of this genre, how individuals deal with a diagnosis of a serious illness, and its broader role for medical caregivers and society.

One thing that I was wondering about while reading this is whether there are any pathographies of *aging*. There is no shortage of pathographies about cancer, HIV/AIDS, dementia (etc.) but I was curious if anyone had ever considered writing about the individual experience of the aging process and its inevitable outcome, death. Hawkins's book has a very useful list of pathographies organized by disease. Perusing this list provides one with a good understanding of which kind of pathographies are popular but I failed to find even one title that explicitly concerns aging. Similarly, a search on "pathography of aging" on the internet did not produce any results. Sure, there are many books about facing death (or dealing with the death of a loved one) or the challenges and opportunities associated with growing older. But I am not aware of any account that treats the aging process in a format that is remotely similar to the descriptions of disease we meet in the pathography, let alone one where the aging process is described as a battle to be undertaken.

This should not be surprising. For most of us, disease is an *abnormal* condition that is defined relative to the normal aging process. Although a lot of disease is closely associated with aging, most people hesitate to call the aging process itself a disease because it would render the conventional use of the word disease problematic. There are diseases that are characterized by rapid aging in children, such as progeria, but we do call such conditions a disease because the pace at which these children grow older is not normal. In fact, pathographies of accelerated aging diseases might be the closest thing that approaches a pathography of aging.

Regardless of one's perspective on the causes or mechanisms of aging, if we look at aging at the molecular level we will find a progressive accumulation of damage as we grow older. Whatever we mean by "aging gracefully," this accumulation of damage stops for no one and ultimately results in death. Because aging is normal, and no one is being *diagnosed* with aging, there is not a clear, identifiable, moment in life that triggers the experience and events that are documented in the typical pathography. In fact, the universal nature of human aging and our propensity to react more strongly to unexpected events strongly biases humans to respond to specific diseases and not the aging process itself. What we seem to care about is *abnormal* deterioration and death, not the deterioration and death that is universal and foreseeable.

Not all people react in such a passive manner to aging. Not anymore. To some of us the relatively slow pace of physiological deterioration is a source of anxiety and the fact that it is a universal phenomenon does not provide solace, especially when medical technologies to halt or reverse aging can be envisioned and pursued. What sets humans apart from other animals is that we can recognize a universal condition and not be satisfied with it. Aging is an undeniable source of suffering and loss of dignity, sets the stage for separation and death, and favors short-term thinking over long-term responsibilities. It will only be a matter of time before the first pathographies of those who succumbed to the process while consciously fighting it will reach us. ■

CEO Update

By Max More

STRATEGIC MEETING 2012

The 2012 Strategic Meeting took place from Friday September 7 until Sunday September 9. All Alcor directors attended in person, as did Alcor president Max More. The Strategic Meeting is the annual, intensive review of the organizations priorities and performance. You will find a more extensive discussion of several of the outcomes in a forthcoming issue of *Cryonics* magazine, but here are the main resolutions and priorities on which agreement was reached:

The current officers and board of directors were reelected.

The board accepted the CEO's recommendation to accept Kim Suozzi as a charity case, based on arrangements that will reduce Alcor's costs. The full allocation of $25,000 to the patient care trust fund will be made. Alcor members have contributed to the fundraising effort to enable Kim to be cryopreserved.

The following resolution was formally passed: "Alcor shall tender to the PCT the full amount of the current PCT minimums for all underfunded cases, as soon as practicably consistent with Alcor's cash flow needs, except to the extent that the PCT board waives some amount. Any amount not immediately paid shall be recorded as a liability to be discharged as soon as practicably possible."

Various changes to the language in the Cryopreservation Agreement for new members were agreed to. The allocation to the Comprehensive Member Standby (CMS) fund for whole body and neuro members was equalized.

Alcor has previously offered terminal members up to $5,000 to relocate to the Scottsdale area. Relocation close to Alcor both substantially reduces costs and improves the expected quality of procedures by greatly reducing transport time and enabling the team to go straight to cryoprotection rather than first doing a remote blood washout and long-distance transport. The board increased that allowance to $10,000.

As minimum requirements for funding of cryopreservation inevitably go up over time, members who did not take out insurance well over the minimum of the day – or who do not regularly add to their savings in the form of a trust or other fund reserved for cryopreservation – may find it difficult to meet new, higher minimums. For older members, adding to life insurance may be too expensive or not an option. Other assets may be illiquid yet substantial, real estate being a common example. One possibility would be to accept alternative financing methods such as real estate, but to discount the amount to allow for uncertainties such as market volatility and unknown conflicting claims. Alternative funding might be allowed only for amounts above the cryopreservation minimum at the time a member joined. Periodic valuation of these assets would also be necessary, although the frequency of valuation might vary inversely with the discount applied. These and other important issues will have to be addressed. At the meeting, the board and president resolved further to pursue possible options.

If cryonics is to become more widely accepted in the general scientific community, we need to add to existing evidence for the effectiveness of our procedures. One way to do this is to gather more data during all stages of stabilization, transport, and cryoprotection. We can also gather evidence of the quality and effectiveness of brain perfusion and structural preservation in several ways: routine CT scanning of neuro patients; collecting more blood samples for analysis; spinal cord sampling; and perhaps a biopsy of a small sample taken from the brain just after completion of cryoprotective perfusion – the kind of sampling that is done without harm in human patients when looking for brain diseases. Other means of gathering feedback might include examining the brain or body surface for signs of ice formation, and weighing patients before and after cryoprotection. The board expressed general support for carefully moving forward with this, ensuring that members understand what we propose to do.

The board agreed to a proposal to alter the discounts we offer for membership dues. The aim is to make changes that are nearly budget-neutral but are more fair than the existing discount structure. From the start of 2013, this means that discounts for older students will be reduced, while members who have been with Alcor for over 20 years will receive a discount of $186 per year at current rates. The exact discounts will be announced separately.

Top Five Priorities

The Strategic Meeting not only reviews current priorities, it acts as a forum to set new priorities or to reaffirm existing ones. The board and the president came up with a list of almost two dozen potential high priorities. Each person then voted for no more than three of the priorities. Five priorities emerged as the most strongly supported:

1. ***Fundraising***. Alcor would be strengthened by bringing in new funds, primarily to be added to the Endowment Fund in order to generate operating income over the long term (the Fund allowing only a 2% annual draw), assuring funders that contributions will not be spent recklessly on a project-of-the-moment. Pursuing this goal will involve cultivating relationships with wealthy patrons and adding significantly to the endowment fund over the next couple of years.

2. ***SOPs and backup training.*** Jobs and roles at Alcor tend to be unusual. It's not easy for a new person to step in and take over at short notice. To minimize the disruption of losing a staff member, we want to produce detailed standard operating procedures (SOPs) for every staff member as well as to think about who could take over any given position. This project is to be completed within 12 months.

3. ***Improved communication and coordination with Suspended Animation (SA).*** Since SA now handles standby, stabilization, and transport for all Alcor cases outside Arizona but within the United States, it's important that the two organizations have excellent communication and coordinate their activities as fully and smoothly as possible.

4. ***Membership growth.*** Growth cannot solve all problems but it can help. This is especially true when new members are fully funded and when the organization can reap economies of scale. Currently, Alcor finds itself in something of a Catch-22 situation: Providing high quality services without running at a perpetual deficit means membership dues are at a level that are making it difficult to retain and attract members. If we can find a way to accelerate membership growth, we should eventually be able to continue raising our quality of service while actually reducing membership dues. The board set the goal of doubling the rate of growth.

5. ***Structural balance in finances.*** Although Alcor's finances have looked good in the last couple of years, this is partly due to unusual (or at least unpredictable) income, and to some salaries being paid by donors rather than out of general operating funds. The goal here is to be able to cover all operating expenses without relying on extraordinary income. The current structural deficit could be covered if we gained 200 members but, at recent rates of growth, this would take years. We will be looking at both big and small expenses to see where savings might be made. It should also be noted that the structural budget deficit does not allow for case income, since this is unpredictable.

Among other topics also discussed but not fully resolved was the Underfunding Plan. Despite a tremendous amount of thought and versions of a possible plan, the board did not reach full agreement. Also addressed were research goals, obstacles to progress in the Endowment Fund, developments with the Wealth Preservation Trust, progress in more accurately assessing the costs of long-term cryopreservation of whole body and neuro patients, and how we might very gradually begin shifting the funding of operations from dues to cryopreservation funding.

My own priorities going forward reflect the top five set at the meeting, but I will aim to keep moving forward on several other important fronts, with the support and skill of Alcor's directors and staff. ■

New Discount Structure

At the 2012 Strategic Meeting, the board agreed to a proposal made by Finance Director Bonnie Magee and supported by Alcor President Max More to alter the various discounts offered for membership dues. The aim is to make changes that are nearly budget-neutral but are fairer than the existing discount structure. Alcor would also like to recognize our long-term members, who have supported Alcor for many years.

From the start of 2013, this means that discounts for older students will be reduced, while members who have been with Alcor for over 20 years will receive a discount. Family member discounts remain unchanged. The revised discounts are as follows:

Full-time students:

- 25 and under: $310 off annual dues
- 26–30: $155 off annual dues
- 31+: no discount

Long term members:

- Members over 20 years receive $186 off annual dues

Family members:

- Minor family members: $465 off annual dues
- Adult family members: $310 off annual dues

All amounts are shown as reductions to the annual membership dues of $620. Members may only receive one type of discount. Alcor will automatically select the largest discount. Discounts are not applied to life members. Family members should reside in the same residence to receive discount.

Hitching a ride on his pet human, November 1994.

Bon Voyage Aido

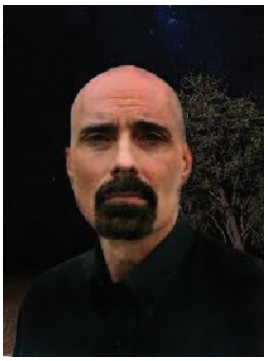
By Mike Perry

Alcor's unofficial mascot and my cat, Aido, was unusually long-lived, starting life around May 1993 as a feral kitten in Riverside, Calif., somewhere near our small, tilt-up building and the one next to us, which was occupied by a moving company called Starving Students. (A kind-hearted lady there put out food for the feral cats that roamed the vicinity, thus keeping up their population, as Malthus would have predicted.) Though wild he was unusually friendly and in late December '93 he took up residence with us, made the move with us to Arizona the following February, and well, stayed on. He was popular with visitors as well as being a good pet. In his middle years he put on weight, then slimmed down again. For long he lived a charmed and charming life, but finally the years took their toll. Arthritic, deaf, and briefly at the end, blind, though still affectionate, he was euthanized and neuropreserved July 14. Special thanks go to Nancy McEachern (DVM), Aaron Drake, and Hugh Hixon; and also to Lisa Shock who helped with Aido's care during his last days before preservation. (The cryoprotection went reasonably well and quickly, using the usual M22 as cryoprotectant, and achieving the target terminal concentration of more than 100% needed to vitrify.) May he rest in peace, and join us again someday!

"Alcor's unofficial mascot and my cat, Aido, was unusually long-lived..."

Aido, September 1994.

Ray Kurzweil on Memory and Cryonics



By Michael G. Darwin

As evidence is emerging that contemporary vitrification technologies are adequate to preserve identity-critical information in the brain, critics of cryonics have tried to raise the bar by postulating that the neuroanatomical basis of memory is so fragile and transient that it cannot be captured by technologies that can successfully preserve the connectome. The online exchange that gave rise to this article is 10 years old but the topic has renewed relevance again (editor).

Following the Alcor 2002 *Fifth Alcor Conference on Extreme Life Extension,* Eric Drexler, Robert Bradbury and Ray Kurzweil discussed the question of what would be required to achieve successful recovery of a fully functioning human brain from cryopreservation with intact mentation and memories. This email dialogue was sparked as a result of the recent Alcor Conference on Extreme Life Extension. [See http://www.kurzweilai.net/dialogue-between-ray-kurzweil-eric-drexler-and-robert-bradbury for the full discussion.]

One of the most interesting and, for me, certainly one of the most memorable quotes from that discussion was this assertion by Kurzweil:

"It's the third requirement that concerns me; the neurotransmitter concentrations, which are contained in structures that are finer yet than the interneuronal connections. These are, in my view, also critical aspects of the brain's learning process. We see the analogue of the neurotransmitter concentrations in the simplified neural net models that I use routinely in my pattern recognition work. The learning of the net is reflected in the connection weights as well as the connection topology (some neural net methods allow for self-organization of the topology, some do not, but all provide for self-organization of the weights). Without the weights, the net has no competence."

This quote is memorable, and surprising, because it demonstrates an inaccurate understanding of the neurobiology of memory and learning. There are certainly many things we do not know about how long term (or short term) memories are encoded in the physical structure of the brain. However, there are some things we can pretty much rule out, and the ideas put forth by Kurzweil (and not immediately criticized by Drexler and Bradbury) are among them.

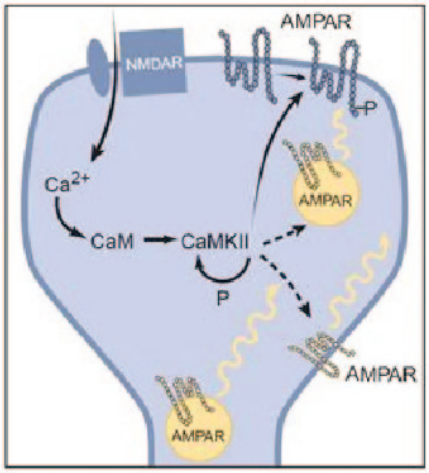
It thus seems pretty clear that within the cryonics scientific community some serious education needs to take place and, to that end, let's dissect Kurzweil's statement.

What are neurotransmitters (NTs) and how is their concentration in brain synapses determined?

Simply put, NTs are chemicals released at the synaptic junction which are responsible for not just the transmission of signals across the synapse, but for the "strength" of the signal transmitted. Thus, they serve a "weighting function" to signaling. How much NT gets made or released is NOT a function of the NT itself, anymore than how much smoke gets released from a fire being used to send smoke signals is a function of the smoke. NTs are smoke, they are the signal medium, *not the signal itself,* or the source of signal, or the signal's strength.

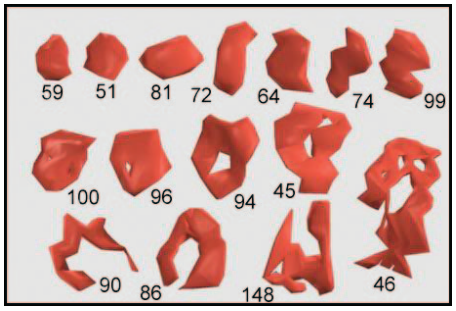
Focusing on the conservation of NT levels in synapses as the key to the preservation of memory is analogous to focusing on the smoke in a smoke signal as the durable element of the underlying data set. Neurotransmitters are the smoke, the real question is, what causes the NTs to be made and released in predictable amounts and ways over long periods of time. In other words, who is controlling the amount and pattern of smoke release in a smoke signaling operation?

The current consensus in the field of the neurobiology of learning and memory is that there is extensive biochemical change in the synapse itself, probably beginning with a process called Long Term Potentiation (LTP):



Simplified schematic of the expression of LTP: An increase in calcium within the dendritic spine binds to calmodulin (CaM) to activate CaM Kinase II, which undergoes autophosphorylation, thus maintaining its activity after calcium returns to basal levels. CaMKII phosphorylates AMPA receptors (AMPARs) already present in the synaptic plasma membrane, thus increasing their single-channel conductance. CaMKII is also postulated to influence the sub-synaptic localization of AMPA receptors, such that more AMPA receptors are delivered to the synaptic plasma membrane. The localization of these "reserve" AMPA receptors is unclear, and thus they are shown in three different possible locations. Before the triggering of LTP, some synapses may be functionally silent in that they contain no AMPA receptors in the synaptic plasma membrane. Nevertheless, the same expression mechanisms would apply.

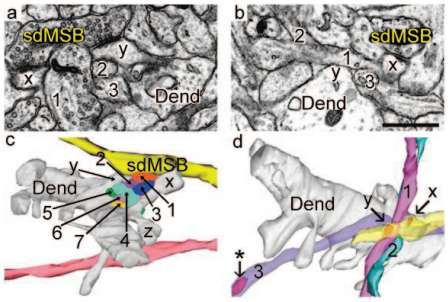
Beyond that, many questions abound. It seems clear that in addition to biochemical changes in the synapse, there are also changes in the number and in the physical type and configuration of the synapses that occur during learning and memory encoding:



Most synapses cover a small area and have a compact, roughly convex shape, such as numbers 51, 59, and 81, above. These are referred to as macular synapses. Larger synapses are often exhibit 'holes' in the middle. These holes are regions of cell membrane devoid of the specializations characteristic of the synapse, e.g. postsynaptic density, synaptic cleft, presynaptic active zone, etc. Synapses with holes, such as numbers 45, 46, 86, 90, 94, 96, and 100, are referred to as perforated synapses. Of the 161 synapses so far classified in the neuropil, 148 are macular, while the remaining 13 are perforated. The difference between macular and perforated synapses can be seen in electron micrographs in which the postsynaptic densities have been stained.

There are well over 140 different physical TYPES OF SYNAPSE and the myriad new connections that form during learning may use many different synaptic morphologies. What's more, sometimes many of the synapses that initially form during encoding of learning, especially multiple synapses on the same dendrite, are pared down or disappear during what is believed to be the consolidation phase of memory encoding.

Now the really interesting thing is that synapses are not transient fluctuations in the level of a biochemical, or signaling molecule – they are complex structures made of protein and protein gets made (and maintained) only as result of signal transduction between the cell nucleus



Reconstruction of 'same-dendrite, multiple synapse boutons' (sdMSBs) and related structures in a hippocampal brain slice. (a) The sdMSB makes a synapse with the head of one spine (x) on this section. Three of the axons (4,6,7) are visible between the spine head and the dendrite (Dend). (b) Three-dimensional reconstruction of the dendrite (gray), the sdMSB axon, and all seven axons (1–7) passing through the gap between the spines (x,y). Four of the axons (2,4,5,6) are cross-sectioned to avoid obscuring the other axons. Scale bar, 0.75 µm. [Fiala JC, Allwardt B, Harris KM. Dendritic spines do not split during hippocampal LTP or maturation. Nat Neurosci. 2002 Apr;5(4):297-8. PubMed PMID: 11896399.]

and the ribosomes: DNA > RNA > ribosomes > protein. Indeed, even the synaptic vesicles and the neurotransmitters inside them, are manufactured in the cell bodies and subsequently transported to the synapses (the "right" synapses) – all of which is presumably under nuclear control. Since memories persist at least a century in humans, it is clear that the biological structure(s) that encodes them is durable and well maintained. Put another way, the mechanism that controls and determines the pattern of smoke signaling is both robust and durable.

That's where things get hazy about how long term memory is preserved.

Our current understanding of the gating mechanisms of synapse firing suggests that the character, quantity and configuration of synapses is how memory "works," or is encoded. But what we don't know is how the instructions to maintain those synaptic configurations are initially activated and ultimately encoded in the neuron itself.

At this point, it should hopefully be clear that in theory, it should be possible to recover a brain with memories and personality intact, even if there was not a single molecule of NT present in any synapse, anywhere. The NTs are MADE by the neurons and released by the synapses in the "right" amount at the "right" time and in the "right" way as a function of the UNDERLYING synapse and nerve cell structure. Not the other way around!

Since I spent a good part of my adult life wrestling with the problem of ischemia-reperfusion injury in the mammalian brain, I would be remiss if I did not point out that in ischemia, NTs leak out of the boutons in the synapses. In the case of the excitatory NTs, such as glutamate, the superabundance of NTs that are present when circulation is restored causes enormous injury. The point is that NTs aren't stable and don't sit around in synapses without active pumping going on (requiring metabolism). They leak out rapidly under conditions of ischemia and hypoxia. And yet, if the animal or person survives (along with their brain cells), they still have intact long term memories. The neurons simply re-synthesize and replace the necessary synaptic vesicles/boutons containing the requisite types and amounts of NTs.

The question that should be preoccupying cryonicists is whether there are sufficient intact neurons and synapses present to be preserved in the first place – not whether or not the NTs levels are conserved in synapses following cryopreservation.

A scientifically sound and considerably more rigorous discussion of the issue of whether memory (and personal identity) survive cryopreservation can be found here: http://chronopause.com/index.php/2011/02/23/does-personal-identity-survive-cryopreservation/ ■

Immortality: the Quest to Live Forever and How it Drives Civilization

By Stephen Cave. Crown Publishers, 2012.

BOOK REVIEW BY STEPHEN BRIDGE

If you were lucky growing up, by high school or college perhaps you found a group of friends who were interested in talking about "big ideas," who wanted to use their intellects to discuss politics, love and relationships, jobs, and religion. "What will life be like for us in a few years?" was always the base of the discussion.

But eventually the discussion went beyond the next few years and got down to the highly personal and often uncomfortable topics of life, death, and that murky concept of *immortality*. What happened after death? Was death real? Was there a way to never die?

When we were with Christians or people of other religions, some said that your soul was immortal and that it would go to live with God or Allah, or that it would be reincarnated, or exist in a ghost-like state. Others, especially the more conservative Jews and Christians, pointed out that the Bible says that death is *real* and that we would stay dead until we were resurrected as our own physical bodies.

If we were with a more science-oriented group, the talk would turn to extending life through medical advances, medications, vitamins and diet, and future technologies like nanotechnology and cloning. Some would even talk about the more radical possibilities of cryonics, full-scale duplication of themselves with multiple copies, downloading their personalities into a computer, or inhabiting a robot body.

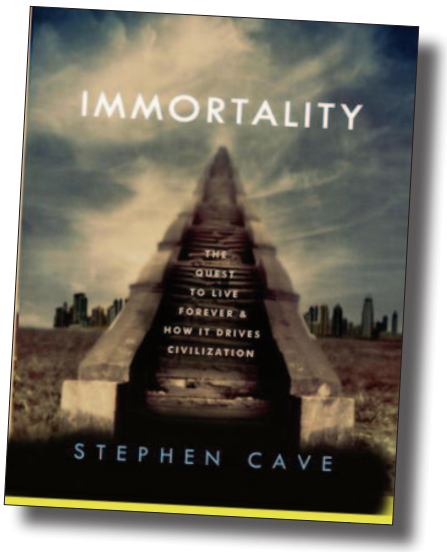
And in each group there would always be a few people who stated that they were happy just to live on in their children, in the memories of their friends, in the books they had written, or in the people whose lives they had helped.

If someone had been with us for all of those discussions, taking notes, and then following it up with years of reading the history of these ideas, they might have produced a book like Stephen Cave has.

This is a fascinating book that I highly recommend. I do not agree with everything Cave says and I suspect that nearly every reader will find things to like and hate here. But Cave asks the right questions, the ones that we as individuals and as members of human cultures need to answer.

Let's think about that subtitle: "The Quest to Live Forever and How it Drives Civilization." That may seem like an outlandish claim and Cave himself states that "some will be skeptical" of such a claim. But he argues that ALL living creatures do whatever they can to stay alive and to reproduce. This is the essential function of life. That drive in humans promotes the study of medicine, science, technology, farming, and many other areas of knowledge.

But that's not all. Cave believes that the human drive for religion is also a major



creator of civilization. Among other aspects, religion attempts to answer the question, "what happens when we die and how do we make sure something good happens?" While concern about death is not the only creator of religion, no one can deny that it is an extremely important factor. And he would also argue that the uniquely human desire to make sure that we are *remembered* after we die is part of what creates art, literature, history, and even the spread of civilization by conquest.

Maybe some of these desires and motivations are more concerned with a

desire to *delay* death or to delay the end of other people's memories of you. It is a debatable point, to be sure, but Cave would say that this is just a part of the real human desire – not to *ever die*. If you don't *ever* want to die, then you are basically looking for the opposite of death – not just "life", but "Immortality."

Cave posits that "beneath the apparent diversity of stories about how immortality is to be attained, there are just *four* basic forms – what I will call the four *immortality narratives*. All attempts at everlasting life that have ever been made – and ever will be – follow one or another of these four." To illustrate these narratives, Cave uses stories from as far back as the Epic of Gilgamesh from ancient Babylon, the story of Akhenaten from ancient Egypt, the story of St. Paul, Gautama Buddha, the Dalai Lama, and other religious figures to show many of these narratives, connecting them in interesting ways with people of today.

1. **The Staying Alive Narrative**
   Looking for ways to extend physical life by staying young and healthy – magic objects, elixirs, vitamins, diet, drugs, whatever. This often takes the form of doing things that extend our lives by a few years, hoping to find something else that extends them a few more years. This narrative is what drives the field of medicine, but it also has deep effects on other scientific fields.

2. **The Resurrection Narrative**
   "The belief that, although we must physically die, nonetheless we can physically rise again with the bodies we knew in life…. The three great monotheistic religions of Judaism, Christianity, and Islam all also believe in literal, physical resurrection as a central doctrine."

3. **The Soul Narrative**
   Survival as some kind of non-physical "spiritual entity", whether as a ghost, or in a heaven, or in being reincarnated into a different physical body.

4. **The Legacy Narrative**
   An indirect way of extending ourselves into the future, through our fame, our writing, the memories of others, or genetically, through our children.

As the base of his book, Cave uses the "Terror Management Theory of the development of human culture" (from Solomon, Greenberg, and Pyszczynski). The quote he uses from these writers is that our religions, national myths, and values "are humanly created beliefs about the nature of reality shared by groups of people that serve (at least in part) to manage the terror engendered by the uniquely human awareness of death." In short, the fear of death creates human culture.

"While concern about death is not the only creator of religion, no one can deny that it is an extremely important factor. "

Cave then goes on from this to develop what he calls the "Mortality Paradox," – something we are all aware of. As intelligent, observant human beings, we see death all around us. We see that no one escapes death and therefore, it is inevitable that we will be treated no differently. We ourselves will die. At the same time, "the one thing that these minds cannot imagine is that very state of nonexistence; it is literally inconceivable. Death therefore presents itself as both inevitable and impossible." The author then presents the many ways that philosophers and historians have concluded this paradox has changed human civilization.

One obvious way, of course, is religion. If death is inevitable, yet our minds tell us that our own death is impossible, then systems must be developed to cope with this knowledge. Most religions directly confront the question of death by stating that it is not real, or perhaps that it is real but there is a supernatural being who has a plan for getting past it.

Cave does an excellent job of detailing the ways in which humans have used "magic elixirs" to attempt to defeat death. These include all of the strange chemicals from cinnabar (red mercury) and virgins' blood to the alchemists' search for the Philosopher's Stone. But today's medical drugs and vitamins come directly from the same history and impulse toward staying alive. He uses Linus Pauling as a particularly sad example of someone who gave much to civilization but then (from Cave's point of view) wasted his last years in a vain attempt to save his wife's life and his own legacy.

Cave's discussion of the Resurrection Narrative is particularly well done. He is careful to note what many Christians believe about resurrection, then show the counter-arguments ("No, that's impossible because…"), but THEN detail the Christians' counter to the counter-argument, and then the objectors' counter to that. You can learn a lot about the history of religion from this series of arguments alone.

The author's third section, on the Soul Narrative, is much less successful, because the author begins to show his impatience and his frankly arrogant personal disbelief in any kind of soul. In fact, he believes, with the flimsiest of examples, that he has proven the non-existence of the soul. I don't know whether any kind of soul exists or not; but he has certainly proven nothing here, and I was irritated with the author assuming he had.

Cave certainly doesn't answer all of the reader's questions about how religion is focused on immortality. One friend asked, "If fear of death and/or the desire for immortality gives rise to religion, how do you explain adherence to religions that only offer salvation for the select few?" Cave doesn't deal with that; but the answer is obvious to me. For many people in business, in sexual competition, or even in religion, it is not just important that they win. It is equally important that other people lose. This almost certainly comes from the evolutionary advantages to males who win the mating competition. It helps if the other males are NOT allowed to reproduce. That's not the way that I run my life; but if you are a business leader who does not understand that this attitude is

common among your rivals, you will get trampled.

In the fourth section, the author discusses attempts by Alexander the Great and millions of people since then to provide a sort of immortality through great works and deeds or through their children. This was interesting but not very powerful, because it was obvious immediately that he thought this was nonsense. I doubt that any of you reading this magazine are much comforted by the thought of achieving immortality through what you leave behind.

Sadly, Cave's treatment of cryonics is a major weakness. He completely misunderstands the basic point of cryonics, putting it in the section about raising the dead, right after his discussion of Mary Shelley's *Frankenstein*. He fails to appreciate that cryonics is NOT about preserving corpses for future revival. Cryonics is about redefining the label of "dead." We believe that dying patients today are labeled as "dead" long before a physician of the future would do so, and therefore we should place these patients into an unchanging, long-term state that will allow those future physicians to discover that the dying condition was reversible and repairable. In his notes, Cave generously refers people to Alcor's "useful online library"; but he certainly didn't use it well.

"He fails to appreciate that cryonics is NOT about preserving corpses for future revival. Cryonics is about redefining the label of "dead."

A major thread woven throughout the book was the impossibility of ever achieving "immortality," based on the very definition of immortality – living FOREVER. The author continually pooh-poohs even a life of hundreds of thousands of years by telling you, "But that's not immortality." After all, the sun will explode someday and if the galaxy or the universe cannot be immortal, then how can you?

One possibly useful thought experiment, or perhaps I should say, "non-thought experiment," he discusses is to point out that since we are completely unable to imagine non-existence, we should not fear death — because we will never "experience *death*." Dying, yes, but not death.

To summarize, the author gives all of his reasons why medicine and technology won't allow you to live forever; he shows (to his satisfaction, if not to mine) that resurrection won't work and that souls don't exist; then states that fame and descendants won't satisfy anyone's desire for immortality. And it won't work anyway, because the universe will end and so the very definition of "immortality" makes it impossible.

Finally, Cave's answer to how you should live life, when you have achieved the awareness that you cannot live forever, is to "stop excessive focus on oneself," "identify with others," "focus on the present," "have no regrets," and "enjoy what you have." After 270 pages of examining the question of immortality, this is his conclusion? *You can't live forever, so stop worrying about it and stop trying?*

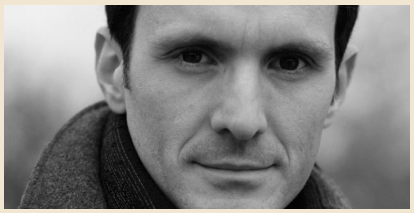
While I find much of this book to be interesting and even enlightening, I have to reject the fullness of his conclusion, as you will, too, I suspect. I concur that we should live a good life, love other people, enjoy what we have, and not let our concerns about our own death ruin the lives of the people around us. But I still want to keep participating in life as long as possible, to find ways to see the future, and to take as many of you along with me as possible. The probability that we won't be able to do this for "eternity" doesn't bother me. There is nothing wrong with the philosophy of "live one more day, for as long as possible."

When I was a young man, possibly as early as age 12, I told people that my goals were "To live to be one hundred" and "To change the world." I didn't really understand the work involved in those goals. What 12-year-old does? And I didn't know that my goal for a time scale was going to expand many times after I became involved with you folks.

That is the adventure of cryonics. We don't know the odds that cryonics will work for anyone, much less work for us individually. But staying alive as long as possible, whatever that is, is an admirable life's work.

As for Cave, it's always nice to remember that you can invite him to your party; but you don't have to let him move in. ■

About the Author



Stephen Cave Stephen was born in Cornwall, in the beautiful but rainy Southwest of England.

After a decade studying and teaching philosophy, he was awarded his PhD in metaphysics from the University of Cambridge in 2001. Before dedicating himself to writing, Stephen made ends meet working as a diplomat, negotiating international treaties on behalf of Her Majesty.

Stephen has since written essays, features and reviews on many philosophical, ethical and scientific subjects, from human nature to robot warriors and animal rights. He writes regularly for the *Financial Times*, and has also written for the *New York Times*, the *Guardian*, *Wired* and others.

Stephen lives in Berlin with his wife, the journalist Friederike von Tiesenhausen, and their daughters. He speaks fluent German.

Hiking in the red rock near Sedona, Arizona.

MEMBER PROFILE:

Keith Lofstrom

By Chana de Wolf

Keith Lofstrom intends to be around for a very, very, *very*, VERY long time. It is this hope – frequently treated as an assumption – that occupies his mind and shapes his every day endeavors. And with such little time to spare under the current circumstances, Keith's endeavors are plentiful, varied, and carried out with passionate enthusiasm and an all-consuming haste.

"I am primarily a futurist, as in 'the way to predict the future is to invent it,' Alan Kay, sense," Keith explains. "If a cryonicist wants to live millennia because a few decades are too short to accomplish audacious goals, then immortality is necessary for such accomplishments. One person can build a cathedral, an ocean liner, or an interstellar spaceship, given enough time."

Motivated by a "checklist of things I worry about," Keith was able to breathe a small sigh of relief upon signing up with Alcor in 1992. "Checking cryonics off the list allowed me to quit worrying about doing what I can to make it to the future," he says. This gave him the freedom to turn his attention to those items most important to him – like how to build the infrastructure to support humanity into the far distant future.

A project Keith calls Server Sky represents his most ambitious attempt to get some of that infrastructure in place as soon as possible. Server Sky is an engineering proposal to place billions of micron-thin satellites into medium orbit around the earth, forming a massive computation and communication network powered by a tiny fraction of the 384 trillion terawatts the sun wastes on empty space [see sidebar].

Intimately related to Server Sky is the Launch Loop, a system proposed by Keith for launching objects into space orbit using a moving cable in a long tube attached to the earth at two ends and suspended above the atmosphere in the middle. Launch loops gently accelerate large vehicles into Earth orbit or beyond electro-mechanically, inexpensively, without rockets.

If these ideas seem rather well thought-out, it's because they are. With a B.S. and M.S. in Electrical Engineering at his disposal, as well as a life-long fascination with taking things apart and figuring out how they work, Keith is well-versed in working out ways to bring seemingly far-futuristic endeavors to ground in the here and now.

Born in Portland, Oregon, in 1953, Keith obtained his master's degree from U.C. Berkeley in 1974. He designed analog and digital integrated circuits for Tektronix from 1972 to 1991 and helped found I-Cube Design Systems, producing crossbar routers for the early internet. He has consulted for other startups as well, producing sound chips for toy trains, video imaging chips for projection displays, precision timing circuits for testers, and analog test standards. Currently, Keith is running another startup, Siidtech (http://siidtech.com), which licenses integrated circuit identification technology.

An avid consumer of science fiction throughout life, he credits Arthur C. Clarke's *Fountains of Paradise* with giving him "a lot of ideas about what is and is not feasible." An unguarded approach to idea generation is characteristic of Keith's general style. "One of the reasons I'm interested in cryonics," he explains, "is that it allows us to start looking at any problem from a different perspective. If you look at the brain from the perspective of cryonics, for example, you will learn more about neurology that can be beneficial to fields other than cryonics. Even if cryonics comes to bust, if we learn enough about neurology we may still come to immortality in another way."

Another reason Keith dreams of successful resuscitation from cryopreservation is more personal. "I have

raging tinnitus," he explains. "Continuous loud noise 24/7, exacerbated when listening to friends in loud places and straining to hear." He emphasizes that, though it does not exist today, the technology required to eliminate his tinnitus, such as "serious brain rewiring or even robotic molecular-scale reconstruction of cochlear mechanisms," are the same kinds of technologies needed to resuscitate a cryopreserved brain.

"If I am suspended, I expect I will be reanimated with fully functional hearing, and I will hear silence for the first time in my life, and be able to listen to my friends as easily as they can listen to me. My blind or mobility restricted friends will be able to share other activities with me. [This is] something to look forward to."

Keith describes himself as a "voracious reader with interests in space, physics, business, medicine, history, futurism, and computation." He is active in Portland's linux and open source community and hosts http://dirvish.org for disk-to-disk backups. Physically, he enjoys walking and hiking for cardiovascular health and, when weather permits, is currently rebuilding a 600 ft^2 greenhouse on 2/3 of an acre of soon-to-be garden and orchard and free-range-chicken habitat.

Investigating a mysterious tree fungus discovered during hike.

Keith strikes a happy pose at Tennyson Downs, on the south end of the Isle of Wight in the UK.

And though Keith's primary pursuits involve electronic and mechanical puzzles, that doesn't stop him from thinking about the biological problems at hand. "Right now, I think the biggest challenge in cryonics is the sheer magnitude of the task of preserving 10^{15} synapses with nanometer precision over a wide temperature change," he says. "Not everyone has been preserved well enough and it may take some extra special 'magic' to get them back. And it's quite likely that we won't be able to."

Unsurprisingly, Keith feels that improvements in instrumentation are central to moving cryonics forward. Specifically, he thinks the ability to measure and quantify changes in nanostructure during cryopreservation may be essential to optimal preservation of neural structure.

"And if you are preserved well, then what?" he asks. "Let's say you're back [from cryopreservation], you're in some kind of substrate and you want to live a very, very long time. Brains do not have the capacity

On a visit to the Nobel museum in Stockholm, Sweden.

for infinite accumulation of experience. A frozen brain now might be part of your lifeboat to get there, but the you of 10,000 years later is not going to be the same."

In the end, Keith is happy to leave the details of cryonics to those scientists and activists who have made it their top priority. That he can contribute to the ultimate goal of facilitating indefinite lifespan in a very different future by focusing on fields outside of cryonics puts him at ease.

"I want to encourage others to enthusiastically pursue their own invention of the future, secure in the knowledge that my corner of the canvas is getting painted as well," he states. [Some people] make cryonics #1, and rightly so. It **must** be done and [they] are good at it. What makes us a powerful force is not our popularity or shared focus, but that we cover so much territory. 'We few, we happy few, we band of brothers' – and sisters!" ■

Technologies for an Immortal World

By Keith Lofstrom

We will not be immortal if our world isn't. Immortalists will not be welcome on a damaged, starving earth, displacing the limited opportunities for children. We must earn our place in the future with long term vision and the development of technologies that will support us for a very long time. The natural world is necessary to our survival, and only living, active immortalists will have a deep understanding of how nature changes over time, and the self-interested motivation to enhance or preserve it for the long term.

My ambitious goal for the surface of our planet – **10 billion people, 10 kilowatts each, for 5 billion years.** That is not possible without massive technological improvement. In 5 billion years, the sun will overheat, a dozen nearby stars will supernova, world-killing impactors will target the earth, the tectonic plates will lock and the continents will erode away. We will need centuries to develop the tools to thrive in spite of threats and resource depletion – and short term profitability to compete in a short term world.

The keys will be energy and computation. The sun wastes 384 trillion terawatts on empty space. Moving energy use into space allows nearly unbounded growth. Computation transports easily, requiring neither material feedstock nor waste disposal, just electricity and a heat sink. Within 10,000 kilometers of the equator (100 millisecond "ping time") is an additional one million terawatts of continuous sunlight, ten times what nature uses.

Server sky (http://server-sky.com) proposes to capture some of that power, using arrays of millions of 50 micron thick dinner plate sized satellites, each weighing 3 grams and creating 5 watts of power for computation and communication. Thinsats maneuver with light pressure, are highly radiation resistant, and form into large phased arrays capable of focusing microwave data beams on small ground spots. Terrestrial data centers use nearly 3% of US base load electricity, are growing rapidly in spite of efficiency improvements, and require expensive and vulnerable infrastructure. Locating new data centers in space will be highly profitable, especially for serving rapidly growing markets in the developing world. Server sky technology can eventually be developed into space solar power, sending electricity as microwaves to receivers on earth, powering civilization without carbon fuel, or the environmental devastation of (misnamed) "green" energy.

If thinsats are launched by the trillions, the pollution and expense of rockets will be replaced by low cost electrically powered launch systems such as the **launch loop** (http://launchloop.com). The launch loop is a dynamic structure, magnetically supported by the centrifugal acceleration of an iron rotor moving at 14 kilometers per second inside a vacuum containment. Launch power is removed from the rotor about 50% efficiently, so the 30 megajoules needed to launch a kilogram into orbit can be supplied with a dollar's worth of electricity. A minimum-sized launch loop can launch millions of tons into orbit per year. There is no existing market for that much launch, but server sky can provide one.

Launch loop technologies are also excellent for moving and storing energy, at much higher efficiencies and energy densities than electrical transmission lines. Rotor ring **power loops** can shift terawatts of power over 12 hour cycles, or between continents. Storing far more energy than batteries or flywheels, and cheaper and more market-responsive than pumped storage, power loops will aid the transition to a carbon-free all-electric energy economy.

Immortalists are rational optimists – we know the future will be great because that is what we choose to build. With our entrepreneurial and technological skills and a lot of hard work, we will create a future which will welcome us. Even with all these capabilities, the finite earth cannot support a perpetually expanding human population (either from births or the elimination of death), but a vast and mostly lifeless universe has plenty of room for us, especially if the immortals guide the expansion of life into space.

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5 Dangerous Ideas About Cryonics

By Aschwin de Wolf

The cryonics organizations Alcor and the Cryonics Institute have taken great care to correct some of the persistent myths about cryonics. With so much widespread misinformation being circulated in the media it seems trivial to pay attention to some of the misconceptions that some people who *are* sympathetic to cryonics hold. But the price of ignoring these opinions is that progress in the science of cryobiology and practice of human cryopreservation is adversely affected. What follows is a list of 5 "dangerous" ideas (or misconceptions) about cryonics and their consequences.

1. First in, last out.

A popular expression in cryonics is that the first person who was cryopreserved will require the most extensive repair technologies and therefore will be the last person to be resuscitated. The underlying assumption in this view is quite reasonable: when advances in cryopreservation technologies are made, demands on advanced future repair technologies will be lessened. The problem with this view, however, is that it assumes that advances in cryobiology and neuroprotection are the *only* factor influencing the quality of care in cryonics. Unfortunately, advances in the science of cryopreservation will not automatically translate into better patient care. Other factors, such as the delay between time of "death" and start of procedures, and the protocols, equipment and personnel of the responding cryonics organizations, matter as well. For example, if a cryonics standby team is not able to get to a patient before 24 hours after cardiac arrest, pumps him full of air during remote blood washout, and ships him back to the cryonics organization at subzero temperatures, that patient will not benefit from advances in human cryopreservation such as rapid induction of hypothermia, neuroprotection and vitrification.

A professional cryonics organization with "old" technologies may on average do better than an incompetent cryonics organization with "new" technologies. The important lesson to be drawn here is that the concept of "patient care" is a meaningful concept in cryonics and consumers of cryonics services need to evaluate their cryonics providers on their ability to provide good care.

2. Only the future will tell us how good our cryonics procedures are.

It is true that only the future will tell us whether cryonics patients will be *resuscitated* or not; but that does not mean that we cannot say anything meaningful about the quality of care in *individual* cryonics cases. The most obvious point is that we can compare actual patient care to the published protocols and objectives of the cryonics organization. More specific observations can be made *during* a cryonics case using medical equipment. In a well-run cryonics case a number of physiological and chemical measurements are made to determine the response of a patient to various interventions. As a general rule, the objective of cryonics stabilization procedures is to keep the brain of the patient viable by contemporary medical criteria. The danger of thinking of cryonics as one single experimental procedure that can only be evaluated in the future is that it ignores the fact that actual cryonics procedures consist of various separate procedures that can be monitored and evaluated using existing medical tools. The least that a cryonics consumer should expect from his cryonics organization is that it discloses its cryonics procedures to the general public and produces detailed case reports.

3. Cryonics patients are no longer being frozen.

Because not all cryonics patients will be "ideal" cases, this view is vulnerable to the same objections as the "first in, last out" rule, but there are some other issues that are important to mention in this context. The most important fact to be stressed is that ice formation is not a binary all or nothing thing but a continuum ranging from straight freezing (cryopreservation without cryoprotection) to complete elimination of ice formation. Although there have been many cases where patients have been

frozen without the use of a cryoprotective agent, its opposite, complete vitrification, should be considered a theoretical ideal. The degree of ice formation is determined by the nature and concentration of the cryoprotective agent. For example, low concentrations of the cryoprotectant glycerol will result in more ice formation than higher concentrations of glycerol.

What has changed in recent years is that both major cryonics organizations are now offering cryopreservation using vitrification agents. Although these agents are formulated to eliminate ice formation, it is generally believed that such a result is not achievable in all tissues and organs in the human body at the moment. Another important point to be made is that not all solutions that can eliminate ice formation are equal because they can differ greatly in toxicity. The technical challenge in cryonics is not so much to eliminate ice formation but to develop vitrification solutions with no or limited toxicity. Although it is correct that contemporary vitrification solutions can solidify without ice formation, delays in response time, poor patient care, and high toxicity can offset most of these advances.

4. The probability that cryonics will work is X.

Both critics and supporters have made specific probability estimates about how likely cryonics is to work. In its worst form such probability assessments convey nothing more than putting a number on overall feelings of pessimism or optimism. More serious attempts have been made to calculate a specific probability that cryonics will work. Such attempts usually go as follows: A number of independent conditions (or events) for cryonics to work are distinguished, these conditions are "assigned" a probability, and the total (or joint) probability is calculated by multiplying them. Although such calculations give the semblance of objectivity, they are equally vulnerable to the fundamental objection that assigning one single number to the probability that cryonics will work is just a lot of hand waving. How many independent events are there and how do we know that they are independent? What is the basis for assigning specific probabilities to these conditions? What are the effects of minor changes in the numbers?

Probability calculations are not completely useless. They can help us in identifying important conditions that need to be satisfied for resuscitation. They can also help identify weak links that can be improved. But probability estimates can be dangerous as well when we take them too seriously and discourage people from making cryonics arrangements. The point here is not that we should refrain from being skeptical but that if we make quantitative estimates we should be able to back up our statements with rigorous arguments or just confine ourselves to more qualitative statements. Another objection to making cryonics probability estimates was made by the cryonics activist and mathematician Thomas Donaldson. He makes the common sense point that many of these conditions are not independent of what we do. We can make a contribution to increasing the probability that cryonics will work.

Last but not least, what does it mean when we talk about "cryonics working?" It is conceivable that cryonics will work for one person but not for another, reflecting improved technologies and protocols. Perhaps asking the question if cryonics patients can be "revived" is the wrong question. As the cryobiologist Brian Wowk has pointed out, the real question is how much original personality would survive the many possible damage/repair scenarios, not revival per se. Survival in medicine is not a simple black-and-white issue, as evidenced by people who recover from stroke or cardiac arrest but with personality and memory alterations. And it is worth mentioning once more that how much of our personality survives depends on what we do to improve the quality and long-term survival of our cryonics organizations.

5. I will sign up for cryonics when I need it.

It should be obvious without much reflection why this is a dangerous idea. At the time a person *really* needs cryonics, he may no longer be able to communicate those desires, lack funding to make arrangements, or encounter hostile relatives. A more subtle variant concerns the person who expects that aging will be solved before cryonics will be necessary. This person may or may not be right, but such optimism may not make him more immune to accidents than other people. This mindset is often observed among young "transhumanists" and practicing life extensionists. A related, but rarer, variant is to postpone making cryonics arrangements until the cryonics organization makes a number of changes including, but not limited to, hiring medical professionals, stopping wasting money, becoming more transparent, giving members the right to vote, etc. Such issues are important, and need to be addressed, but a safer response would be to join the organization and influence its policies, or, if this proves necessary, combine with others to start a competing cryonics organization without such flaws.

There are not many people who think that it is sensible to make cryonics arrangements, but there are even fewer people who have actually *made* such arrangements.

As we have seen, some of these dangerous ideas share the same or related assumptions and produce identical effects: decreased scrutiny of cryonics organizations and a decreased chance of personal survival. An important common theme is that cryonics cannot be treated as one single monolithic technology and that the fate of our survival depends as much on the state of the art in human cryopreservation technologies as on the competence of cryonics providers. Caveat emptor! ■

Originally published in January 2009 on the cryonics blog Depressed Metabolism.

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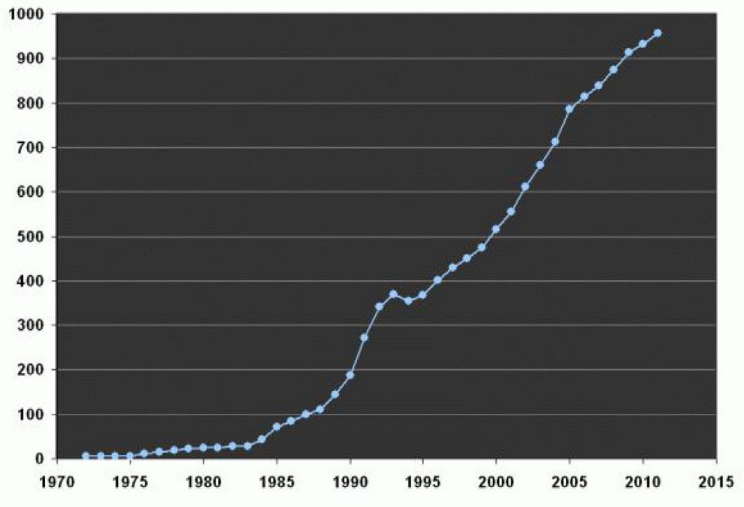
REINSTATED	0	1	1	0	0	1	0	1					4
CANCELLED	3	2	1	1	1	2	3	3					16
TRANS TO ASSOCIATE	0	0	0	1	0	0	1	1					3
CRYO-PRESERVED	0	0	1	0	0	0	1	0					2
NET GAIN	-1	+3	+4	+4	+1	+6	0	+1					+19

As of August 31, 2012, Alcor had 975 cryopreservation members, 20 associate members, and 112 patients.



There's no debating the power of **omega-3** fatty acids. From support for **heart health** and **brain function** to help with **inflammation**, their broad-spectrum benefits have been firmly established in a wealth of studies.[1-9]

To ensure the purest, most stable, and easy-to-tolerate fish oil supplement, **SUPER OMEGA-3 EPA/DHA** is *molecularly distilled*. This proprietary technology ensures any environmental pollutants are reduced to extremely low levels. The result? Our fish oil enjoys a **5-star rating** for **purity**, **quality**, and **concentration** from the **International Fish Oil Standards** program (**IFOS**)—the highest possible ranking from the world's *premier* testing laboratory.

Sesame Lignans and *Standardized* Olive Fruit Extract for Enhanced Benefits

Fish oils (and other fatty acids) have a tendency to oxidize, rendering them nutritionally inferior. Scientific studies show that when added to fish oil, ***sesame lignans*** safeguard against oxidation and direct fatty acids toward pathways that help with inflammatory reactions.[10]

To further emulate the benefits of a **Mediterranean diet**, **Super Omega-3** delivers standardized, high-potency ***olive fruit extract***. Research shows that **fish oil** combined with **olive oil** helps with inflammation better than fish oil alone.[11]

Olive also contains the compounds ***hydroxytyrosol***, ***tyrosol***, and ***oleuropein***. Together these nutrients counter the action of free radicals, delay aging in specialized skin cells, prevent undesirable LDL oxidation, and help maintain normal platelet activation.[12-15]

Super Omega-3 (4 regular size softgels) supplies the equivalent content of **6 tablespoons of extra virgin olive oil**. Take two softgels twice daily with meals.

A bottle containing 120 softgels of **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract** retails for $32. If a member buys four bottles, the price is reduced to **$21** per bottle. If **10 bottles** are purchased, the cost is **$18.68** per bottle. (Item # 01482)

Just one serving of SUPER OMEGA-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract provide:

EPA Pure+™ Extract (eicosapentaenoic acid)	**1400 mg**
DHA Pure+™ Extract (docosahexaenoic acid)	**1000 mg**
Olive Fruit Extract [std. to 6.5% polyphenols (39 mg), 1.73% hydroxytyrosol/tyrosol (10.4 mg), 0.5% verbascoside/oleuropein (3 mg)]	**600 mg**
Sesame Seed Lignan Extract	**20 mg**

A SMALLER SOFTGEL for easier swallowing!

Some members have requested we make **Super Omega-3** available in a smaller capsule for easier swallowing. We have accomplished this by making **half-size** softgels available.

A bottle containing 240 half-size softgels of **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract** retails for $32. If a member buys four bottles, the price is reduced to **$21** per bottle. If **10 bottles** are purchased, the cost is **$18.68** per bottle. (Item # 01619)

For those with sensitive stomachs, **Super Omega-3** is also available with **enteric coating** and retails for **$34**. If a member buys four bottles, the price is reduced to **$23.25** per bottle. If **10 bottles** are purchased, the cost is **$21** per bottle. (Item # 01484)

To order the most advanced fish oil supplement, Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract (with or without enteric coating), call 1-800-544-4440 or visit www.LifeExtension.com

Ratings based on results of the 2012 ConsumerLab.com Survey of Supplement Users. More information at www.consumerlab.com.

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

Contains fish (anchovy, mackerel), sesame, and corn.

Supportive but not conclusive evidence shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.

IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc. These products have been tested to the quality and purity standards of the IFOS™ program conducted at Nutrasource Diagnostics, Inc.

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MEETINGS

About the Alcor Foundation

The Alcor Life Extension Foundation is a nonprofit tax-exempt scientific and educational organization dedicated to advancing the science of cryopreservation and promoting cryonics as a rational option. Being an Alcor member means knowing that—should the worst happen—Alcor's Emergency Response Team is ready to respond for you, 24 hours a day, 365 days a year.

Alcor's Emergency Response capability includes specially trained technicians and customized equipment in Arizona, northern California, southern California, and south Florida, as well as many additional certified technicians on-call around the United States. Alcor's Arizona facility includes a full-time staff, and the Patient Care Bay is personally monitored 24 hours a day.

ARIZONA

Flagstaff:

Arizona without the inferno. Cryonics group in beautiful, high-altitude Flagstaff. Two-hour drive to Alcor. Contact eric@flagstaffcryo.com for more information.

Scottsdale:

This group meets the third Friday of each month and gatherings are hosted at a home near Alcor. To RSVP, visit http://cryonics.meetup.com/45/.

At Alcor:

Alcor Board of Directors Meetings and Facility Tours – Alcor business meetings are generally held on the first Saturday of every month starting at 11:00 AM MST. Guests are welcome. Facility tours are held every Tuesday and Friday at 2:00 PM. For more information or to schedule a tour, call D'Bora Tarrant at (877) 462-5267 x101 or email dbora@alcor.org.

The Alcor Volunteer Network, Scottsdale Chapter has a variety of meetings on topics including: member education, training, community outreach, and fundraising. To RSVP, visit: http://www.meetup.com/AVNScottsdale/members/

CALIFORNIA

Los Angeles:

Alcor Southern California Meetings—For information,call Peter Voss at (310) 822-4533 or e-mail him at peter@optimal.org. Although monthly meetings are not held regularly, you can meet Los Angeles Alcor members by contacting Peter.

San Francisco Bay:

Alcor Northern California Meetings are held quarterly in January, April, July, and October. A CryoFeast is held once a year. For information on Northern California meetings,call Mark Galeck at (408) 245-4928 or email Mark_galeck@pacbell.net.

FLORIDA

Central Florida Life Extension group meets once a month in the Tampa Bay area (Tampa and St. Petersburg) for discussion and socializing. The group has been active since 2007. Email arcturus12453@yahoo.com for more information.

NEW ENGLAND

Cambridge:

The New England regional group strives to meet monthly in Cambridge, MA – for information or to be added to the Alcor NE mailing list,please contact Bret Kulakovich at 617-824-8982, alcor@bonfireproductions.com, or on FACEBOOK via the Cryonics Special Interest Group.

PACIFIC NORTHWEST

Cryonics Northwest holds regular meetings for members of all cryonics organizations living in the Pacific Northwest.

For information about upcoming meetings and events go to: http://www.cryonicsnw.org/ and http://www.facebook.com/cryonics.northwest

A Yahoo mailing list is also maintained for cryonicists in the Pacific Northwest at http://tech.groups.yahoo.com/group/CryonicsNW/.

British Columbia (Canada):

The contact person for meetings in the Vancouver area is Keegan Macintosh: keegan.macintosh@me.com

Oregon:

The contact person for meetings in the Portland area is Chana de Wolf: chana.de.wolf@gmail.com

ALCOR PORTUGAL

Alcor Portugal is working to have good stabilization and transport capabilities. The group meets every Saturday for two hours. For information about meetings, contact Nuno Martins at n-martins@n-martins.com. The Alcor Portugal website is: www.alcorportugal.com.

TEXAS

Dallas:

North Texas Cryonauts, please sign up for our announcements list for meetings (http://groups.yahoo.com/group/cryonauts-announce) or contact David Wallace Croft at (214) 636-3790 for details of upcoming meetings.

Austin/Central Texas:

We meet at least quarterly for training, transport kit updates,and discussion. For information: Steve Jackson, 512-447-7866, sj@sjgames.com.

UNITED KINGDOM

There is an Alcor chapter in England. For information about meetings, contact Alan Sinclair at cryoservices@yahoo.co.uk. See the web site at www.alcor-uk.org.

If you are interested in hosting regular meetings in your area, contact Alcor at 877-462-5267, ext. 113. Meetings are a great way to learn about cryonics, meet others with similar interests, and introduce your friends and family to Alcor members!

What is Cryonics?

Cryonics is an attempt to preserve and protect human life, not reverse death. It is the practice of using extreme cold to attempt to preserve the life of a person who can no longer be supported by today's medicine. Will future medicine, including mature nanotechnology, have the ability to heal at the cellular and molecular levels? Can cryonics successfully carry the cryopreserved person forward through time, for however many decades or centuries might be necessary, until the cryopreservation process can be reversed and the person restored to full health? While cryonics may sound like science fiction, there is a basis for it in real science. The complete scientific story of cryonics is seldom told in media reports, leaving cryonics widely misunderstood. We invite you to reach your own conclusions.

How do I find out more?

The Alcor Life Extension Foundation is the world leader in cryonics research and technology. Alcor is a non-profit organization located in Scottsdale, Arizona,founded in 1972. Our website is one of the best sources of detailed introductory information about Alcor and cryopreservation (www.alcor.org). We also invite you to request our FREE information package on the "Free Information" section of our website. It includes:

A fully illustrated color brochure

- A sample of our magazine
- An application for membership and brochure explaining how to join
- And more!

Your free package should arrive in 1-2 weeks.
(The complete package will be sent free in the U.S., Canada, and the United Kingdom.)

How do I enroll?

Signing up for a cryopreservation is easy!

Step 1: Fill out an application and submit it with your $150 application fee.
Step 2: You will then be sent a set of contracts to review and sign.
Step 3: Fund your cryopreservation. While most people use life insurance to fund their cryopreservation, other forms of prepayment are also accepted. Alcor's Membership Coordinator can provide you with a list of insurance agents familiar with satisfying Alcor's current funding requirements.
Finally: After enrolling, you will wear emergency alert tags or carry a special card in your wallet. This is your confirmation that Alcor will respond immediately to an emergency call on your behalf.

Call toll-free today to start your application:

877-462-5267 ext. 132
info@alcor.org
www.alcor.org

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