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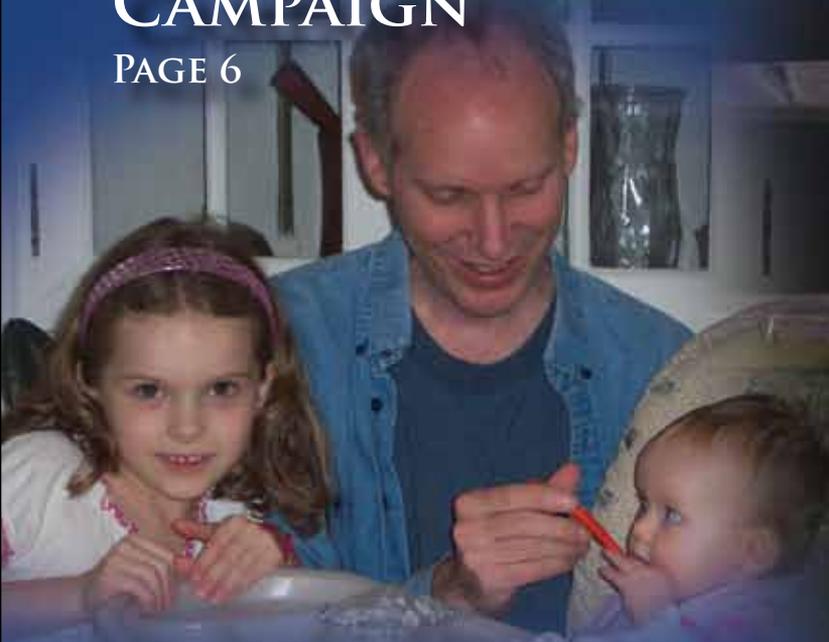
CRYONICS

APRIL 2013 · VOLUME 34:4



2013 SOCIETY FOR VENTURISM CHARITY CAMPAIGN

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FOR THE RECORD CRYONICS IN NEW YORK: HOW IT STARTED

PAGE 16

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CRYONICS



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2013 Society for Venturism Charity Campaign—Shannon Vyff
Aaron Winborn is a 45-year-old web developer who was diagnosed in 2012 with an aggressive form of Lou Gehrig's disease. Aaron has a long-time interest in cryonics but the costs associated with his terminal care prevent him from making short-notice cryonics arrangements. Aaron has appealed to the Society for Venturism and after verifying his condition and financial situation, they have started a fund-raising appeal for him.

12 Alternatives for Very Long-Term Storage of Personal Information & Materials

At the recent Alcor conference long-time cryonicist Mike Anzis encouraged Alcor to develop a formal plan for preservation of personal information and re-integration. In this issue he presents preliminary research he has done about currently existing physical and online services for very long-term data preservation.

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Cryonics in New York: How it Started

Mike Perry's indispensable column about important figures and events in life extension, cryonics, and human enhancement.

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CRYONICS

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The James Bedford Society



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.

The James Bedford Society recognizes those who make a bequest of any size to the Alcor Life Extension Foundation. If you have already provided a gift for Alcor in your estate, please send a copy of your relevant documents to Alcor's Member Communications Director, Lisa Shock.

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. ■



2013 Annual Giving Program

Alcor provides a wide array of services for you the member, and the general public. We inform and educate, we protect and preserve, and we strive to remain at the forefront of cryonics technology.

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QUOD INCEPIMUS CONFICIEMUS



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



PROTECTING CRYONICS PATIENTS By Aschwin de Wolf

Anyone who has ever reflected on the fragility of human life and the seemingly inevitable rise and fall of complex societies cannot fail to be concerned about the fate of patients in cryopreservation. Cryonics organizations have learned from the early days and abandoned the practice of accepting patients without complete prepayment – a practice that almost invariably guarantees a tragic loss of life when family members or the cryonics organization can no longer afford to care for them. Alcor has given a lot of thought to the financial and legal requirements of keeping patients in cryopreservation but it is understandable that people question the prospect of cryonics patients making it to the time where a suitable treatment of their disease will be available.

This challenge is further exacerbated by the fact that cryonics patients do not have the legal standing that ordinary human beings (or patients) enjoy. If the media revealed blatant incompetence in a local hospital, it would be inconceivable that the existing patients would be abandoned and left to die. In cryonics there is a far greater risk of abandoning both the organization and the patients, despite the safeguards that some cryonics organizations have

made to separate the organization from the maintenance of patients. In fact, the most rabid opponents of cryonics have little patience for the idea that abandoning cryonics patients could one day be considered one of the most tragic events in the history of medicine.

The first step to protect cryonics patients is to strengthen your cryonics organization and the legal and logistical structures that have been erected to keep them in cryopreservation. But almost just as important is to give people who have not made cryonics arrangements themselves reasons to protect them. In the case of surviving family members that is usually not a challenge but time may eventually pass the direct descendants of those people by as well. One important practice that can be strengthened is to give these people a face. Cryopreserved persons are not just a homogenous group of anonymous people (unless they chose to be so!) but are our friends, family members, and patients who would like their story to be told.

Fortunately, in the age of the internet this has become a lot easier. Social networking websites like Facebook retain the profiles of deceased and cryopreserved persons unless the family requests removal. Cryonics organizations *themselves* can offer

opportunities for members, friends, and family members to maintain their presence online. Last but not least, there are a lot more people who support cryonics and protection of cryonics patients than people who have made actual cryonics arrangements and these people can be involved and organized as well. As evidenced on a daily basis, you do not have to benefit yourself to support a cause. Cryonics is not just an individual seeking an experimental procedure but part of a broader social movement that hopes to update the way we think about death. In fact, Alcor now offers Associate Membership for those who want to support our mission but do not desire to make arrangement themselves, or not yet.

It is easier to dispose of people who are nameless, who have been removed from the social fabric of life, and who are only perceived as anonymous vehicles of an “erroneous” idea. We cannot decide that resuscitation will work but we can decide to keep their memories alive and personalities present to help them reach that opportunity. ■

2013 SOCIETY FOR VENTURISM CHARITY CAMPAIGN

DYING WISH



In 2001 a young man interested in healthy eating and supporting community work and activism met his soul mate at a food co-op. It was the beginning of a deep and responsible love between the two of them as they chose to build their lives together and planned to bring children into the world. In 2003 they welcomed their first child, amazed at how much more love they could feel. They naturally became nurturing parents who took joy in teaching their child about the world. In 2010 they welcomed their second child. All in their lives was going well—but it would not be for long.

On March 3, 2011, before their second baby was even a year old, the dad, 43-year-old Aaron Winborn, was diagnosed with Amyotrophic Lateral Sclerosis, commonly known as ALS or Lou Gehrig's disease. He threw himself into researching the disease, looking for any ways he could fight it. Sadly he was found to have an aggressive, terminal form of the disease that only gave him a few years more to live.

His wife, Gwen, did all she could to help him, help their children and learn how to incorporate this horrifying disease into their lives. They went through grief stages initially, Gwen said. "He was a young guy with young kids, who was doing everything right and just had a horrible diagnosis with one outcome. He was an upstanding citizen who liked to take his kids to the park and museum, a computer geek, who liked to play the piano and the flute—this could happen to anyone, you can do everything right, eat healthy, exercise, not smoke and still come down with a terminal illness at a young age."

They quickly realized they'd need to move from their two-story home, and were able to find a ranch style home that

could accommodate his wheel chair. He continued to work as long as he was able; he had been the primary income earner but had to leave his job as the illness rapidly progressed. Currently they are living off of Gwen's income as a social worker. After some initial denials, and after friends started a letter-writing campaign to the state on their behalf, they are still waiting for their first disability payment—it will be months from now, if then. They have applied for a Pennsylvania state Medicare waiver to help provide care in the home but that has not yet come through. As Aaron lost his ability to care for himself they needed nursing help. The ALS association has given them a grant for ten hours a week, but they have to pay the rest out of pocket. Gwen reduced her hours at work to have Friday through Sunday to care for him; they require a nurse for Monday through Thursday and still have daycare costs for their two-year-old along with the mounting medical bills. They have found generous volunteers in their area who help some with appointments, meals, rides, childcare and such, though not ongoing nursing care. Their family went through an enormous amount of change in a short time, always insisting that both needed to be there for their children.

Today Gwen says she helps other families who have been recently diagnosed by letting them know, "The initial pain and shock gets better as you come to terms with the reality, it doesn't get easier, it is still hard but you learn how to deal with the constant changes. The disease is degenerative so when you feel like you have tackled a problem then you are on to the next one." Now the family has been living with the disease for about two years, and sadly, from month to month, Aaron's



descent into paralysis has been faster than expected.

Their first child, Ashlin, was just 7 when Aaron was diagnosed—today, at 9, she is incredibly helpful, but also misses her dad. She remembers the way he used to be when they could build things together, do crafts and play. Her mother says, "She has a lot of sadness of losing the things they used to share. We try to keep some normal kid things for her, but it is hard. She is such a good kid, so caring and conscientious—she is dealing with it as best as she can. We've never lied to her, we've always shared the information we can—in an age-appropriate way." Any kid who has a parent with a degenerative illness struggles. They remember when their family had more time, when things were normal—but learn how to adapt to the new reality. Aaron and Gwen both worry that their youngest girl, Sabina, age 2, will not get the opportunity to form any memories of her father at all.

Now Aaron is on a bipap machine day and night, a machine that forces air in and out of his lungs since his diaphragm muscles have atrophied and will not work on their own. He can talk, but it sounds like he has a stuffed nose, and it takes a great deal of effort. First after diagnosis, he lost his ability to move his arms. Then his hearing became affected. A majority of ALS cases have cognitive problems, such as difficulty processing language or the onset of dementia. In Aaron's case, he lost the ability to understand music and became unable to understand speech over phones—the voices, as he puts it, "Sound like Charlie Brown's teacher." In November 2012 he wrote on his blog, "I am the father of 2 young children, and last year, I was diagnosed with ALS. This disease has already wreaked havoc in our lives, as it has

left me without use of my arms or hands, and with a severely compromised breathing capacity. The best is yet to come, however: I will become increasingly dependent on my foot-control power wheelchair for mobility as the atrophy in my legs and feet continues; as my swallowing and speech continue to decline, I will need to be fed through the feeding tube that has already been implanted, and I will only be able to communicate with the eye gaze tracker hooked up to my computer; and I will soon need to decide whether to die or to accept a locked-in state with invasive artificial ventilation.”

Aaron has been aware of cryonics for about three years after reading Ray Kurzweil’s book, *The Singularity is Near*. Last year, the year after his diagnosis, as he was doing everything humanly possible to beat the odds, he slowly felt his body falling towards a locked-in state. He had immediately thought of cryonics but found that life insurance, the normal way to cover the costs, was way out of reach. With all the mounting costs of care, he couldn’t think of a way he could set up cryonics arrangements—until he read a story about Kim Suozzi and the Society for Venturism. He decided that he might have a chance if he contacted the Venturists. He wrote to see if he could be considered for a Cryonics Charity Campaign. The board, after reviewing his medical history and his family’s financial situation, and talking with his family, voted to take him on as the 2013 Cryonics Charity Recipient.

His breathing score, as of January 2013, is at the point where they would often consider an invasive way of breathing, such as a tracheostomy. The concern is the CO₂ gas in his blood; if it stays low enough he can remain on the bipap machine—if it gets too high, he’ll need the tracheostomy. His condition is borderline right now; the threshold is 50% concentration, and in November of 2012 he was at 47%. If it runs higher than 50%, his body will not be able to exhale enough through his lungs—it’s anybody’s guess when that could happen. A pneumonia, bronchitis, or increase in CO₂ could send him to the hospital. They are worried that if he has to go onto a ventilator before the care

from the state comes through, it will be an exorbitant amount of money that they are unable to afford. They are trying to do everything they can to stay in their home, as they feel this is in the best interest of their children. They simply do not know how much time he has left, and Aaron is hoping he can have the peace of mind of having cryopreservation arrangements in place.

Gwen supports him in his decision to choose cryonics. She recognizes it is very important to him saying, “It is something he has been passionate about for a long time.” Out of her love for him, she is trying to help fulfill his wish and she knows he would do the same for her if their roles were reversed. “It is important that I can do what I can, to support what is meaningful for him,” she started saying but then paused. Attempting to compose herself as she tried to not become emotional, she continued, “He is, of anyone I know, a person who I’d say has always loved life and I don’t mean to say that tritely, it is true. He is a person who is excited to get up in the morning and has a million things to do. He doesn’t mess with the trivial or get sad about things that might bother a lot of people. He sees the best in others and sees what is important.” She paused again, before finishing, “I think it is important for me to honor that, I’m sorry to get all choked up.” Gwen took the time out of her busy and highly scheduled life to find a moment when their children were away, so she could help Aaron communicate over the phone with the Society for Venturism, saying she would do whatever she could to help his campaign to raise funds for cryopreservation. Although it is a hardship for them with all they have going they are getting together five thousand to give towards the fund.

Kim Suozzi heard of Aaron when he contacted the Society for Venturism in late October 2012. In November when he had been accepted as a new charity recipient she contacted him saying she wanted to help promote his campaign. She hoped that people who supported her would also support him; she was very optimistic about Aaron being able to raise enough funds for Cryonics Institute or Alcor. She offered to write about his campaign on Reddit and

include a link to his donation page but on December 13th Kim wrote to Aaron apologizing for not having been able to help more, explaining that her condition had worsened. She encouraged him to continue to raise the funds and to keep his options open for Cryonics Institute or Alcor. He thanked her and told her to stay strong. She continued to fight her cancer, still trying to enroll in treatments until the end, but lost her battle and arrested January 17, 2013, at age 23. Kim was successfully cryopreserved at Alcor Life Extension Foundation where her family and friends hope that someday science, medicine and technology will advance enough that she can be revived, cured, and given the means to continue her life.

Aaron and his wife have reached out to the cryonics community to help him make cryopreservation arrangements. When they first met and fell in love, they found they had similar understandings about death—they felt peace with it and were not afraid of it. This has continued even in the face of a terminal illness. As Gwen said, “A lot of people get depressed with this disease, facing your mortality, facing paralysis—but Aaron is not depressed. He still wakes up in the morning loving life and getting going, as hard as it is now for him to get going. Cryonics for him, it’s one of his passions, one of those things that wake him up excited to start his day and be excited about his future. He still enjoys life even as hard as it is now. Aaron had mentioned to me that Kim had contacted him and offered to help—oh my gosh, he was so excited by Kim contacting him: he thought he could actually get cryonically preserved.” Aaron sent a letter to the Society for Venturism, included below, where he pleads, “I come to this prestigious circle of like-minded people, asking you for help.” He ends with, “Thank you for considering my situation. I hope you find it in your hearts to help us out.” His wife too, over the phone, thanked the cryonics community, and was very hopeful that the funds can be raised to grant her husband his dying wish.

All donations to the Society for Venturism’s Cryonics Charity Campaign for Aaron Winborn will go to the cryonics organization that he sets up arrangements

with; they do not go to the individual. Please consider giving. As of print, with the campaign just started and not yet fully promoted, we have raised just over two thousand dollars. Even small amounts will help as many people donating will add up to

a large amount. It is not known how much time he has, and it would be wonderful to give him and his wife the peace of mind of knowing that he has cryonics arrangements in place.

*Thank you,
Shannon Vyff, Society for Venturism Director
and Alcor Member (shannonvyff@yahoo.com)*

Your Chance to Help

By Mike Perry

Life today has many joys and blessings—but it isn't all good, and we in cryonics are trying to address one of the main shortcomings we feel rather pervasively—our mortality. We address our mortality through being cryopreserved at clinical death, placing our hopes in future medicine to both cure or alleviate our ailments, including aging, and reverse the cryopreservation and restore us to a functioning, healthy state. We don't know if it will work, of course, but we do think cryopreservation is a better choice than alternatives. Unfortunately, it's rather expensive—we know how organizations failed in the past and cryopreserved members were lost, due to inadequate funding and inadequate amounts being charged. When someone has a terminal illness and wants cryopreservation but cannot afford the arrangements, it poses a special dilemma and at the same time offers us an opportunity to help in a way that can help us in return. For in the kind of future we are hoping to enjoy, good people will be welcome and it will be a joy to make their acquaintance and count them as friends.

Such a person is Aaron Winborn, a bright, loving husband and father who was diagnosed with a terminal disease, ALS, in 2011 and has steadily weakened and is now virtually paralyzed. Aaron hopes to see the future and he needs our help. He admits he was caught off guard by the sudden, unexpected onset of his disease, which

prevented his obtaining insurance that would have covered his cryopreservation. Though he also had a good job that paid well he has had to give that up and his family is struggling with expenses and hoping for some aid from charitable sources to defray their considerable medical bills. These sources will not cover cryonics, however.

Presently about 1,500 are signed up for cryopreservation and probably on average earn around \$50,000 per year. Most of you I hope read *Cryonics* and will read this brief appeal. As a start I will propose to you, to consider donating just \$100 each to help Aaron. \$100—0.2% of your annual income—should not be too much to afford. If you try this, it may be enough and if not, we will have made progress and can go from there. Even if you haven't yet made cryonics arrangements for yourself you can consider donating this modest amount. Maybe on the other hand \$100 is too much right now—give what you can. (Donations *more* than \$100 are greatly appreciated also!)

Where and how to send donations: The Society for Venturism, founded in 1986, is a cryonics advocating and promotional, non-profit organization that is interested in helping in needy cases like Aaron's and has organized a Cryonics Charity Campaign in which we try to assist one needy cryonicist each year. Last year we were able to raise funds so Kim Suozzi could be cryopreserved (as she was in January), for which we are most grateful to those

who donated. (Kim was sympathetic to Aaron's predicament and had planned to write a letter in support but time ran out.) Check our website, <http://www.venturist.info>, to donate to Aaron's Charity Fund. Funds collected for his cryopreservation, if sufficient, will go to the organization he chooses for this service, not to himself or other individuals. Surplus or unused funds, if any, will be used by the Venturist organization for other cryonics-related charity work as determined by the board of directors. We thank you for any contributions you can make.

Sincerely,

Mike Perry
Alcor Foundation, Society for Venturism
(mike@alcor.org)

Aaron Winborn's Letter to the Society for Venturism

(November 2012)

My name is Aaron Winborn. I am a 45 year old web developer and author, and the father of 2 young girls, and our lives were upended last year when I received the devastating diagnosis of ALS, more frequently known as Lou Gehrig's disease. It all started in August of 2012, soon after the birth of our younger daughter, when I noticed that I had difficulty clipping my nails. At 1st, I thought it was the clippers, until I threw out that pair and tried another. I began to lose my grip strength, and I quickly developed weakness in my arms. I went 1st to a chiropractor, suspecting carpal tunnel syndrome. Things escalated from there, until I was sitting in the neurologist's office and listening to Dr. Simmons tell me that I had an incurable terminal illness, in which chances were even that I would be dead in 2 to 3 years.



I have had a full life, full of adventures and exciting times. When I was 19, I lived in a monastic retreat center briefly, before living with and working for Elisabeth Kubler-Ross, the author of *On Death and Dying*. After that, I lived in a commune in England, where I helped to build a meeting house. Then back stateside, I worked in a corporate culture for a few years. After some soul-searching, I left that, and flirted with a few jobs, including waiting tables during the graveyard shift at IHOP, working in a garden nursery, and running a flight simulator for the Navy. When I learned about Sudbury schools, and a new school being built in North Carolina, I dropped everything and moved there to be part of its startup. That began a lifelong commitment to this Democratic, age mixed, non-coercive model of schooling, where I worked at another similar school in Connecticut. I also worked as a puppeteer in 2 different puppet theater companies. Somewhere in all of that, I lived for a few months in another monastery, and met soon after my lifelong partner, Gwen.

She changed my life. We had our 1st daughter, Ashlin, in 2003, and decided to move to a place closer to family, as we were both from the South. We chose Harrisburg, Pennsylvania, for The Circle School, so that Ashlin would be able to experience that model of schooling. Also about this time, I chose to work for Advomatic, as a web developer. In 2008, I wrote a technical book, *Drupal Multimedia*. Sabina was born in 2010, and has brought much joy to our lives.

As I said, I have had a full life, and I know that many might say that I should be content with that, and accept my upcoming death. I have even been told such by my primary care physician, whom I have since fired; I wrote about that on my blog at <http://aaronwinborn.com/blogs/aaron/heaven-can-wait>

As you can guess, that is not option for me. I love life too much, and have too much to do still. At the same time, I need to be realistic, and make responsible choices. Currently, from society's perspective, my only available choices are to die sometime within the next year from respiratory failure, or get a tracheostomy and use invasive artificial ventilation, and most likely die within the next 5 to 8 years from pneumonia.

I do not accept either of those choices. It is not that I am afraid of death; to the contrary, I strongly believe that I am not afraid to die. Rather, I am saddened by the prospect.

My arms and hands are already paralyzed, and my breathing is severely compromised. I currently use DragonDictate to type on the computer, and as my voice begins to fail, I am switching to an eye gaze tracker. I am in a power wheelchair, and we have moved into an accessible home. Technology holds the only hope for a person with ALS, where medical science has all but given up. I look forward to a day when, even if we have not cured all diseases, at least we have tackled this, the living nightmare that no one should have to endure.

Thus, I come to this prestigious circle of like-minded people, asking you for help. Life insurance, the usual method for funding one's cryopreservation, is out of reach for me, with the diagnosis of a terminal illness. Likewise, it is not an option for me to self-fund it, both because of the current and upcoming medical expenses, and to ensure that my family is provided for after I have gone on. I have blogged about our financial situation at <http://aaronwinborn.com/blogs/aaron/special-needs-trust> but it is out of date, as on top of all of our expenses, I am now applying for disability under Social Security, and Medicaid, which has rather severe restrictions on income and assets.

Thank you for considering my situation. I hope you find it in your hearts to help us out.

Aaron Winborn

ALZHEIMER DISEASE IN 2020

By Chana de Wolf



Any terminal illness is a terrible thing; but to a cryonics member, a brain-destroying neurodegenerative disease is the worst contemporary medical “death sentence” one can receive. There are several flavors of neurodegenerative disorders, many of which primarily affect the patient’s movement, strength, coordination, or the peripheral nervous system. And there are numerous contributory mechanisms in the causation of neurodegeneration, including prion infection and toxin related disease. But the most common – and the most feared – neurodegenerative disease is one that affects not movement, but cognition.

Of course, I am speaking of Alzheimer disease (AD). Originally described in a 51-year old woman by the Bavarian psychiatrist Alois Alzheimer in 1906, neuropathologists have increasingly recognized that AD is also the most common basis for late-life cognitive failure. Culminating in neuronal dystrophy and death leading to the progressive loss of memory and other cognitive functions (i.e., dementia), and affecting individuals of both sexes and of all races and ethnic groups at a rate of occurrence in the U.S. ranging from approximately 1.3% (age 65-74) to 45% (age 85-93), it is easy to see why AD has generated so much intense scientific interest in recent years.

In the recently published work “The Biology of Alzheimer Disease” (2012), most of what is known about

AD today is described in detail in the various chapters covering topics such as the neuropsychological profile and neuropathological alterations in AD, biomarkers of AD, the biochemistry and cell biology of the various proteins involved in AD, animal models of AD, the role of inflammation in AD, the genetics of AD, and treatment strategies. The editors’ selection of contributions has resulted in the most up-to-date compendium on Alzheimer disease to date.

“Taken together, progress in brain imaging and identification of fluid biomarkers hold great promise in improved diagnosis of AD cases.”

The book culminates in a chapter called *Alzheimer Disease in 2020*, where the editors extol “the remarkable advances in unraveling the biological underpinnings of Alzheimer disease...during the last 25 years,” and yet also recognize that “we have made only the smallest of dents in the development of truly disease-modifying treatments.” So what can we reasonably expect over the course of the next 7 years or so? Will we bang our heads against

the wall of discovery, or will there be enormous breakthroughs in identification and treatment of AD?

Though a definitive diagnosis of AD is only possible upon postmortem histopathological examination of the brain, a thorough review of the book leads me to believe that the greatest progress currently being made is in developing assays to diagnose AD at earlier stages. It is now known that neuropathological changes associated with AD may begin decades before symptoms manifest. This, coupled with the uncertainty inherent in a clinical diagnosis of AD, has driven a search for diagnostic markers. Two particular approaches have shown the most promise: brain imaging and the identification of fluid biomarkers of AD.

Historically, imaging was used only to exclude potentially surgically treatable causes of cognitive decline. Over the last few decades, imaging has moved from this minor role to a central position of diagnostic value with ever-increasing specificity. The ability to differentiate AD from alternative or contributory pathologies is of significant value now, but the need for an earlier and more certain diagnosis will only increase as disease-modifying therapies are identified. This will be particularly true if these therapies work best (or only) when initiated at the preclinical stage. Improvements in imaging have also greatly increased our understanding of the biology and progression of AD temporally and spatially.

Importantly, the clinical correlations of these changes and their relationships to other biomarkers and to prognosis can be studied.

The primary modalities that have contributed to progress in AD imaging are structural magnetic resonance imaging (MRI), functional MRI, fluorodeoxyglucose (FDG) positron emission tomography (PET), and amyloid PET. Structural MRI, which is used to image the structure of the brain, has obvious utility in visualizing the progressive cerebral atrophy characteristic of AD. Such images can be used as a marker of disease progression and as a means of measuring effective treatments (which would slow the rate of atrophy). Functional MRI, on the other hand, measures changes in blood oxygen level-dependent (BOLD) MR signal. This signal, which can be acquired during cognitive tasks, may provide the clinician with a tool to compare brain activity across conditions in order to assess and detect early brain dysfunction related to AD and to monitor therapeutic response over relatively short time periods.

FDG PET primarily indicates brain metabolism and synaptic activity by measuring glucose analog fluorodeoxyglucose (which can be detected by PET after labeling it with Fluorine-18). A large body of FDG-PET work has identified an endophenotype of AD – that is, a signature set of regions that are typically hypometabolic in AD patients. FDG hypometabolism parallels cognitive function along the trajectory of normal, preclinical, prodromal, and established AD. Over the course of three decades of investigation, FDG PET has emerged as a robust marker of brain dysfunction in AD.

Imaging of β -amyloid ($A\beta$) – the peptide that makes up the plaques found in the brains of AD patients – is accomplished via amyloid PET to determine brain $A\beta$ content. Historically, this has only been possible upon postmortem examination, so the utility of amyloid imaging is in moving this assessment from the pathology laboratory to the clinic. Because amyloid deposition begins early on, however, amyloid PET is not useful as a marker of disease progression.

The well-known hallmarks of AD, the plaques and neurofibrillary tangles first described by Alois Alzheimer in 1906, were discovered in 1985 to be composed primarily of β -amyloid and hyperphosphorylated tau protein, respectively. Advances in our knowledge of $A\beta$ generation and tau protein homeostasis have led to substantial research into disease-modifying drugs aimed at decreasing overall plaque and tangle load in an effort to halt neurodegeneration. Such treatments will likely be most effective if started early in the disease process, making sensitive and accurate fluid biomarkers of $A\beta$ and tau especially important.

Outside of imaging, progress in AD diagnostics stems primarily from the assessment of fluid biomarkers of AD. These biomarkers are generally procured from the cerebrospinal fluid (CSF) and blood plasma and include total tau (T-tau), phosphorylated tau (P-tau) and the 42 amino acid form of β -amyloid ($A\beta_{42}$). These core biomarkers reflect AD pathology and have high diagnostic accuracy, which is especially useful in diagnosing AD in prodromal and mild cognitive impairment cases.

Because the CSF is in direct contact with the extracellular space of the brain, biochemical changes in the brain can be detected in the CSF. Assays to detect $A\beta_{42}$ led to the discovery that $A\beta_{42}$ in AD is decreased to approximately 50% of control levels, making the measurement of $A\beta_{42}$ a useful clinical tool. Measurements of T-tau (around 300% of control in AD patients) and P-tau biomarkers (a marked increase in AD patients) in combination with $A\beta_{42}$, however, provide an even more powerful diagnostic assay.

Fluid biomarkers for AD other than $A\beta$ and tau have been posited, but positive results have been difficult to replicate. Novel biomarkers with the most promise include the amyloid precursor proteins sAPP β and sAPP α , β -site APP cleaving enzyme-1 (BACE1), $A\beta$ oligomers, and other $A\beta$ isoforms. Additionally, neuronal and synaptic proteins as well as various inflammatory molecules and markers of oxidative stress may prove valuable as CSF biomarkers. Studies of plasma biomarkers

such as those investigating plasma $A\beta$ have yielded contradictory results, but promising novel blood biomarkers for AD may be found in certain signaling and inflammatory proteins.

Taken together, progress in brain imaging and identification of fluid biomarkers hold great promise in improved diagnosis of AD cases. When combined with expected drug therapies we may be able to delay the onset of neurodegeneration and associated cognitive impairment significantly. In the meantime, early diagnosis is helpful in stratifying AD cases, monitoring potential treatments for safety, and monitoring the biochemical effect of drugs. For cryonicists, early diagnosis can help guide treatment and end-of-life care decisions in order to optimize cryopreservation of the brain.

So – back to the original question. What can we predict about the AD landscape in 2020?

Besides continued progress in early diagnosis through brain imaging and fluid biomarkers, the authors anticipate that advances in whole-genome and exome sequencing will lead to a better understanding of all of the genes that contribute to overall genetic risk of AD. Additionally, improved ability to sense and detect the proteins that aggregate in AD and to distinguish these different assembly forms and to correlate the various conformations with cellular, synaptic, and brain network dysfunction should be forthcoming in the next few years. Lastly, we will continue to improve our understanding of the cell biology of neurodegeneration as well as cell-cell interactions and inflammation, providing new insights into what is important and what is not in AD pathogenesis and how it differs across individuals, which will lead, in turn, to improved clinical trials and treatment strategies. ■

ALTERNATIVES FOR VERY LONG-TERM STORAGE OF PERSONAL INFORMATION & MATERIALS

By Mike Anzis

INTRODUCTION

An important consideration for many cryonicists and other immortalists is the long-term storage of information and materials such as audio and video recordings, photos, documents and records, to be retrieved at the time of revival or cloning. In the future these simply may be welcome and enjoyable connections to one's prior life, or they could serve as aids in reconstructing one's identity and personality. Storage may also include objects such as memorabilia or those with possible future value such as precious metals and jewels, or even tissue and DNA samples. Assuming that revival could take as long as a hundred or hundreds of years to become feasible, it would not be reasonable to expect that one can leave records and material with friends or relatives and expect them to be continually guarded, maintained, and passed on through future generations.

This article is a brief survey of currently available methods of potentially very long-term storage, including discussion of their respective advantages and disadvantages, and some recommendations by the author. As a disclaimer, technologies and available services are always changing, and some information is not readily available. Therefore I can only state that this represents the best information I could obtain at the time of article submission, and additions and corrections are welcome. My analysis and recommendations are based on my personal perspective, and anyone seeking such services should verify the information they rely on and make their own choices.

STORAGE ALTERNATIVES

The various alternatives examined are summarized on the chart in this article. A term that may not be familiar to the lay reader is "cloud services." This refers to the technology and services available today that allow a user or customer to load digital files via the Internet to remote computers that are managed and maintained by an outside service company or organization. Also, to clarify the column "Longevity Representation," it describes any implicit or explicit assertions or contractual obligations the provider makes regarding the very long-term storage that would be needed, i.e. until revival. In addition, for the non-tech oriented, "GB" means gigabyte, or one billion bytes or characters, and TB means terabyte, or one trillion bytes.

The most significant issues for immortalists regarding long-term storage (other than costs) are:

1. Will the storage company, organization, or individual storing information and materials be inclined and obligated to provide it, or even be in existence at the time of revival, and,
2. Will the media used (DVD's, CD's, flash drives, video tape, paper, etc.) be preserved and readable, including the question of whether there will be compatible devices to read them.

The bottom line is that there are no absolute assurances with any of these (not to mention whether bio-stasis and revival techniques will work), and I have arranged the chart with the rows in descending

order of what I feel is the highest to lowest probability of retrievability. So, it starts with Alcor and the Cryonics Institute on top, since their mission is completely aligned with our objectives as cryonicists. Next is Terasem with the LifeNaut and CyBeRev options, since transhumanism is closely aligned with cryonics. (I was unable to determine that any other cryonics or transhumanist organization offer storage services.) These are followed by commercial services that have a purpose not connected to immortalism, although not necessarily in opposition. I've also included toward the top the Millenniata M-Disk, since it is a technology that can be used along with various physical storage options.

Alcor Storage Box

As part of an Alcor full cryopreservation membership, Alcor members have the use of an 18"x15"x13" cardboard storage box that is stored in an environmentally maintained former salt mine in Hutchinson, Kansas. This is a service provided by Underground Storage Vaults, Inc. (undergroundvaults.com), which has been in business since 1959. Members can add to their boxes approximately every two years. Additional boxes cost \$250. Beside digital media, a wide variety of objects can be stored such as books, albums, collectables, paintings, etc.

In addition to it being free to members, this alternative has the advantage of Alcor itself monitoring the company and Alcor's continued stewardship of the stored boxes (but not the material). With no management of the media in the boxes however, there is no control over deterioration

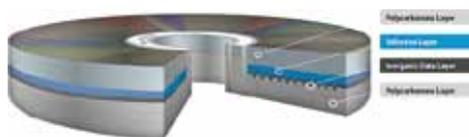
or maintenance of readability of the media. (Storing digital information in the cloud or with an organization focused on storing “information” rather than storing “boxes” implies that they would maintain compatibility with changing reading devices and software.) As with any commercial company however, Underground Vaults may revoke its commitments or go out of business, and Alcor would have to find another alternative or take on storage itself.

Cryonics Institute Storage File Vault

Cryonics Institute provides the option to their suspension members of buying a drawer in a file cabinet at CI’s facility in Michigan. The drawer has a one-time fee of \$1,000. The cabinets are in an office environment, and other than being fireproof (i.e. fire resistant), there are no other environmental controls. This alternative has the same advantages as the Alcor storage box, except for the more strictly controlled environment and security of the salt mine. CI also specifies that only papers and digital media may be stored.

Millenniata M-Disk

I discovered the Millenniata M-Disk while researching this article. It is a DVD with a data layer made out of stone-like metals and metalloids that ExtremeTech (www.extremetech.com), the provider, asserts will last and be readable for 1,000 years. It has been tested by the Naval Air Warfare Center under extreme conditions. (See <http://www.mileniatta.com/m-disc/>.) It can only be written-to by an LG DVD writer, but they are not expensive. I purchased the writer at Fry’s for \$34, and a 5-pack of disks for \$20. Capacity of a disk is 4.7 GB. This is, allegedly, the most physically robust medium that I have identified for storing digital information.



Mind Files

There are two projects within the Terasem Movement that allow storage of digital information in the cloud (i.e. over

the Internet), LifeNaut and CyBeRev. Terasem is a 501c3 not-for-profit charity “endowed for the purpose of educating the public on the practicality and necessity of greatly extending human life... concentrating in particular on facilitating revivals from bio stasis. The Movement focuses on preserving, evoking, reviving and downloading human consciousness.” (Quote from the Terasem Movement website at www.terasemcentral.org.) It is largely funded by Martine Rothblatt, a successful entrepreneur and promoter of futures technologies and acts as an umbrella organization over many projects, including LifeNaut and CyBeRev.

Both LifeNaut and CyBeRev are highly advantageous since they are both aligned with cryonics and immortalism, and many Alcor members are members of one or both. It was easy to sign-up for LifeNaut and uploading was straightforward. When I had questions about uploading files, a call to Bruce Duncan, Terasem Managing Director, was returned promptly. Bruce spent considerable time helping me with the LifeNaut uploading tools and answering questions about Terasem and LifeNaut. He said that the available LifeNaut on-line user manual is currently in need of update because of a recent major system revision. Bruce told me that LifeNaut’s infrastructure includes three physically separate sites that replicate systems and data among themselves in “near-time”, i.e. minutes or hours, allowing failover to another of two sites should one fail. I was also told that while the stated limit of storage per user is 7 GB, many members use more, and there is currently no need or plan to limit user storage.

It took ten days after requesting participation on CyBeRev’s website to become a participant. Uploading after signing-up was easy and straightforward. I was told in an email from Mike Clancy, General Manager, Terasem, that “In addition to off-site (local) and off-site (out of state) storage, mindfiles are stored on two waterproof fireproof drives on site”; and that “The database is also on a fault-tolerant raid array.” In my opinion, CyBeRev’s technical infrastructure compares satisfactorily with LifeNaut’s,

with the difference being that LifeNaut would probably recover from a major system failure in minutes or hours, while it may take CyBeRev a day or more.

Regarding both LifeNaut and CyBeRev, there is always a question of whether something free from a charitable organization will remain so over the long-term, or whether the organization will remain in existence. That is also a concern regarding commercial organizations. A case in point is an entity called Swiss DNA Bank that, apparently, was set up as a commercial enterprise for immortalists to store DNA information and digital files in a Swiss mountain for a fee. There are references to and articles about it on the Web, however the website is not operating, and one must assume they are out of business. The concern about sustainability would also apply to cryonics or other immortalist organizations, however, I believe that alignment of goals and cross-participation of members makes immortalist organizations the best available option for long-term storage of digital information.

Commercial cloud archival and backup services

These services focus on business users with the need to retain archival copies of important data and materials relevant to their business, and to have backup copies of these available in case active copies are corrupted or lost. Such backup is required of publicly traded companies under Sarbanes-Oxley legislation and by regulations in certain industries such as banking, insurance, and healthcare. Many companies offer this service, including well-known companies such as IBM and Google, and others such as GlobalDataVault, Seagate, Iron Mountain’s LiveVault, etc.

These services offer some distinct advantages in that they are tightly managed by large, strong companies with a vital stake in the integrity and readability of data, including conversion to new technologies. While they offer some assurance of longevity, very-long term stability is not assured. Arrangements with these services also requires continuous renewal of

contracts (every year or every few years), and continuous payments. Also, because they focus on data, storage of large video files can get very expensive, and storage of objects is not available.

Overall, because the focus of these services is not aligned with immortalist objectives, and because of the need for continual renewal of contracts and payments, these services are not recommended.

Commercial cloud sharing and storage services

There are numerous commercial cloud sharing and storage services available today, including the popular and highly publicized Apple iCloud, Google, Dropbox, Amazon Cloud Drive, and Windows Live SkyDrive, as well as Google's YouTube. They vary from 5 to 18 GB free, and you can purchase a TB or more, depending on the service. They vary in the details of what is available, but the most important point for immortalists is the short-term focus of these services. They focus on the general retail user, and their purpose is to provide a file sharing platform and backup for currently used files, music, video, etc., not archival preservation for the long-term. As such, there is no intention or awareness of any of these long-term immortalist objectives, and these services are also not recommended.



Another related service which deserves mention is one that converts photos, slide and movie film, and analog media such as audio and video tapes, to a digital format. This, of course, then allows you to store these on digital media such as the M-Disk or with a cloud storage service. You can purchase your own equipment for this conversion, retailers like Walmart and Costco provide the service, and there are

numerous such services available through the Internet. At least one of the online services which does conversion, PeggyBank (peggybank.com), also provides cloud storage for archival and sharing purposes, and does it for free for the media that you've paid to have them convert. The same caution would apply to the storage aspects of this service as to other commercial cloud storage services, namely that it is not aligned with immortalist objectives of very long-term storage, so it is problematic how long files would be maintained.

Other physical storage service providers

There are also companies besides Underground Vaults that focus on the long-term archival storage of physical business documents and materials. The leader and best known is Iron Mountain, which stores materials in caves in Iron Mountain, Colorado, and other locations. Some will also store materials, such as the archival film libraries that Underground Vaults stores for the movie industry.

I see no reason why an Alcor member would choose this option from an organization other than Underground Vaults since it's free and overseen by Alcor. Other immortalists may wish to compare other services.

RECOMMENDATIONS

My recommendations are simple, and are based on the "belt and suspenders" approach: Use more than one of the viable alternatives simultaneously for the best possible assurance that you will see your selected personal material in your next life. I see the viable alternatives as those with objectives that align with mine, i.e. revival in the very long-term future. So I am using the Alcor box to store materials, and digital information written to M disks, and I am in the process of deciding between LifeNaut and CyBeRev to also store information through the cloud on their servers. I may decide to use both, although I like the freer access by would-be participants that LifeNaut appears to provide, and their service that offers cryostorage of DNA.

Commercial archival and backup services may be another viable alternative

because of their robust infrastructure and the strong companies that provide them. However, I don't consider their costs as worthwhile, and the need for constant contract renewal and payment seems infeasible over immortalist timeframes. I don't recommend commercial sharing and storage services such as iCloud, Dropbox, or YouTube because their focus is so short-term and constantly changing to meet market preferences (and whims).

Finally, in addition to recommending that immortalists provide for this kind of very long-term storage in some way to assure higher quality future lives for themselves, I also recommend making this material available to friends and loved ones, either now or after bio-stasis. Tell them where it is stored and communicate your very long-term storage arrangements so they may continue to experience you in a way that may make them more inclined to continue to support efforts to revive you.

One other recommendation: Create an "Ethical Will" and store it with your other long-term material as well as where friends and loved ones can have access. Briefly, this is a statement of your basic values, beliefs, and what made you who you are as a person, and messages you would like to pass on to future generations. CyBeRev focuses on providing a framework for this kind of information; however I'm inclined to think that a simple video of you communicating your message would be just as effective. I think this may be the most valuable content I can pass on to my children and have upon my revival. ■

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Long-Term Storage Alternatives

PRODUCT	COMPANY / PROVIDER	MEDIA / METHOD	LONGEVITY REPRESENTATION	COST	ADVANTAGES	DISADVANTAGES
Alcor storage box	Underground Vaults and Storage, Inc.(undergroundvaults.com)	18"x15"x13" cardboard box stored in environmentally controlled prior salt mine 650 feet underground in Hutchinson, Kansas	Underground Vaults logo says "Security Forever"; has been in business since 1959; 99 year lease on salt mine; no contractual representation.	One box free with Alcor membership; additional boxes \$250 ea.	No cost for one box; can store various objects; security, low temperature and humidity controls; Alcor oversight	No very long-term assurance/ representation by vendor; no media management
Cryonics Institute storage file vault	Cryonics Institute	File cabinet-sized storage drawer housed at CI in Michigan	As a cryonics organization, CI is implicitly committed to storage until revival	\$1,000 one-time fee with CI membership	CI stewardship in connection with suspension membership	No environmental management or controls (office); digital and paper media only (no objects)
Milleniata M-Disk "DVD made out of stone that lasts 1,000 years"	ExtremeTech http://www.mileniatta.com/m-disc/	4.7 GB DVD with a data layer made out of stone-like metals and metalloids	Co. claims data layer lasts for 10,000 yrs., polycarbon layer for 1,000 yrs.	Fry's - 5 pack \$20, 10 pack \$30; to write must also have LG R/W drive \$34.	User control; store anywhere including Alcor box or CI, no on-going costs	Uncertain future readability, small capacity for video (4.7 GB per disk)
MindFiles	LifeNaut (www.lifenaut.com); part of Terasem movement (www.terasemcentral.org)	Free cloud storage of digital info up to 7 GB+ for registering; can create your own interactive avatar and freeze and store DNA for a fee	Assertion of unlimited timeframe for revival and/or uploading to future avatars and other transhuman technologies	Digital storage free with registration; DNA storage free with \$99 shipping costs in U.S., \$399 from outside U.S.; donations requested	Free digital storage; committed to idea of cryonics and transhuman immortalism; on-line control and easy use	"Free" can also mean freely withdrawn. No contractual commitments regarding retention. Supported by private philanthropy.
MindFiles	CyBeRev (www.cyberev.org); Part of Terasem movement	Storage of up to 10GB digital information, including questionnaire/personality profile; personal avatar	Similar to LifeNaut; more emphasis on personality and psychological profile (i.e. "bemes" - units of personality)	Free, however limited to pre-existing accounts; new accounts by invitation only	Free digital storage; committed to idea of cryonics and transhuman immortalism; on-line control and easy use	Controlled membership; terms of service seem to imply that Terasem owns your information
Commercial Cloud Archival & Backup Services	Examples: IBM, Seagate, Google, Sungard	Cloud backup/storage of 50 GB+ digital files	Various assertions; no very long-term representation	\$4 / month and up	High capacity; tightly managed storage infrastructure; on-going business may assure readability and some long-term viability	No very long-term assurance; focus on data and documents; continuous monthly/yearly contracts and cost.
Commercial Cloud Sharing & Storage Services	Examples: iCloud, Dropbox, Amazon Cloud Drive, YouTube	Cloud backup of files, music & media; up to 1 TB; 5 to 18 GB free	No long-term representation or contractual assurance	Free up to 18GB+, depending on service	Easy to use with popular tools (Windows, Apple and Android devices). Robust commercial backing	Focus on short-term backup and sharing; no focus on immortalist objectives
Other physical storage service providers	Examples: Iron Mountain, Gaylord, GRM	Physical storage of paper documents and materials	Generally no contractual assurances or representations	Varies by volume and services provided	Actively managed secure venues; commercial viability	Paper materials only with some exceptions; no commitment or focus on very long-term

CRYONICS IN NEW YORK: HOW IT STARTED

By R. Michael Perry



The cryonics movement has two main originators, Robert Ettinger and Evan Cooper. Ettinger's active efforts started in the 1940s but his main early milestone was the commercial publication of his book, *The Prospect of Immortality*, in June 1964. There the cryonics premise, that persons frozen (cryopreserved) at clinical death and maintained indefinitely in that state might be resuscitated by future technology, is presented and defended at length. Often it is thought that this publication is what "started" cryonics as we know it, but that is not entirely correct. Cooper was a later, though independent, starter than Ettinger, and his early 1960s book, *Immortality: Physically, Scientifically, Now* (written under the pseudonym N. Duhring), which paralleled Ettinger's, was never commercially published and for a long time was difficult to obtain (now it's online¹). Cooper, however, accomplished something crucial to the early movement that no one else did. His Life Extension Society (LES) in Washington, D.C. was the first organization promoting the cryonics idea (before the term *cryonics* had been coined—see below) and the first to have conferences and publish a newsletter where like-minded people could communicate as they developed their own organizations and approaches. LES also built a cryonics facility in Maryland, which was never used.

One important place for early development was New York City and surroundings. Here there were two principal efforts that started almost simultaneously around 1964.

One was headed by Dr. Benjamin Schloss, described as a "scientist-businessman" and head of Nucleonic Corporation of America, a company that manufactured Geiger counters. (Schloss in fact had been active during WWII in the Manhattan Project that created the first atomic bombs.) Schloss formed the Society for Anabiosis with stress on "an immediate crash program in cryobiological research" and a goal of raising \$1,000,000. He was not interested in freezing the dying until significant progress had been made.² Around March 1965 there was gathering attended by Ettinger who reported, "... Dr. Schloss outlined some of the aims and programs of the Society for Anabiosis. Besides Dr. Schloss and myself, the speakers included Dr. Richard Lillehei, the well-known experimental surgeon and cryobiologist, and a Georgetown U. pathologist who is a former president of the Cryobiological Society. The latter two are mainly interested in accelerated research (there are said to be only a dozen men in the U. S. working full time in cryobiology), but they also support, at least passively, the goal of indefinitely extended life. They do not endorse freezing now, but neither do

they seem actively opposed to it."³ Schloss's project itself was endorsed by a wealthy celebrity, musician and entertainer Artie Shaw (Arthur Arshawsky). Yet it was short-lived, and Schloss would soon change focus to antiaging research.⁴ (In 1978 he died of leukemia with no attempt at being cryopreserved.⁵)

Of far more significance to cryonics was the other effort, led by two activists with no celebrity backing but more enthusiasm for freezing now: Curtis Henderson and Saul Kent. Both read Ettinger's book and it would change their lives. Their early involvement, in which the word *cryonics* was coined and the first organization was started to offer the full service (involving more than just a straight freeze after clinical death),⁶ is the main subject of this article.

Curtis at this point had been doing well. An attorney, his job as insurance adjustor gave him considerable free time, and he

1 See <http://www.evidencebasedcryonics.org/2008/05/27/ev-coopers-cryonics-classic-published-online/>, accessed Feb. 4, 2013.

2 *Freeze-Wait-Reanimate*, Feb. 1965, 3; for back issues file of this publication see <http://www.foreverforall.org/> (accessed Feb. 4, 2013).

3 Robert Ettinger, letter printed in *Freeze-Wait-Reanimate*, Mar. 1965, 6.

4 Robert Ettinger, "Cryonics and Conscience," *First Annual Cryonics Conference* (2 Mar. 1968), 12; <http://cryoeuro.eu:8080/download/attachments/425990/Proc1stAnn+Cryo+ConfNYC1968.pdf>, accessed Feb. 4, 2012.

5 Carl Carlyle, "Passing the Torch, Project 1989 Lives!" *Long Life Magazine*, 2; Saul Kent, "The First Cryonicist," *Cryonics* Mar. 1983, 10, <http://www.alcor.org/cryonics/cryonics8303.txt>, accessed Feb. 4, 2013.

6 Cf. incorporation papers of the Cryonics Society of New York (Alcor Foundation).

had other income by inheritance. He had bought a house on Long Island, a boat big enough to live in, and a small airplane that he kept at a nearby airport. He had a wife and a young son. What happened at this point was the start of an obsession that would leave him penniless and help to break up two marriages, yet he would remain dedicated to the end.⁷ (In 2009 he was cryopreserved by the Cryonics Institute.)⁸

In 1964 Curtis spent a lot of time reading, working on his boat, and riding around on his motorcycle. One day he saw in the New York *Times* Book Review, a review of Ettinger's book. "I bought the book," he tells us, "and that was when I heard that little voice telling me, maybe there could be an exception in my case" [to the rule that everybody had to die]. Though thinking the book was "terribly written," it was the idea that mattered. "Nothing can guarantee that you will live another second, or another 100,000 years. But what cryonics does do is, it relieves you of the absolute certainty that you're going to die. In our hearts, we are immortal, because we have the prospect of immortality, now. We're doing something, and however slim the possibility may be, the absolute certainty that we won't be here in another 150 years is gone. So in a sense, you're getting the same emotional release that somebody who absolutely believes in one of these religions gets. To me, this is the most important thing about cryonics." Curtis wrote to Ettinger, who gave him the names of two others in his area who had already contacted him: Jim Sutton and Saul Kent.⁹

Saul had picked up a copy of *The Prospect of Immortality* right after it first appeared, in June 1964. A recent phys-ed graduate at a local college who had graduated with difficulty, Saul spent a lot of time at the beach and did not like being told what to do, whether in school or, even worse, on the job—when he had a job. As he tells it, on perusing the pages of Ettinger's book, "I was exhilarated to a degree I had never before experienced. Instantly, I knew—beyond a shadow of a doubt—

that the most profound and powerful idea in history had been unleashed and that I would devote my life to it." And he did after a few months' pause become a tireless worker for cryonics, starting by contacting Ettinger, who put him in touch with Ev Cooper and LES and would pass his name on to Curtis Henderson.

The first response to Saul from Cooper was a Special Delivery letter Saul found "a bit overwhelming." For, "Not only did Ev welcome me into his organization with open arms, he actually asked me if I wanted to represent LES in New York as a 'Life Extension Coordinator.' I wasn't quite ready for that yet and wondered what kind of man would make such an offer so quickly." About a month later Saul met Cooper and his wife Mildred at Grand Central Station in New York. Cooper had just participated at a seminar at Pace Institute in Brooklyn on the freezing idea; Dr. Schloss was also present. (Ettinger's reported meeting must have been later, the following year.) Saul reports, "From the beginning I found Ev to be warm, friendly, gracious, and generous. We carried on an exciting and highly stimulating conversation in his car as we drove out to a restaurant in Queens to meet (for the first time) with Jim Sutton and Harry Costello, who were to join with me in becoming coordinators for LES in New York." A few weeks later Saul and his two colleagues would drive to Washington, D. C. to meet with Ev and other LES members, with the same positive effects plus extras, including a ride Saul took on Ev's sailboat.¹⁰

Curtis got in touch, starting with Jim Sutton, a difficult prospect at first, with unanswered letters followed by a fruitless visit to his apartment in Queens, "just a room in a completely dilapidated, end-of-the-world type place. A long narrow hall, one light bulb ... unpaid bills all over the place. I left one of my cards under his door, with a note for him to call me. Finally he called me, and he told me he'd contacted another guy, Saul Kent, who he said was a genius." Jim liked to dress in fancy suits, hiding his modest means while Saul, somewhat to Jim's chagrin, went about in shorts and sandals.

Another joiner to the group around this time was Karl Werner, who had attended

the seminar at Pace Institute. He read science fiction, wanted to see the future,¹¹ and was working on his Master's Degree project (an underwater habitat) at Pace.¹²

Saul sent a letter to Cooper that was published in the LES newsletter, *Freeze-Wait-Reanimate*, March 1965. In one paragraph he outlines reasons for his interest and voices disagreement over one matter of policy, Cooper's ideal of an all-volunteer, unremunerated service that would eliminate the possibility of any conflict of interest. "I am interested in the freezer movement simply because the process of living has so thoroughly infused my consciousness that I am unwilling to discontinue it," he writes. "Relative immortality is a scientific inevitability, and I welcome the opportunity to bridge the gap through freezing. As far as your preoccupation with motivation is concerned, I find that you make a rather abrupt and cynical dialectical dichotomy between the purposes of profit and public service. Truth must certainly be compromised if one's sole ambition is to make money, however, stoic dedication is not necessarily the most efficient means of approaching a problem that concerns the masses. To get this movement off the ground a great many complex problems will have to be solved, and I do not believe that voluntary work alone will suffice...."¹³

As time went by, increasing frustration developed between Cooper in D. C. and the newly-formed LES group in New York. "We wrote to Ev Cooper," Curtis remembered, "and we got back vague letters, in which he would never send us names and addresses of other people who had written to him. So we asked if we could print up stationery. He didn't want us to do that."¹⁴ Finally the decision was made to cut ties with LES and form a separate organization, the Cryonics Society of New York (CSNY), which was incorporated July 13, 1965. Its founding members were Curtis Henderson, Saul Kent, Karl Werner,

7 Charles Platt, *Interview with Curtis Henderson* (1992, unpublished, used with permission).

8 See, for example, *Cryonics* 3rd Quarter 2009, <http://www.alcor.org/CryonicsMagazine/cryonics2009.html#three>, accessed Feb. 4, 2013.

9 Charles Platt, *Interview with Curtis Henderson*.

10 Saul Kent, "The First Cryonicist," *Cryonics* Mar. 1983, 10.

11 Charles Platt, *Life Unlimited*, a book about the history and feasibility of cryonics, acquired for publication by Wired Books, but still unpublished as a result of the dissolution of the publishing company. (Charles Platt, private communications Dec. 27, 2000; Feb. 5, 2013.)

12 Saul Kent, private communication Feb. 23, 2013.

13 Saul Kent, letter printed in *Freeze-Wait-Reanimate*, Mar. 1965, 5.

14 Charles Platt, *Interview with Curtis Henderson*.

James Sutton, and Harold Costello.¹⁵ Karl Werner invented the name *Cryonics*, a melding of the term *bionics* with the Greek word *kryos* for extreme cold.¹⁶ Though originally just a company name, the term was lower-cased and applied to the whole movement eventually, as well as being adopted by other organizations. The first membership meeting was held August 29, 1965 at Karl Werner's apartment, 306 Washington Avenue, Brooklyn.¹⁷

Unlike LES, CSNY fully intended to involve itself in actual freezings with cryoprotective perfusion. Quoting from the bylaws, which were adopted at the August 29 meeting, "Our primary concern is to provide, for our members, a specific program, so that in case of death, they may be frozen under the best possible conditions. This program will include: detailed information about all aspects of the freezing movement; expert instruction

in specialized techniques; and full access to the finest freezing and storage facilities available."¹⁸ At first there were few takers; the organization was small with the membership evidently healthy; a few were frozen elsewhere, in Arizona and California. Finally, in 1968 CSNY started doing freezings too,¹⁹ which led to one of Curtis's memorable sayings, "There's no such thing as feel-good cryonics."²⁰ (Strictly speaking, the non-profit CSNY did not do freezings and patient storage directly, but handled these operations through a sister for-profit organization, Cryospan.²¹) Of the five who started the organization only Curtis and Saul remained active in it, and

cryonics more generally. The organization eventually became inactive (another story I hope to cover, in a future column), but its principals stayed involved, until Curtis was cryopreserved as noted; Saul is currently a director of Alcor and CEO of Suspended Animation, a company that conducts research and provides cryopreservation services to Alcor and other cryonics organizations. Cryonics remains a monument and a hope for those who are not ready to give up when conventional medicine has exhausted its options.

I also thank Saul Kent for reviewing this article and making helpful suggestions. ■

15 Incorporation papers of the Cryonics Society of New York (Alcor Foundation).

16 Saul Kent, "The First Cryonicist," *Cryonics* Mar. 1983, 10-11; private communication Feb. 23, 2013.

17 CSNY Corporate records now at Alcor Foundation.

18 *Ibid.*

19 In fact nearly all the early freezings ended in failure; for a recounting including cases in Arizona, California and New York see R. Michael Perry, "Suspension Failures: Lessons from the Early Days," <http://www.alcor.org/Library/html/suspensionfailures.html>, accessed Feb. 7, 2013.

20 See, for example, the article by Aschwin De Wolf with this title, *Cryonics* 3rd Quarter 2009, 15.

21 See, for example, <http://www.alcor.org/Library/html/suspensionfailures.html>, accessed Feb. 4, 2013.



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ARE CRYONICS PATIENTS... PROPERTY?

By Keegan Macintosh



Doodeward *v. Spence*, a 1908 case out of the High Court of Australia[1], addressed a very difficult question: could human remains be property? The facts of the case were somewhat bizarre. Some forty years prior to the appeal, a New Zealand woman had given birth to a stillborn, two-headed fetus. The fetus had been preserved in spirits by the attending physician, who kept it as a curiosity, until it was sold at auction after his death along with his other personal effects. The preserved fetus made its way into the hands of the appellant, Doodeward, who exhibited it for gain, resulting in his prosecution and arrest, and seizure of the preserved fetus. Doodeward sued for its return, on the grounds that his property was being wrongfully detained. The potential problem with his claim was that the established common-law rule was that “there can be no property in a corpse,” so the High Court of Australia had to consider whether this particular scenario warranted a principled exception of some kind. There was no question that exhibiting the preserved fetus was a misdemeanor – the issue to be decided was whether the mere possession of it was unlawful.

In a 2 to 1 split, the court held that “it does not follow from the mere fact that a human body at death is incapable of having an owner that it is forever incapable of having an owner,” and that in some cases, human remains could acquire property status. Chief Justice Curtis pointed to the

many instances of possession of mummies, prepared skeletons, and other anatomical specimens. He went on to declare: “I entertain no doubt that, when a person has by lawful exercise of work or skill so dealt with a human body or part of a human body in his lawful possession that it has acquired some attributes differentiating it from a mere corpse awaiting burial, he acquires a right to retain possession of it, at least as against any person not entitled to have it delivered to him for the purpose of burial, but subject, of course, to any positive law which forbids its retention under the particular circumstances.”

While it is presently beyond debate that cryonics patients are not persons under the law, Doodeward and cases like it raise the question of whether cryonics patients might fall within the category of property, with some or all of the accompanying legal attributes. What would that mean, legally and practically? Could there be any benefits or disadvantages to acknowledging it?

Legal cross-pollination between common-law countries is a reasonably frequent occurrence, especially in novel circumstances where there may not be any relevant case law from within the jurisdiction to draw from. Since the High Court of Australia’s decision in 1908, the “work and skill” exemption to the no-property rule has been referred to and applied, and even expanded, in Australia and elsewhere. Of recent note, the England and Wales Court of Appeals referred to Doodeward coming

to the decision that body parts preserved at the Royal College of Surgeons could be the subject of a theft, having “acquired different attributes by virtue of the application of skill.”[2] The Court of Appeals left the door open that human body parts might be capable of being property “even without the acquisition of different attributes, if they have a significance beyond their mere existence,” citing body parts destined for transplant, extraction of DNA, or for exhibit in a trial. The Doodeward exception has also been referred to in cases acknowledging property in cryopreserved sperm, expanding the principle to encompass not only human remains, but human biological products.[3]

In distinction to England, Canada and Australia, U.S. courts have long recognized “quasi-property” rights in human remains. However, these rights are closely tied to the executor/next-of-kin’s duty to dispose of the decedent’s human remains, coupled with some enforceability of testator instructions on the subject – but they do not empower a person to simply “gift” their remains to someone absolutely, to do with as they please. And it is important to remember that even an exception like the one embodied in Doodeward only applies to human remains that have been subjected to a lawful exercise of work or skill by a person in lawful possession of them. Alcor acquires lawful possession and the right to carry out the procedures which follow via Arizona’s enactment of the Uniform Anatomical Gift Act [“UAGA”]. Like the model statute,

the Arizona UAGA doesn't explicitly state whether bodies or parts donated under the Act acquire property status. However, it does prohibit the sale or purchase of parts for transplantation or therapy.[4] There are three relevant observations to make from this: (1) the presence of this provision implies that such transactions would be legally possible otherwise, which would require that the part was property capable of being sold; (2) the provision does not apply to parts donated for research and education purposes; and (3) the provision does not apply to whole bodies, as the definition of "parts" expressly excludes this.[5] The relevant federal law similarly applies only to organs for transplantation.[6] Thus, in Arizona it appears that whole bodies or parts donated for research or education purposes may be sold and purchased – implying that the donees have acquired proprietary interests in them.

I cannot see a reason why this would not apply to cryonics patients, though substantially more comprehensive research would be required to draw any real conclusions. It would certainly go too far to say that Alcor "owns" its patients, as any proprietary interest it has in them is limited by the terms of the anatomical gift. These terms lie collectively within the Cryopreservation Agreement, Consent for Cryopreservation, and the Last Will and Testament for Human Remains and Authorization of Anatomical Donation. The extent of Alcor's interest in its patients is expressed as "full and complete custody and control," and elsewhere, "sole and complete control": fairly maximizing language, which is for the good purpose of protecting against third-party interferences. While complete rights of ownership would ordinarily include the right to freely alienate (i.e. give away, or sell) the property, Alcor does reserve the right to transfer patients to other organizations in circumstances where it is facing dissolution, or other circumstances which make continued maintenance of the patient impossible. However, the Cryopreservation Agreement is not immutable – lesser restraints on Alcor's ability to alienate its patients could be possible.

The flip side of this coin, is that if the sale and purchase of bodies or parts donated for research or education purposes is legal, then research specimens of this description have a potentially ascertainable market value. I am not implying a cryonics organization would

ever start selling off its patients – that would obviously be quite monstrous. However, the possibility that cryonics patients could have research value that is collateral to their true purpose, or rather collateral to the underlying motivation behind the patients' decision to "donate" their bodies in this way, could have other consequences. If cryonics patients are proprietary assets of their cryonics organization, then they are assets which could become hostages in lawsuits against it. The actual danger of this would in part depend on the market value assignable to the patients as research specimens, which would depend on their relevance to other research efforts – none of which I am in a good position to estimate. One would hope that the research purpose expressed in the Authorization of Anatomical Donation, being "cryobiological and cryonics research" [emphasis mine], would be construed so as to limit the possible destinations of Alcor's patients to other cryonics organizations, thereby avoiding the hypothetical danger I have identified. However, there may be another way to protect cryonics patients from being a liability to their own survival.

One of the reasons behind establishing the Alcor Patient Care Trust ["APCT"] was to protect assets marked for patient care from litigants coming after apparent "deep pockets." If cryonics patients are a form of property, then it is possible that they themselves could be the subject matter of trusts. As with the APCT, legal title to Alcor's "specimens" could be transferred to an entity other than the cryonics organization itself, to be held on trust for the revived patient, using similar trust law mechanics as used in personal revival trusts (which are beyond the scope of this article), all the while remaining in the custody and care of Alcor. When the patient is revived, if this is achieved through the repair and rejuvenation of the cryopreserved specimen itself, then we face the novel consequence of trust property becoming its own beneficiary (though this would not be the first occasion of a being which was previously classified as property acquiring personhood). If, alternatively, revival is achieved with some kind of uploading technology, then, rather fittingly, the recognized successor in identity will become entitled to what is left of their former substrate.

On the other hand, formally acknowledging any proprietary status of cryonics patients by making them subjects

of trusts, or otherwise handling them in ways that could only be done with property, could have the side effect of confusing outsiders even more than they already tend to be. There is much to be said for approaching what we do, as much as possible, as medicine being performed on patients (even if, on paper, it is research being performed on specimens). That said, there already exists a field of medicine that treats patients that are not persons, but property: veterinary medicine. Whether a veterinarian happens to think their patients should be recognized as something more than property is not something that would be expected to decrease the quality of care they provide; and, conversely, their role as a caregiver for patients that are presently classified as property would not, to me at least, detract from any efforts they might make to lobby for increased recognition of animals as persons.

The one thing we know for sure right now is that our cryonics patients are not recognized as legal persons. As with the example of animal patients, it should be possible to operate within a system that presently recognizes our patients as property, in such a way as maximizes their benefit, while at the same time arguing they are persons and should be recognized as such. ■

Endnotes

[1] (1908) 6 CLR 406.

[2] (1998) 3 All ER 741.

[3] On the one hand, a survey of the legal treatment of cryopreserved embryos would seem superficially relevant to an exploration of the legal status of cryopreserved human remains, but cryopreserved embryos evidenced capacity for future personhood situates them in a different policy debate that I think distracts from an exploration of the legal status of cryonics patients today.

[4] ARS § 36-854.

[5] ARS § 36-841.

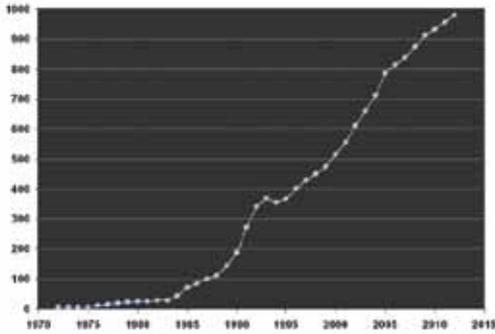
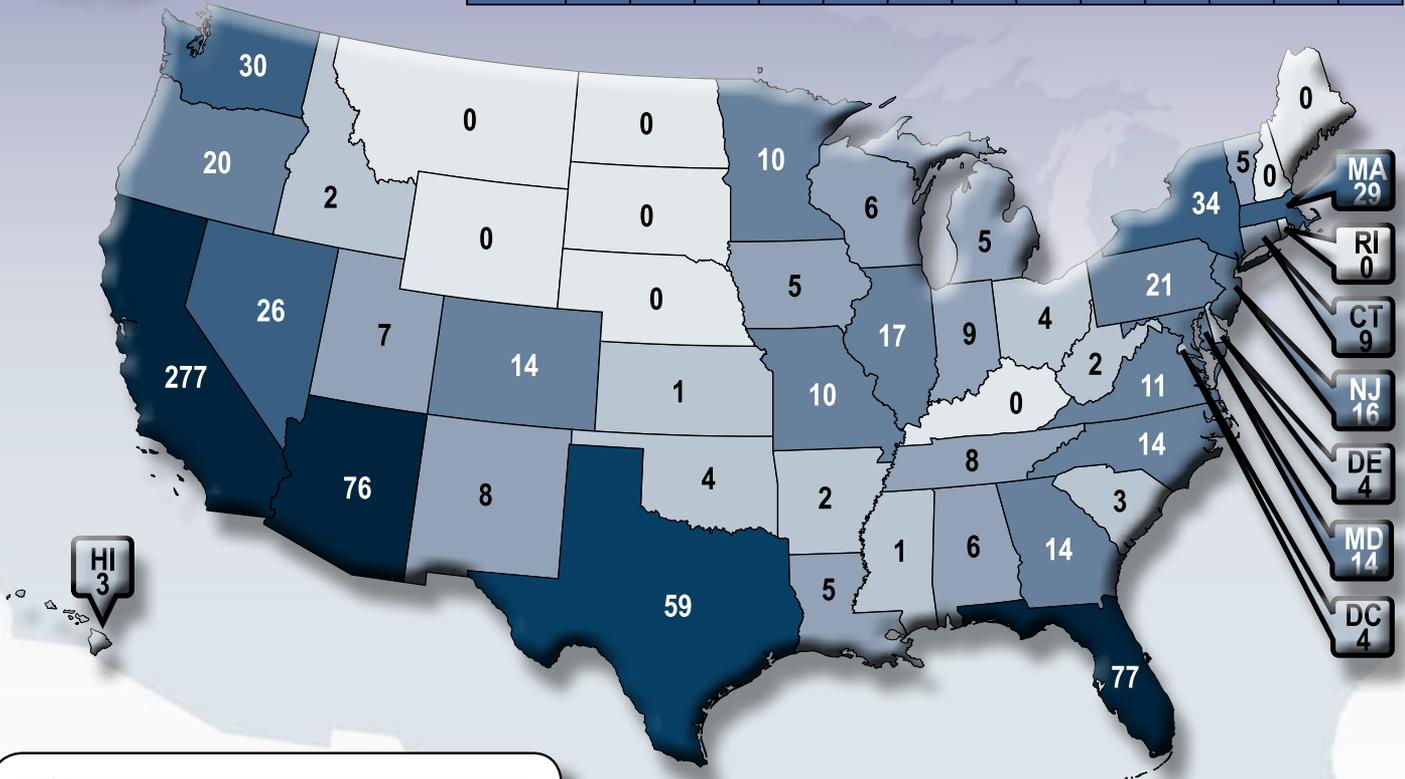
[6] 42 USC § 274e.

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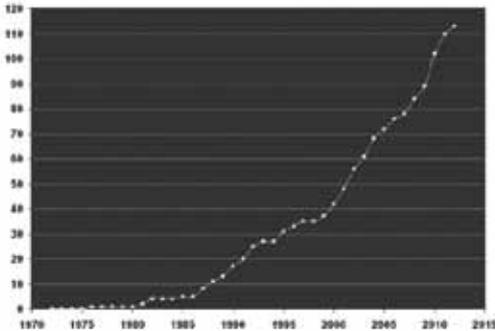
Membership Statistics



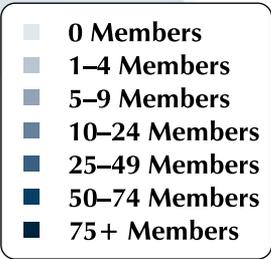
2013	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Members	981												
Patients	114												
Associate	37												
Total	1132												



Number of Alcor members



Number of Alcor patients



International

Country	Members	Patients
Australia	11	2
Canada	42	2
Denmark	2	0
France	1	0
Germany	5	0
Israel	0	1
Italy	2	0
Luxembourg	1	0
Mexico	4	0
Monaco	2	0
Netherlands	2	0
New Zealand	2	0
Portugal	4	0
Spain	2	1
Thailand	3	0
United Arab Emirates	1	0
United Kingdom	24	2
TOTAL	108	8

Dance of Water Molecules Turns Beetles into Antifreeze Artists

Certain plants and animals protect themselves against temperatures below freezing with antifreeze proteins. How the larva of the beetle *Dendroides canadensis* manages to withstand temperatures down to -30 degrees Celsius is reported by an international team of researchers led by Prof. Dr. Martina Havenith from the Department of Physical Chemistry II at the Ruhr-Universität in the journal *PNAS*. Together with American colleagues, the RUB-researchers showed that interactions between the antifreeze proteins and water molecules contribute significantly to protection against the cold. Previously, it was assumed that the effect was only achieved through direct contact of the protein with ice crystals. The team obtained the results through a combination of terahertz spectroscopy and molecular dynamics simulations. The structure of the fire beetle antifreeze proteins resembles a triangular prism. The ice binding surface of the "prism" contains many exposed side chains, where fragments of the amino acid threonine protrude from the surface. These side chains bind ice crystals.

Ruhr-University Bochum / EurekAlert
2 Jan. 2013
http://www.eurekalert.org/pub_releases/2013-01/rb-dow010213.php

Editing the Genome with High Precision

Researchers at MIT, the Broad Institute and Rockefeller University have developed a new technique for precisely altering the genomes of living cells by adding or deleting genes. The researchers say the technology could offer an easy-to-use, less-expensive way to engineer organisms that produce biofuels; to design animal models to study human disease; and to develop

new therapies, among other potential applications. To create their new genome-editing technique, the researchers modified a set of bacterial proteins that normally defend against viral invaders. Using this system, scientists can alter several genome sites simultaneously and can achieve much greater control over where new genes are inserted, says Feng Zhang, leader of the research team. "Anything that requires engineering of an organism to put in new genes or to modify what's in the genome will be able to benefit from this," says Zhang. Zhang and his colleagues, including lead authors Le Cong and Ann Ran, describe the new technique in the Jan. 3 online edition of *Science*.

Anne Trafton / MIT News Office
3 Jan. 2013
<http://web.mit.edu/newsoffice/2013/editing-the-genome-with-high-precision-0103.html>

Gene for High Activity Linked to Longer Life

A variant of a gene associated with active personality traits in humans seems to also be involved with living a longer life, UC Irvine and other researchers have found. This derivative of a dopamine-receptor gene – called the DRD4 7R allele – appears in significantly higher rates in people more than 90 years old and is linked to lifespan increases in mouse studies. Robert Moyzis, professor of biological chemistry at UC Irvine, and Dr. Nora Volkow, a psychiatrist who conducts research at the Brookhaven National Laboratory and also directs the National Institute on Drug Abuse, led a research effort that included data from the UC Irvine-led 90+ Study in Laguna Woods, Calif. Results appear online in *The Journal of Neuroscience*. The variant gene is part of the dopamine system, which facilitates the transmission of signals among neurons and plays a major role in the brain network responsible for attention and reward-driven learning. The DRD4 7R allele

blunts dopamine signaling, which enhances individuals' reactivity to their environment.

UCIrvine News
3 Jan. 2013
<http://news.uci.edu/press-releases/dopamine-receptor-gene-variant-linked-to-human-longevity/>

Harnessing Patients' Own Immune Cells to Fight Disease

The human body contains immune cells programmed to fight cancer and viral infections, but they often have short lifespans and are not numerous enough to overcome attacks by particularly aggressive malignancies or invasions. Now researchers reporting in two separate papers in the January 4th issue of the Cell Press journal *Cell Stem Cell* used stem cell technology to successfully regenerate patients' immune cells, creating large numbers that were long-lived and could recognize their specified targets: HIV-infected cells in one case and cancer cells in the other. The findings could help in the development of strategies to rejuvenate patients' exhausted immune responses. "The system we established provides 'young and active' T cells for adoptive immunotherapy against viral infection or cancers," says senior author of one study Dr. Hiromitsu Nakauchi, of the University of Tokyo. The techniques the groups employed involved using known factors to revert mature immune T cells into induced pluripotent stem cells (iPSCs).

Nishimura et al.; Vizcardo et al. /
EurekAlert
3 Jan. 2013
http://www.eurekalert.org/pub_releases/2013-01/cp-rtc122712.php

New Technique Can Sequence Entire Genome From Single Cell

The notion that police can identify a suspect based on the tiniest drop of blood or trace of tissue has long been a staple of TV dramas, but scientists at Harvard have taken the idea a step further. Using just a single human cell, they can reproduce an individual's entire genome. As described in a Dec. 21, 2012 paper in *Science*, a team of researchers led by Xiaoliang Sunney Xie developed a method—dubbed MALBAC, short for Multiple Annealing and Looping-based Amplification Cycles—that requires just one cell to reproduce an entire DNA molecule. The breakthrough technique offers the potential for early cancer treatment by allowing doctors to obtain a genetic “fingerprint” of a person's cancer from circulating tumor cells. It also could lead to safer prenatal testing for a host of genetic diseases. “If you give us a single human cell, we report to you 93 percent of the genome that contains three billion base pairs, and if there is a single base mutation, we can identify it with 70 percent detectability, with no false positives detected,” Xie said. “This is a major development.”

Peter Ruell / Harvard University
4 Jan. 2013
<http://news.harvard.edu/gazette/story/2013/01/one-cell-is-all-you-need/>

Cheap and Easy Technique to Snip DNA Could Revolutionize Gene Therapy

A simple, precise and inexpensive method for cutting DNA to insert genes into human cells could transform genetic medicine, making routine what now are expensive, complicated and rare procedures for replacing defective genes in order to fix genetic disease or even cure AIDS. Discovered last year by Jennifer Doudna and Martin Jinek of the Howard Hughes Medical Institute and University of California, Berkeley, and Emmanuelle

Charpentier of the Laboratory for Molecular Infection Medicine-Sweden, the technique was labeled a “tour de force” in a 2012 review in the journal *Nature Biotechnology*. That review was based solely on the team's June 28, 2012, *Science* paper, in which the researchers described a new method of precisely targeting and cutting DNA in bacteria. Two new papers published last week in the journal *Science Express* demonstrate that the technique also works in human cells. A paper by Doudna and her team reporting similarly successful results in human cells has been accepted for publication by the new open-access journal *eLife*.

Robert Sanders /
University of California, Berkeley
7 Jan. 2013
<http://newscenter.berkeley.edu/2013/01/07/cheap-and-easy-technique-to-snip-dna-could-revolutionize-gene-therapy/>

Stem Cells Found to Heal Damaged Artery in Lab Study

Scientists at the Texas Biomedical Research Institute have for the first time demonstrated that baboon embryonic stem cells can be programmed to completely restore a severely damaged artery. These early results show promise for eventually developing stem cell therapies to restore human tissues or organs damaged by age or disease. “We first cultured the stem cells in petri dishes under special conditions to make them differentiate into cells that are the precursors of blood vessels, and we saw that we could get them to form tubular and branching structures, similar to blood vessels,” said John L. VandeBerg, Ph.D., Texas Biomed's chief scientific officer. This finding gave VandeBerg and his team the confidence to do complex experiments to find out if these cells could actually heal a damaged artery. The scientists found that cells derived from embryonic stem cells could actually repair experimentally damaged baboon arteries. The results are presented in the January 10, 2013 issue of the *Journal of Cellular and Molecular Medicine*.

Texas Biomedical Research Institute
10 Jan. 2013

<http://txbiomed.org/news-press/detail/news/2013/01/10/stem-cells-found-to-heal-damaged-artery-in-lab-study-raises-hope-for-developing-new-therapies-for-many-diseases>

Molecular Machine Could Hold Key to More Efficient Manufacturing

An industrial revolution on a minute scale is taking place in laboratories at The University of Manchester, UK, with the development of a highly complex machine that mimics how molecules are made in nature. The artificial molecular machine developed by Professor David Leigh FRS and his team in the School of Chemistry is the most advanced molecular machine of its type in the world. Its development has been published in the journal *Science*. Professor Leigh explains: “The development of this machine which uses molecules to make molecules in a synthetic process is similar to the robotic assembly line in car plants. Such machines could ultimately lead to the process of making molecules becoming much more efficient and cost effective. This will benefit all sorts of manufacturing areas as many manmade products begin at a molecular level. For example, we're currently modifying our machine to make drugs such as penicillin.” The machine is just a few nanometers long (a few millionths of a millimeter) and can only be seen using special instruments.

University of Manchester
11 Jan. 2013
<http://www.manchester.ac.uk/aboutus/news/display/?id=9323>

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.

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.facebook.com/cryonics.northwest>

A Yahoo mailing list is also maintained for cryonists 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





Will You Be Alive and Healthy 10...20...30 Years from now?

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- Access to a toll-free phone line to speak with **knowledgeable health advisors**, including naturopathic doctors, nutritionists, and a cancer expert, about your individual health concerns. You can also receive help in developing your own personal life extension program.
- **Discounts on prescription drugs, blood tests, and pharmaceutical quality supplements** that will greatly exceed your membership dues. You'll receive a directory listing

the latest vitamins and supplements, backed by scientific research and available through a unique buyers club.

FREE BONUS!

- ***Disease Prevention and Treatment* book** (\$49.95 cover price)...this hardbound fourth edition provides novel information on complementary therapies for 133 diseases and illnesses—from Alzheimer's disease to cancer, from arthritis to heart disease—that is based on thousands of scientific studies.

Life Extension Foundation funds advanced vitrification and gene-chip research. Your \$75 membership fee helps support scientific projects that could literally save your life.

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