Alcor Life Extension Foundation
A Non-Profit Organization

CRYONICS

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Advance Directives and Medical Power of Attorney for Cryonicists

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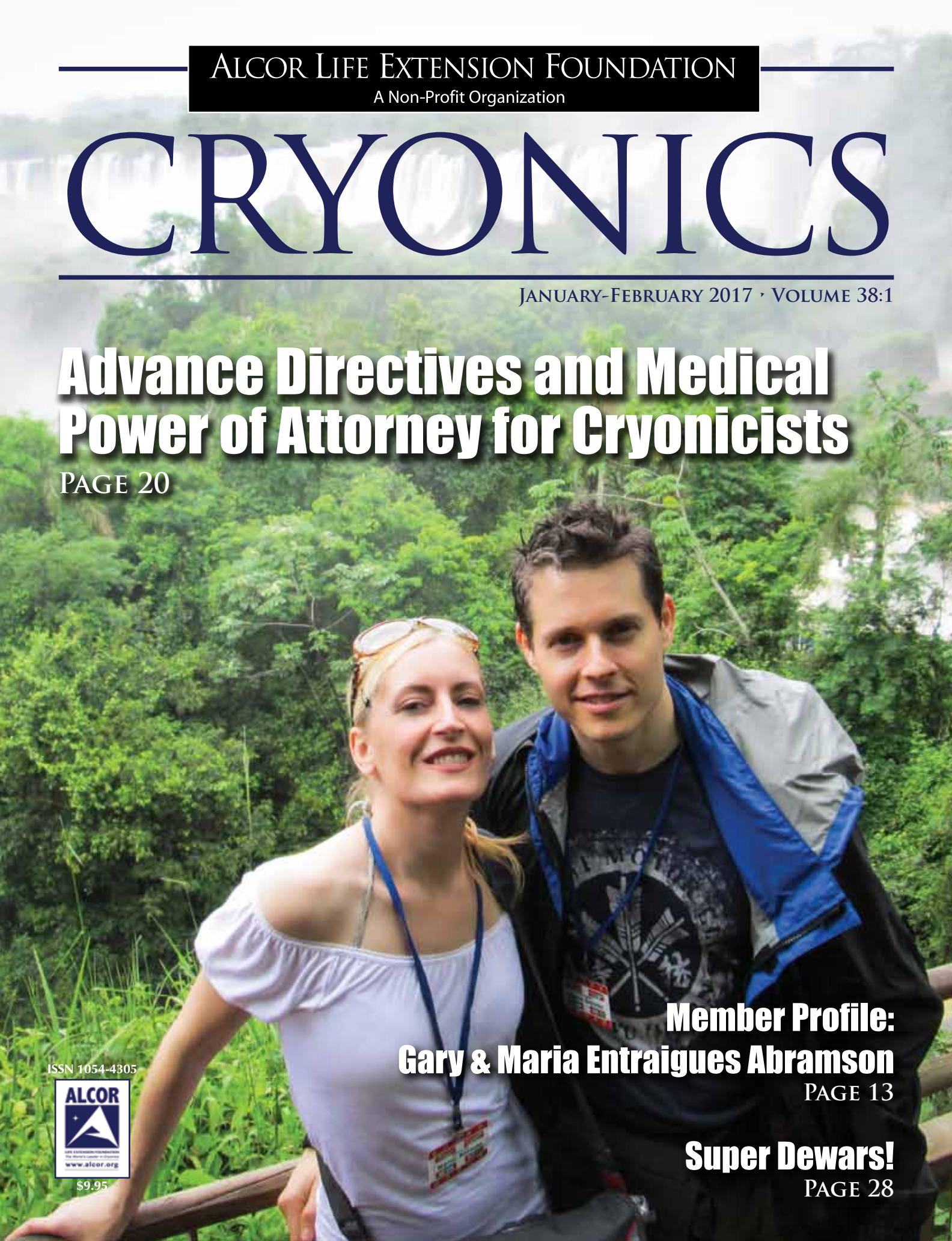

Member Profile: Gary & Maria Entraigues Abramson

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Super Dewars!

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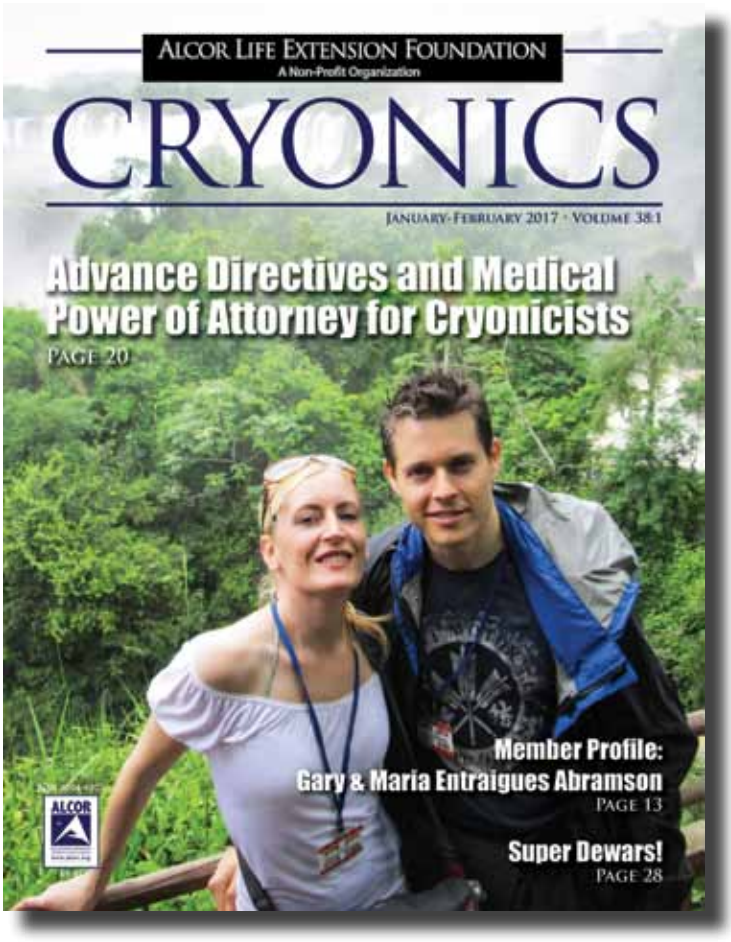
CRYONICS



COVER STORY: PAGE 20

Advance Directives and Medical Power of Attorney for Cryonicists

Some years ago, Rebecca Lively contributed an article about how to protect your cryonics arrangements against hostile third parties and family members. Many Alcor members found this article so useful that Alcor decided to add the article to its member sign-up materials. This time Rebecca offers her first effort to address another need; to provide a template for cryonics members to execute a set of cryonics-friendly Advance Directives. The popular Five Wishes document that is valid in most US States is used as a model.

On the cover: Gary and Maria pose at Iguazu Falls near the border of Argentina and Brazil.

ALCOR LIFE EXTENSION FOUNDATION
A Non-Profit Organization
CRYONICS

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QUOD INCEPIMUS CONFICIEMUS

Photo: Cryo-Care Equipment Corporation at 2340 E. Washington St., Phoenix, AZ. Dr. Bedford's "home" about 1970.

ASSOCIATE MEMBERSHIP By Aschwin de Wolf

As of writing, Alcor has more than 1100 members with cryonics arrangements. The Alcor Facebook page, however, has more than 14,000 likes. While it is easy to "like" something on social media, this number indicates that there are a lot of people who support our mission and research but are not quite ready to make cryonics arrangements for themselves. In 2012, I sent a proposal to the Alcor advisors and Board of Directors to introduce a new kind of membership that allows people who support Alcor's mission to join the organization as Associate Members. Associate Members pay a small annual fee ($60 or $5 a month) and get a paper copy of Alcor's magazine, discounts on conferences and events, access to the Alcor forum, and the paid fees can be used to lower or eliminate the application fee for full membership. Alcor now has 317 Associate Members. This is not bad at all, but membership statistics at other cryonics organizations, such as the Cryonics Institute, indicate that it should be possible to have at least twice the amount of Associate Members as members with full cryonics arrangements.

One attractive feature of Associate Membership is that, unlike full membership, it can be easily gifted to friends and family, too! In fact, what I would like to achieve with this column is to encourage each and every reader (yes, you, too!) to think of someone who supports cryonics and life extension and encourage them to become an Associate Member, or even gift it to them.

You know this friend who is still figuring out her life insurance...Associate Membership!

One attractive feature of Associate Membership is that, unlike full membership, it can be easily gifted to friends and family, too!

What about that person who would like to join Alcor in the future but only when they introduce fracture free storage... Associate Membership!

That colleague who is fascinated with the idea of cryonics needs to think about it a little more...Associate Membership.

And there is this person who has been saying for 5 years now that they will sign up but never gets around to start the process.... Associate Membership.

Not sure about which cryonics organization to join? Join both major US cryonics organizations as a non-funded member and learn more.

What would it be like if Alcor had 5,000 Associate Members instead of 300? For starters, more resources would be available for publication of the magazine, social media presence, bigger conferences, and other outreach events. Local life extension and cryonics groups would see substantial growth in attendance, and new groups can be started to bring people with shared interests together. Support for cryonics research would grow. And when cryonics is under threat by hostile critics or legislators, we can draw from more people to mount an effective response. And perhaps, most importantly, a larger membership will allow Alcor to recruit more (young) talented writers, advocates, and researchers who can work together to bring human suspended animation closer to reality and strengthen the scientific and legal status of human cryopreservation.

So think hard about all these conversations you had over the last couple of years, or the people you'd really, really, like to see reading more about cryonics and Alcor and call Alcor (480) 905-1906 or head over here, and give the gift of life:

http://www.alcor.org/BecomeMember/associate.html ■

CEO Update

By Max More

I am writing this on a flight back from Seoul, South Korea (by way of San Francisco), concluding 10 days of travel in three parts. The first part was a personal trip to see family in England. The second was to Basel, Switzerland where I had been invited to give the keynote speech at the first CryoSuisse conference, which took place on November 12-13, organized by Patrick Burgermeister and colleagues. On the Saturday afternoon, I spoke on "How Cryonics Can Flourish in Europe: A Collaborative Approach."

This started with some reflections on starting cryonics in England back in 1986 (my fellow co-founder, Garret Smyth, was also present), went on to offer some lessons learned over the years, informed the attendees of Alcor's current status, and concluded with advice for emerging European organizations. The latter included a suggestion to collaborate with established organizations such as Alcor for training, standards, and, especially, patient care. It also included preliminary thoughts on trans-national cooperation and organization. This last part anticipated a remarkably well thought-out proposal that followed on Sunday. Everyone who expressed an opinion responded positively to my hour-long talk (including Q&A). I also gained some useful knowledge about the legal, regulatory, and cultural constraints in close to a dozen different countries.

Apart from presentations by Aschwin de Wolf, Ben Best, and British perfusionist David Gifford, speakers represented cryonics groups in Germany, Switzerland, the Netherlands, Finland, Italy, Spain, Belgium, Poland, and Sweden.

The most promising area (outside of England) is Germany. Working with them to build Alcor-specific capabilities there has been complicated by a deep split within the 60+ German cryonicists. However, it is now even clearer to me that we should work with Torsten Nahm and his fellows in their new organization, Cryonics Germany. It seems to me time to position a kit with Torsten and colleague's organization, to help cover our members in continental Europe.

Cryonics Germany has 20 active members, and does training twice a year. The group includes two MDs and one embalmer. Torsten reported that the cryonics team may only operate on the patient once there are "sure signs of death". This usually takes from 30 minutes to two hours after cessation of heart beat. But, in practice, hospitals may allow pre-mortem cooling of a terminal patient. Storage of patients in Germany is possible. Cryonics Germany has a full set of equipment (not including Alcor's field neuro kit or perfusate), including ice bath, LUCAS 1, and 180 liters of cryoprotectant (VM-1). They maintain a hotline, can perform standby and gravity-fed perfusion, and have an extensive manual of procedures.

I will not go into detail about the other national organizations that presented at the event, except to note that the Spanish startup is planning a conference in May 2017, and that Cryonics UK's Tim Gibson gave a training presentation, including an impressive array of equipment and props, and a brand new emergency vehicle.

Ben Best talked about cryonics organizations and efforts in Florida, China, Japan, India, Argentina, Canada, and Australia.

On Sunday November 13, 2016, Torsten gave a second talk, this time presenting a detailed proposal for forming an international cryonics umbrella organization. He explained that international coordination provides key benefits to local organizations: public relations, training, collaboration with third parties, conferences, international services, best practice standards and procedures, and joint projects. His proposed next steps included soliciting feedback from representatives of each country (including the USA), assigning a liaison from each local organization, conducting a survey on requirements and goals, forming an online working group and developing the structure and bylaws, conducting an international workshop to finalize the proposal and bylaws, and ratification of the bylaws by local organizations.

One enthusiastic attendee from Spain proposed me as president but I declined, offering to provide input and advice. This potential development once again raises the question of how best for Alcor to encourage efforts in other countries while maintaining differentiation from other US organizations. Our approach with Cryonics UK has been to offer some general support and training while limiting Alcor-specific supplies and response to Alcor members only.

One thing disappointed me. Cryonics Institute had a flyer at the event,

prominently — and falsely — calling themselves "the world's largest cryonics organization." This is not new. CI continues to do this despite my confronting Stephan Beauregard and Dennis Kowalski. I saw that very soon before my talk. Since I was already talking about the importance of honesty and transparency, I brought this to everyone's attention.

Finally, David Gifford's presentation deserves mentioning. I hope to present some of his findings to the Research group. Mr Gifford, an experienced British perfusionist with whom I first met a couple of years ago, presented research suggesting that immediately cooling before starting perfusion was sub-optimal from a reperfusion injury perspective. I had a chat with him later and asked questions. He acknowledged that the evidence was limited at this point, and he would not urge any precipitous changes to existing protocols, but he believes these results should be taken seriously. He agreed that, in principle, cooling should reduce reperfusion injury by slowing metabolism but argued that other mechanisms outweighed that effect. In particular, it appears that higher temperatures early on in perfusion allow cells to "recharge" in such a way that free radical production is reduced. Something to investigate further.

The third part of my trip involved heading to Seoul, South Korea, to speak at the Global Leadership Forum on Wednesday November 16 on "How Technology Can Improve the Human Condition: Life Extension, Cryonics, and the End of Death." (In the talk, I explained why that last part was a bit of an overstatement. Qualifications don't make for compelling talk titles.) Cryonics seems to be practically unknown in South Korea. This may be South Korea's first exposure to cryonics, apart from one or two media interviews we have done.

At the same time, it has all the signs of being ready for it. Seoul is a city of 25 million people (in the extended Seoul area), and has the fastest average download speed in the world. It is ranked #1 by the OECD for graduates in science and technology and #1 in the Bloomberg Innovation Index. My talk seemed to be well received and I made some promising contacts. Among those, I enjoyed a lunch conversation with Nolan Bushnell, also known as the guy who created Atari, and who hired Bill Gates and Steve Jobs, and who turned down Job's offer of a 33% stake in Apple for $50,000. He said that he had never considered cryonics but that, now, he would have to give it serious thought.

In other news, briefly:

- On September 30, Steve Graber's new SuperD/Superdewar design arrived in fully realized 5,250 lb form. Despite lack of proper warning, fork lifts were quickly secured and unloading occurred without incident.
- Case report progress has picked up the pace, with several new reports having been published since my last update.
- We sent out a letter to members about potential Directors and Advisors, and there was a surprisingly large number of responders. I talked to most of them. We hope to have one or more new directors on board by the end of the year.
- On October 17, we met again with the architect to finalize plans for the PCT expansion and other work.
- After advertising the second MDR job on Glassdoor and being disappointed with the results, it's time to look at more expensive job search services.
- We moved the server to a more secure and well air-conditioned room.
- Older case videos were digitized and then put in the safe.
- In mid-September, we dealt with a last-minute dog cryopreservation (including cryoprotection).
- The connection for our alarm system was upgraded to 4G, allowing for new capabilities.

Group tours included nine people from St. Joseph's Biobank; a large group from the AZ Dept. of Realtors; and an ASU tour.

MEDIA/PUBLIC EDUCATION

On Wednesday September 21, I participated in the Blueprint Team Podcast – "an up and coming health and wellness website" – to explain the history, process, procedures, and myths about cryonics. On

September 26, I did a Skype interview for the Netherland's newspaper, *de Volkskrant*. The journalist was fascinated by the topic and said that he would like to follow up with a longer piece for another publication. Other international interviews included ones for Sweden's *Icon*; for *Melibe*; for Polish independent TV; and a live interview for W Radio Colombia's show, *La hora del regreso*, which is broadcast to South Florida, New York, New Jersey, Connecticut, Los Angeles, and Orlando as well as Spain, Central America, Colombia, and Panama.

On October 4 an interview by Joe Carmichael led to three separate pieces in *Inverse*, including "Even If Human Lifespan Skyrockets, We May Not Need Mars". All three were very positive and supportive. On October 11, I was interviewed by Susan Stratford for Fox News Cleveland. Alcor was mentioned in a November 2 *Bloomberg* piece, "Decapitate and Freeze Now. Figure Out Immortality Later."

During the Seoul event, I did interviews for South Korean educational TV, and Chosun TV (the sponsors of the conference). Toward the end of that event, I heard about multiple media requests from England sparked by news of a 14 year old girl who sued for the right to be cryopreserved when one of her parents opposed it. While I was traveling back to the USA, Linda Chamberlain stepped up and ably handled several interviews on this topic. ■

A Letter from Our CEO

Max More

Dear Alcor Member,

We are requesting your suggestions for suitable individuals for the Alcor Board of Directors, as well as the Patient Care Trust Board and for Advisors to the Alcor Board.

Currently, of the nine director positions on the Alcor Board, only six are filled. We also have open spaces on the Patient Care Trust Board. We have a few potential candidates in mind but realized that there may be individuals among our membership who would be well-suited but not well-known to us. If you think that you might be such a person — or know of another member who you think might be — please contact either me or Marji Klima.

The core role of the Alcor Board is to ensure that Alcor stays focused on its mission:

1. Maintain the current patients in biostasis.
2. Place current and future members into biostasis (when and if needed).
3. Eventually restore to health and reintegrate into society all patients in Alcor's care.
4. Fund research into developing more cost effective and reliable means for 1-3 above.
5. Provide public education as a means of fostering growth to support the goals of all of the above.

Strong candidates for the Alcor Board will typically have been members for some time, have expertise in one or more areas of relevance to Alcor, and have a history of good judgment and ability to work with others for a common goal. Backgrounds in law, business, science and medicine are preferred. Good candidates for the Patient Care Trust Board will preferably also have a strong grasp of financial management and investing. Alcor Directors provide financial oversight, maintain accountability and ethical integrity, participate in organizational planning, and support and assess the chief executive.

The position of Director is not paid. The time requirements vary considerably but should be expected to be substantial, including two hour monthly telephonic meetings, email discussions, and personal and committee project work, although this varies. Relatively little time is needed (along with less frequent meetings) for service on the Patient Care Trust Board.

The current directors on the Alcor Board are Catherine Baldwin, Ravin Jain, Ralph Merkle, Michael Riskin, Michael Seidl, Brian Wowk

The current members of the Patient Care Trust Board are:

Robert A. Schwarz, Chairman (term expires May 2020)

David Brandt-Erichsen, Secretary (term expires May 2018)

Michael Riskin, Ph.D., CPA, Treasurer (term expires May 2019)

Michael F. Korns (term expires May 2021)

The current Advisors to the Alcor Board are listed at the website: http://alcor.org/AboutAlcor/indexdir.html

Advisors are members with deep knowledge of cryonics and/or expertise in relevant fields who are included in email discussions several times per month with the Alcor Board and management. Advisors confidentially receive the same monthly board reports from staff and management that the Alcor Board does. Typically members serve as Advisors before serving on Boards and emeritus Board members remain as Advisors.

If you are interested in pursuing discussion about joining one of the boards, please send a CV and cover letter. For any questions about the positions or if you would like to suggest someone for consideration besides yourself, feel free to contact either me at max@alcor.org or Marji Klima at marji@alcor.org.

Thank you,

Max More

Max More
480.905.1906 Ext. 101

Alcor Annual Board Meeting

ELECTIONS

Here are the results of the elections at the Alcor Annual Meeting on September 10, 2016.

DIRECTORS

After serving as a board member since 2001, Saul Kent did not stand for re-election, but remains an Alcor Advisory Board member. Alcor is grateful for his many years of service and activism, and for his key role in supporting development of technologies and companies vital to modern cryonics. Saul Kent's support and promotion go back to within a few years of Alcor's founding in 1972. Saul was the principal organizer and Director of Alcor's first conference in 1978. In the 1980s he helped fund Alcor's operations and research, and participated in and funded pivotal legal battles. During the 1990s, Saul established companies that developed the core technologies used by Alcor for stabilization, cryopreservation, and storage. After rejoining Alcor's board in 2001, Saul established Suspended Animation, Inc., and continued to provide financial and legal support. Finding and hiring Alcor's CEO Max More was another accomplishment directly attributable to Saul's initiative and support.

All other directors were unanimously re-elected:

Catherine Baldwin
Ravin Jain
Ralph Merkle
Michael Riskin
Michael Seidl
Brian Wowk

OFFICERS

President: Max More was re-relected unanimously.
CFO/Treasurer: Michael Perry was re-relected unanimously.
Secretary: Michael Perry was re-relected unanimously.

MASSIVE DUES REDUCTION FOR MEMBERS OF 40+ YEARS

In recent years, Alcor has introduced discounts in membership dues for long-term members. Effective immediately, a new dues discount has been introduced. **Anyone who has been a member for 40 years or longer will have their dues reduced to $60 per year ($15/quarter).** This is around 11% of the current full rate for a first family member. This proposal, made by the president and passed unanimously by the board, is intended to build on previous discounts for long-term members and to reassure loyal members that their financial burden will fall over time.

CRYOPRESERVATION MINIMUMS UNCHANGED

At the 2016 Annual Meeting, cryopreservation minimums were left unchanged, remaining at the levels set in 2011. These minimums remain:

Neuro: $80,000 (or $100,000 to receive a waiver of the $180/year Comprehensive Member Standby fee).
Whole Body: $200,000 (or $220,000 to receive a waiver of the $180/year CMS fee).

Look for an article to *appear* soon in *Cryonics* magazine on likely trends in cryopreservation minimums in the near future and in the longer term.

Effect of Stabilization Medications on Cryopreservation of the Ischemic Brain

By Aschwin de Wolf & Chana Phaedra

Preliminary summary of research results for *Cryonics* magazine readers.

INTRODUCTION

During the period of 2014-2016 Advanced Neural Biosciences, Inc. (ANB) collaborated with the Alcor Life Extension Foundation to investigate the effects of Alcor's stabilization medications protocol on the cryopreservation of the brain. This work builds on prior work at ANB to characterize the effects of ischemia on perfusion and cryopreservation of the brain.

Experimental validation of Alcor's medications protocol is important because: a) these protocols have not been validated using ice formation after cryopreservation of ischemic animals as an endpoint, b) the current number of medications in Alcor's protocol mandates a sensible cost-benefit analysis, and c) improvements to Alcor's medications protocol might be feasible.

To keep the scope of this project reasonable and practical, ice formation after cryoprotective perfusion and cooling to -130° Celsius was used to evaluate the efficacy of the drugs. The guiding hypothesis was that administration of Alcor's transport medications should make an observable difference in terms of ice formation in normothermic and cold ischemic patients. While the limitations of the rat model, and using ice formation as an end-point should be recognized, these experiments can guide further research in large animal models and contribute to a greater understanding of the efficacy of Alcor's stabilization medications protocol.

BACKGROUND

ANB has conducted experiments into the effects of cerebral ischemia since its inception in 2008 and has reported on its findings in a prior article for this magazine[1]. In short, in our research we established (or further corroborated) that:

- The degree of perfusion impairment and ice formation after cryopreservation is a function of the duration of ischemia.
- Cryoprotective perfusion times increase as the duration of ischemia increases
- Rapid cooling after circulatory arrest reduces perfusion impairment and ice formation after cryopreservation.
- Blood brain barrier breakdown (absence of CPA-induced dehydration) is substantial after 24 hours of cold ischemia and complete after 48 hours of cold ischemia.
- Blood substitution with an organ preservation solution permits ice-free cryopreservation up to at least 48 hours of cold ischemia.
- Composition of the organ preservation solution matters. The "extracellular" organ preservation solution named MHP-2 produces the best results.
- High perfusion pressure negatively affects outcomes in cryoprotection of the ischemic brain and lower perfusion pressures improve outcome.
- High viscosity cryoprotectants and loading protocols with sharp increases in osmolality improve perfusion of the ischemic brain and reduce ice formation.
- Ischemia-induced whole body edema cannot be mitigated by blood substitution, pharmaceutical treatment, or cryoprotectant carrier solution formulation.
- Blood substitution remains advantageous up to 1 hour of normothermic ischemia.

Our emphasis on normothermic ischemia in our collaboration with Alcor was motivated by two considerations. Firstly, unlike our cold ischemia investigations, we had not been successful in identifying a protocol or treatment that was successful in mitigating the effects of normothermic ischemia. Secondly, a normothermic ischemia model was deemed to be a suitable "test case" to investigate Alcor's stabilization medications because the medications protocol itself was validated in a warm ischemia model.

In our initial studies the medications investigated were administered *prior* to circulatory arrest. After a comprehensive examination of the effects of Alcor's stabilization medications we broadened our investigations to consider the effects of administration of stabilization medications *after* circulatory arrest.

METHODS

Stabilization medications were administered via jugular vein catheters. Cryoprotection of the brain was conducted in-situ using Alcor's open circuit, step-based, field cryoprotection protocol. M22 was introduced through transcardial perfusion and the refractive index was monitored through the jugular vein catheters. Perfusion pressures were limited to 100 mmHg (arterial line pressure). The isolated brain was cooled to -130° Celsius, after which it was inspected for ice formation.

In the experiments where stabilization medications were administered *after* normothermic ischemia, medications were administered via jugular vein catheters and were circulated with 3 minutes of chest compressions. In all experiments normothermic ischemia was maintained with a laboratory incubator.

RESULTS

Effects of normothermic ischemia on cryoprotectant equilibration

In our prior cold ischemia research, we established that cryoprotective perfusion times (for a given volume) increase as the duration of ischemia increases. In our current investigations, refractive index samplings showed that larger volumes of cryoprotectant are required to reach the target concentrations in ischemic brains. One important implication of this finding is that cryoprotective perfusion protocols should not be based on perfusing a certain volume of a vitrification solution but perfusion should be continued until a target concentration in the brain has been achieved – a practice that both major cryonics organizations observe. In comparison, in our cold ischemia experiments, successful mitigation of perfusion impairment did not require the perfusion of larger volumes of cryoprotectant.

Effects of anti-thrombotic drugs on cryoprotection of the ischemic brain

In our normothermic ischemia research administration of anti-thrombotic drugs was not necessary to vitrify the brain for up to at least 1 hour of normothermic ischemia, which indicates that complete inhibition of ice formation in the brain may not require administration of anti-thrombotic agents, even after a delay between circulatory arrest and start of stabilization and cryopreservation procedures. As the duration of normothermic ischemia increased, administration of anti-coagulants *was* necessary for ice-free cryopreservation of the brain. One caveat to this finding is that in experiments where no medications were administered, drawing samples from the jugular catheters was more challenging (or not possible).

Effects of citrate on perfusion impairment

Perhaps the most important finding in our stabilization medications research is that administration of citrate improves perfusion after prolonged periods of normothermic ischemia. While citrate historically has been included in cryonics protocols for cases with long expected transport times, it is only in the last few years that research at our lab and other cryonics-associated labs has established the potency of citrate for mitigating ischemia-induced "no-reflow" in the brain. The combination of citrate and heparin allowed ice-free cryopreservation after 120 minutes of normothermic ischemia at normal perfusion pressure and 160 minutes at low perfusion pressure.

Effects of perfusion pressure on cryoprotection of the ischemic brain

In the early literature on the "no-reflow" phenomenon, increasing cerebral perfusion pressure after circulatory arrest was discovered to permit improved recovery. In contrast, in cryoprotective perfusion of the ischemic brain after cold ischemia we found detrimental results for increasing perfusion pressure, and improved results when perfusion pressure was lowered. We observed identical beneficial effects for lowering perfusion pressure in cryoprotection of the ischemic brain. When (arterial) perfusion pressure was lowered from 100 mmHg to 80 mmHg ice-free cryopreservation was possible for up to 160 minutes of normothermic ischemia after administration of citrate and heparin.

Effects of delayed administration of stabilization medications

In the majority of our experiments, stabilization medications were administered prior to normothermic ischemia. When we changed our protocol to study the effects of delayed administration of stabilization medications (including the combination of citrate and heparin) we did not find benefits in terms of faster perfusion times, reduced whole body edema, or prevention of BBB breakdown, after administration of drugs after 30 minutes of normothermic ischemia. After 15 minutes, however, administration of stabilization medications (most notably, Alcor's "abbreviated protocol") reduced perfusion times compared to no administration of stabilization medications.

Effects of cerebral ischemia on the blood brain barrier

One of the most pronounced, and (presumed) adverse effects, of contemporary brain cryopreservation technologies is that vitrification solutions induce substantial dehydration of the brain. This phenomenon is not observed in cryopreservation of the ischemic brain. In our experiments with cold ischemia we observed progressive breakdown of the BBB as the duration of cold ischemia increases. In the rat model, normothermic ischemia produces rapid breakdown of the BBB and no cryoprotectant-induced

dehydration could be observed after 15 minutes of normothermic ischemia. None of the medications or protocols tested was able to mitigate this ischemia-induced compromise of the BBB.

Effects of stabilization medications on whole body edema

One of the most daunting problems in human cryopreservation concerns the effect of ischemia on vessel permeability. As the duration of cold and/or normothermic ischemia increases, so does the degree of whole body (and cerebral) edema during cryoprotective perfusion. In our research we have not found evidence that either the administration of stabilization medications or the composition of organ preservation solutions or cryoprotectants can mitigate this kind of edema. After 15 minutes of normothermic ischemia, weight loss is still routinely observed after completion of cryoprotective perfusion but this phenomenon is seen with *and* without administration of stabilization medications.

DISCUSSION

Choice of animal model and sample size should prompt caution about the results we report but in conjunction with theoretical predictions, and similar findings in the experimental literature and other laboratories, this research can at least guide other researchers and medical practitioners in their decision making.

All our efforts to understand the effects of cerebral ischemia on cryopreservation of the brain strongly corroborate that the so called "no reflow" phenomenon also pertains to cryoprotective perfusion. A number of caveats are in order. To our surprise, ice-free cryopreservation was still possible up to at least 1 hour of normothermic ischemia, regardless of medications administration. This result raises important questions about the role of anti-thrombotic agents in human cryopreservation.

The interesting question of why delivery of larger perfusate volumes (relative to controls) seemingly overcomes the "no-reflow" phenomenon calls for further research. It is conceivable that the hyper-osmolality of modern vitrification solutions recruits edematous fluids back into the circulatory system and that this mitigates perfusion impairment. Another explanation is that BBB breakdown secondary to cerebral ischemia prevents ice-free cryopreservation through dehydration and thus requires more perfusate volume and longer perfusion times to render the brain resistant to ice formation. Preliminary research in our laboratory with protocols that do not dehydrate the brain support the latter interpretation.

Stabilization medications administration was found to shorten perfusion time if administered at 15 minutes of circulatory arrest and was found to be necessary to eliminate ice formation when the period of normothermic ischemia was longer than 1 hour. The efficacy of citrate has been particularly notable. Our research cannot answer whether the effectiveness of citrate reflects its properties as an anti-coagulant specifically, or as a calcium chelator in general. Impaired calcium regulation has been identified as one of the main drivers of the ischemic cascade in the brain.

It was somewhat concerning, and unexpected, that we did not observe any benefits for any other medications in Alcor's extensive stabilization protocol on variables such as ice formation, weight gain, perfusion time, or BBB integrity. The only exception to this observation was administration of Alcor's abbreviated protocol after 15 minutes of ischemia.

ALCOR'S ABBREVIATED MEDICATIONS PROTOCOL

1. Streptokinase
2. Sodium Citrate
3. Heparin
4. Gentamicin
5. Mannitol
6. Maalox

It is interesting to note that this duration of ischemia is approximately the same as the duration of ischemia that allowed for successful cerebral resuscitation in the research that underpins Alcor's stabilization medications protocol. Pre-administration of citrate and heparin permitted ice-free cryopreservation up to 150 minutes of normothermic ischemia but whether there is a sound rationale for administration of these medications (or Alcor's comprehensive protocol) *after* 30 minutes of normothermic ischemia needs further theoretical and experimental study.

Can whole body edema be prevented during cryoprotective perfusion? Modification of the vitrification solution might be advantageous in cases without ischemia but neither our cold ischemia research nor our normothermic ischemia research have been able to find protocols that mitigate ischemia-induced whole body edema. Whether vascular leaking of this nature can be addressed through different pharmaceutical agents or novel perfusion protocols remains to be seen but this challenge remains the most formidable to date.

Independent validation of our findings in different animal models and using larger sample size is recommended. Perhaps the most significant modification of our research model would be to implement direct visualization of (brain) vessels to obtain a more empirical understanding of the nature of "no-reflow," the development of edema, and the mechanism of cryoprotectant equilibration in the ischemic brain. ■

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Member Profile

Gary & Maria Entraigues Abramson

Maria and Gary pose at the Los Angeles International Airport with the world's largest passenger airliner, the A380, behind them.

By Nicole Weinstock

Some of the most recognized love stories have emerged from the minds of writers, musicians, and historians: Romeo and Juliet, Tristan and Isolde, and Odysseus and Penelope, to name a few. Though the arts may inspire the hearts of many, the sciences play muse to no small number of us. From Pierre and Marie Curie, to William Masters and Virginia Johnson, to Meredith Grey and Derek Shepherd, a mutual passion for research, experimentation and discovery have inspired the union of many. Cryonicists Gary and Maria Entraigues Abramson are no exception. In fact, they left everyone else in the dust. Quite literally.

Gary and Maria pose with Aubrey de Grey, who introduced them in 2012.

One of their most memorable dates took place on a mound of earth near the Los Angeles International Airport in 2012. Knowing they were both pilots and longstanding enthusiasts for all things aviation, Gary had invited Maria there to watch airplanes land. "She dressed up like a diva, looking glamorous," recalls Gary. But Maria is no pushover, as is evident by her history of pioneering successes in entertainment and life extension alike. No sooner had they arrived than "she pulled out this pilot radio and said, 'Hold on, I'm gonna dial in the LAX approach.' That's when I knew I loved her," admits Gary, a warm laugh in his voice.

Like many great romances, theirs was born from a steady friendship, seeded at a Los Angeles Future Salon event in early 2012. The SENS Research Foundation's co-founder and anti-aging icon, Aubrey de Grey, was scheduled to speak. "I had to go see him," says Gary. Himself the owner and founder of Moonburn Creative, a full-service agency for all things digital marketing and design, Gary wanted to collaborate with SENS in an effort to advance their work (he succeeded, and still helps them today). "Well, you have to talk to our Global Outreach Coordinator, Maria," said de Grey.

De Grey's introduction was fitting, given that he would later walk Maria down the

The newlyweds pose at their Planes of Fame wedding in Chino, CA.

aisle towards her future as an Abramson. They had known each other for years by that point, through her current role with SENS and her volunteer work with the nonprofit de Grey co-founded—the Methuselah Foundation—prior to that. It was de Grey who, at the 2006 SENS Conference in Cambridge, convinced her to consider an Alcor membership in a truly earnest light. It worked. Just one year later she finalized her decision at the 2007 Alcor Conference. "It was a no-brainer. The option of not being a cryonicist doesn't look so good, no matter how farfetched cryonics could look."

Maria and Gary spoke for the first time that evening, and swiftly developed a close friendship in the months that followed through their mutual interests in aviation, science, and technology. Maria's experience in aerobatics—think acrobatics, but with planes—with no less than legendary pilot Sean Tucker, immediately struck a chord with Gary, a former aerobatics pilot. Her Alcor membership was also attractive to him.

Gary was not a member at the time, though he had known about cryonics for years. He had met several Alcor members through the various Future Salons that he had attended and was keen on joining, but for the cost of membership. It was Maria who introduced him to Rudi Hoffman, a well-known life insurance agent specializing in cryonics needs, who made his membership possible in the end. Gary signed his final papers at Alcor's 40th Anniversary Conference in the fall of that year. "It seemed like an important measure given the intersection of loving life and emerging technological capabilities." Ever since, he makes sure that both he and Maria faithfully wear their Alcor ID bands, should the unforeseen occur.

Their commonalities only grew in number with time. On their first date, Gary invited Maria to join in an evening of *Cosmos*, the 1980s television series developed to bring fundamental science knowledge back to mainstream audiences. Gary reminisces, "During the show, I interjected some comments, and she was shushing me. And I was like, 'Wow, she's really into *Cosmos* and technology and futurism.' It was extraordinary. We just had so much in common."

This *Cosmos* encounter was no trivial anecdote. That series harkens back to fond memories in both of their childhoods. For Gary, *Cosmos* immediately elicits memories of his mother. "I used to watch *Cosmos* on PBS, but it only came on at 10 or 11 at night." Too young to stay up that late, but a staunch series devotee, he would never go to bed with the knowledge of missed episodes. His frazzled mother finally called PBS and begged them to play it earlier.

For Maria, their evening of *Cosmos* reminded her of watching episodes with her father as a kid growing up in Argentina. He was an engineer who, according to Maria, continuously nurtured her curiosity. "We were always trying to design some machine with perpetual motion." She credits her early interest in aging to his influence as well. Even as a young child, aging "didn't seem or look right," explains Maria.

Sadly, Maria's father died from emphysema and diabetes when she was just 19 years old. Nevertheless, she describes his passing as an event that triggered her move from Buenos Aires to the U.S, where she attended the renowned Berklee College of Music in Boston. Maria was far from your typical rising freshman. She arrived with a reel chock-full of household names in the entertainment industry. She had already acted alongside Juan Carlos Altavista on the popular Argentine TV show *Supermingo*, and toured with musician and singer-songwriter, Alejandro Lerner, to name just a couple of her early accomplishments.

Following Berklee, Maria and her then-husband moved to New York to work in music. After a year and a half, she heard that Oliver Stone—acclaimed writer, director and producer behind such films as *Scarface* (1983), *Platoon* (1986) and *Wall Street* (1987)—was looking for an unknown actress-singer to play Eva Perón in *Evita*, the movie. Maria knew it was meant for her.

Though her maiden name "Entraigues," refers to a quaint little town in southwestern France, there was nothing small town about the hot pursuit that followed. With passion in her heart, Maria got on a plane and flew to LA for the first time to audition. But upon arrival at the casting office, she was turned down because she didn't have an agent. Determined, Maria showed up for several consecutive days in the office. One "hello" to the casting director who walked past—Maria had smartly researched her photo and name in advance—and she was auditioned. Even better, they cast her as Evita.

In the end, to her great disappointment,

the movie (that version) did not survive. Yet this small taste of LA convinced her to stay. Her entertainment career took off. Over the years, she worked alongside director Alfonso Arau of *Like Water for Chocolate* (1992), Latin American idol and singer Luis Miguel, and several other notable artists.

Her artistic work has been continuous ever since, even after she began working full-time for the SENS Research Foundation. As Global Outreach Coordinator, she serves as communicator extraordinaire for Strategies for Engineered Negligible Senescence (SENS) across the world. The acronym, SENS, refers to the foundation's work to develop rejuvenation biotechnologies for the many diseases and disabilities associated with aging. To raise awareness of SENS, Maria builds strategic relationships with partners and other stakeholders, coordinates and engages in public (speaking) events, and spearheads fundraising opportunities to support the foundation's burgeoning presence.

Where was Gary during this whirlwind of family, school and career?

Born and raised in Florida, Gary was, in his own words, "curious and a handful." Insatiable when it came to knowledge, he was frequently picking apart typewriters, clocks and other devices, building models, sketching ideas and designs—it's no surprise he ended up in creative services. His father, a medical doctor and keen diagnostician, often took him on hospital rounds at his work, where Gary witnessed death, dying, and disease up close and personal.

The hospital was far from their only source of adventure. Gary's father took his son on walks in the woods and deep into jungles, imparting his interest in wildlife, nature, and most importantly—adventure. It's no surprise that on one of their many flights together, Gary convinced the pilot to let him sit in the cockpit as they landed the plane into Miami International Airport. It was "a life-changing event," says Gary, who was 11 at the time.

When he later attended college at the University of Florida, Gary pursued aerospace engineering. But after receiving feedback from others about the lack of potential design opportunity, he switched majors, graduating with a degree in finance and a Bachelor's letter of equivalency in economics. His professional trajectory took a turn when he attended a semester of college in Italy and was immersed in Renaissance art and architecture. Following college, he was inspired to attend a creative concepting school, and thereafter pursued a career in design, product development, and creative services, eventually founding Moonburn Creative.

In September of 2012, Gary and Maria experienced a turning point that cemented their partnership. Two years later, they wed. Adventurous aviation aficionados that they were, they tied the knot at the Planes of Fame Air Museum in Chino, California. The museum houses more than 150 aircraft, over 50 of which can be flown. Some are the only surviving planes of their kind, given that many met their end in the smelters of the post-World War II surge in consumerism. It was perfect.

The wedding plan was simple to begin with, but happily became a "full blown affair," as Gary puts it. The couple welcomed guests from all over, including many Alcor members and Alcor President and CEO, Max More. Aubrey de Grey walked Maria down the aisle towards her future husband and their officiant Mike Kope, President, Founder, and CEO of the SENS Research Foundation. The bride wore a traditional Spanish dress, complete with a veil (a "mantilla") and high comb (a "peineta"), while carrying a fan. "I'd never had a wedding before and I realized that this was really my first marriage. I wanted the whole thing that I'd never had," Maria confesses.

The evening did not disappoint. Colin Hay from *Men at Work* came up to sing, among others from Maria's circle of musical friends. She too sang, as did Gary, the best surprise of all. The original slow jam that he performed was a showstopper. "It was so good," adds Maria. "I'm the entertainer, but I swear, he shadowed me completely."

The pièce de résistance was the chrome taildragger, complete with streamers attached to its wings, in which they taxied away at the evening's close. An airplane with one wheel in the back and two up front, the taildragger requires more control by its

Maria speaks on behalf of the SENS Research Foundation—one of many such events for her.

pilot than the newer tricycle-gear airplanes. It was a fitting choice for this dauntless, trailblazing couple.

When they arrived at the opposite side of the airport where their nuptial aircraft lived, they took in their first moments alone as husband and wife. "It was total quiet," says Gary. "It was a really surrealistic moment of togetherness and the fact that we had really started this journey together."

Life after marriage for the Abramsons has been what we all hope for, and perhaps quite a bit more. Both Maria and Gary work from home, a setup that might drive other couples to the brink, but that miraculously brings them closer. Avid travellers, they've gone on a number of trips to Mexico, Argentina, Spain, England, and Germany. "We always look for anything that has to do with science or aviation," says Maria. In Germany for example, Gary surprised her with a tour of the Airbus factory in Hamburg. This plant does the final assembly of the A-320, and the A-380, the world's largest passenger airliner.

The Abramsons also continue to attend aviation events together. Other outings might take them to Maria's singing performances, world music shows, the Alcor Conference, and various science and technology events.

Despite all this activity, Maria and Gary are careful to carve out quality R&R à la Netflix. In addition to their bread and butter sci-fi series, *Star Trek: The Next Generation*, *Battlestar Galactica* and (of course) *Cosmos*, they also watch—from first to last episode—*West Wing*, *Breaking Bad*, *Mad Men*, and other popular shows to round off their repertoire.

Amidst their many personal and professional commitments and interests, health and longevity are huge drivers behind the Abramsons' lifestyle choices. They live as if cryonics didn't exist. Both Maria and Gary are committed to a paleo and sugar-free diet, genetic testing and rigorous regular bloodwork. Self-proclaimed biohackers, they also stay up to date on the latest information and technology to optimize their gene expressions, and ultimately, their wellbeing.

When it comes to the prospect of cryonics, they collectively acknowledge different challenges. Maria first mentions questions of consciousness: "Is it going to be me when I wake up?" Gary acknowledges the challenges of a rapid and quality cryopreservation, and the potential effects of social stigma on emergency first responders or other medical professionals outside of the Alcor network.

To that end, Maria hopes to encourage more people to accept cryonics as a common medical intervention. In her words, "I would like to be the example of somebody who loves life, and who is a sane person making a sane decision."

Gary echoes her desire to reveal the rationale behind cryonics and normalize the practice of cryopreservation. "I like opening people's minds to the possibilities of cryonics. It's fun to peel away barriers until they're only left with a simple choice to do it or not."

The Abramsons pose in front of the original 1903 Wright Flyer.

Gary poses with a leopard. Just another typical day for this adventurous animal lover…

Unsurprisingly, the couple agrees that the biggest priority in the next five to ten years of cryonics research should be the cryopreservation process: improving cryoprotectants and creating more opportunities for preservation farther from Scottsdale. The latter is an obvious concern given their shared passion for travel and family. Maria's mother, for example, supports cryonics and would love to sign up, but is challenged to do so from her home in Argentina.

While the future is the proverbial "promised land" for most cryonicists and cryonicists-to-be, it can also be a source of anxiety for others. Perhaps Gary explains it best:

"The future for me is like nothing that could ever be conceived or visualized with modern sci-fi fantasy...A lot of people don't want to take that journey because they fear that it could be so unknown. You have to have a sense of adventure and be willing to lose connection with everything you know and are comfortable with."

A sense of adventure is something that Maria and Gary have in spades. With a smile in her voice, Maria says, "We have a big imagination."

Gary adds, "Whatever's going to happen is going to happen."

"But," Maria interjects, "we still want to see it." ■

Options for Safe, Secure and Legal Asset Preservation for Post-Resuscitation Access

The Eighth Annual *Young Cryonicists* Gathering

Teens & Twenties 8 2017: Getting to Know You - You Getting to Know Each Other

Fri-Sun; May 26-28, '17 Deerfield Beach FL Host: *Life Extension Foundation* SCHOLARSHIPS AVAILABLE

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Greetings to *ALL Young Cryonicists*,

You are receiving this invitation because you are among the future leaders in cryonics.

All attention will be focused on:
our getting to know you and
you getting to know each other.
PLUS: an update on the latest emergency response technologies and revival strategies.

Who is Eligible?

Fully signed up young cryonicists from all cryonics organizations in their late teens through age thirty *(18-30) as of May 28, 2017* - may apply to attend.

Younger Cryonicists With Parent(s):

Thirteen through seventeen year olds may attend when accompanied by their parent(s) or guardian(s).

Parents/guardians of attendees aged 18-19 are also encouraged to accompany their child. All attending parents will be put in touch with each other should they choose to have their own "get together" during the "young cryonicists" gathering.

Program

Some individuals are social butterflies. This is not so for everyone. And we want *everyone to meet everyone.* Therefore, I have designed a diverse range of "getting to know you" activities. *IF* you would enjoy participating in these various getting acquainted activities, *THEN* this is for you.

Enjoy this exciting & fulfilling weekend.

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Life Extension Foundation, through a generous education grant, is offering *40 scholarships* that pay for ALL of the following:

- U.S. airfare to/from Fort Lauderdale, FL (up to $1000 for origin outside the U.S.)
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- Meals and beverages on Friday night, all day Saturday, & Sunday breakfast & lunch
- Registration fee - $350 - also covered

Please click on this website for a full packet with all details and application forms.

http://www.alcor.org/T2_8_2017_details.pdf

Forever,

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PS Come Early. Stay Late.

Some attendees to T2 enjoy spending *extra time in Florida* - especially since their flight is already paid for via their scholarship.

This is at their own expense for additional lodging and food.

I look forward to getting to know you.

Bring in a NEW member and save a year of dues!

Membership growth has been slowly accelerating since bottoming out in 2013. But we would benefit from faster growth. Alcor is now at a point where we could enjoy considerable economies of scale: We could manage many more members with minimal or no increase in staffing costs. That would enable us to *reduce membership dues* while building up our resources. A modest acceleration in membership growth would move us into a virtuous circle where growth enables reductions in dues which further spurs membership growth. Growth will also make it easier to hire highly skilled people in medical and technical areas.

The most effective way to bring in new members has been through direct encouragement by existing members. Many of us realize this, but may not make it a priority to nudge our friends a little more to sign up and potentially save their lives. How can we spur more members to gently persuade those they care about to move ahead with making cryonics arrangements? Perhaps some financial incentive will help.

Anyone who is primarily responsible for getting a new member to sign up will, at their request, be given a one-year waiver of membership dues.

For an existing member to receive the dues waiver, they must (a) be credited by the person who has signed up; (b) ask for the waiver; (c) not be otherwise profiting from the signup; (d) wait until the new member has completed all essential cryopreservation paperwork and has paid at least six months of dues; and (e) the new member must not be a member of their family. If the member signs up two new members, they are eligible for a two-year waiver of dues. If the new member is a student, the existing member is eligible for a waiver of six months of dues.

Who do you know who could do with some encouragement to sign up? Please, give it some thought, then help yourself and help the organization by helping to stimulate membership growth. Bring in one new member per year, and you will never pay dues again!

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Advance Directives and Medical Powers of Attorney

LEGAL STEPS TOWARD ENSURING YOUR WISHES ARE HONORED

By Rebecca K. Lively

This paper is made available for educational purposes only. The intent of this paper is to provide general information on the law. Laws vary from state to state and this paper cannot be considered as specific legal advice in any state. This paper should not be used as a substitute for the advice of a competent attorney licensed in your state.

In 2010, I wrote an article about basic steps that cryonicists can take to protect their cryonics arrangements from third parties.[1] Included were steps like signing up for cryonics and telling people about your arrangements. Additionally, I recommended executing legal documents appointing a medical guardian and making your cryonics wishes part of a living will. For background on the basics of these legal documents and general recommendations on how to protect yourself, I recommend you consult my earlier article. This article addresses the practical aspects of two of those recommendations—creating a living will (usually referred to as an advance directive) and appointing a medical guardian (a health care power of attorney). These two things can often be combined in a single document.

While executing the appropriate legal documents is easy in theory, many have expressed frustration finding an attorney who will assist them with such documents, determining the appropriate language to include, or meeting state-specific requirements. Moreover, despite the myth that all cryonicists are wealthy, many cryonicists don't feel they have sufficient assets to warrant hiring an attorney or simply don't have the funds to afford attorney fees. And, while some states, hospitals, and local bar associations make generic forms available, none of those forms contain the type of language most cryonicists would like to include in their legal documents. The following document is a first step toward filling that gap.

I. WHAT IS THE STATUS QUO?

Often I hear that people do not want to spend the time or money to deal with advance directives and health care powers of attorney, especially when they're "too young to need them." For non-cryonicists, it may be perfectly reasonable to wait until later in life to take care of these requirements, especially because the law generally provides that the people closest to you, like your spouse, parents, or adult children will make legal decisions for you if you cannot make them for yourself. And, without an advance directive, doctors will usually take all medically reasonable measures to preserve life, even at great risk of brain damage. However, for cryonicists this legal status quo is almost never acceptable.

First, unless your family members are all cryonicists, having the law decide who will make medical decisions for you is a risky move, even if your family means well. Worse, if you have family members who are not supportive of your cryonics arrangements, they may end up as the very people who are making decisions for you when you are at your most vulnerable. And, even assuming that your cryonics provider is contacted, without any guidance from you, doctors cannot be expected to take advice or recommendations from your stand-by team. Thus, for those who have already executed the legal documents necessary to sign up with a cryonics provider, it makes sense to execute the additional documents necessary to appoint medical guardians who understand and support your wishes and to document those wishes in a format that physicians are already familiar with.

II. WHAT IS THIS FORM?

Unfortunately, the legal requirements to execute an advance directive or medical power of attorney vary greatly among the states. Some states require all forms to contain mandatory disclosures or notices, some require very specific formats, and others place limits on who can serve as witnesses to your signature and execution of the documents. Creating one form that meets the requirements of every state is impossible.

The difficulties of finding the appropriate form, selecting the ideal language, and understanding state requirements are not unique to cryonicists. Accordingly, national bar associations and non-profits focused on elder care have made great strides to develop legal templates that meet the requirements of as many different states as possible. One

notable effort, developed by non-profit Aging with Dignity, is called "Five Wishes" and claims to meet the requirements of 42 states.[2] Five Wishes was developed with the assistance of the American Bar Association. An earlier version was analyzed in-depth by attorney Charles P. Sabatino who also conducted an exhaustive analysis of the requirements of all fifty states.[3] However, while these forms meet the legal requirements of many states, they do not contain tools to assist cryonicists in communicating their wishes about end of life care. Accordingly, this article contains an attempt to create a near-universal health care directive for cryonicists.

This form attempts to meet the requirements of as many states as possible and to address some common concerns of cryonicists. As written, this template intends to meet the legal requirements of 41 states. To do that, some clauses and sections are more restrictive than might be required by your state. For example, the form requires certification by a physician and "another health care professional" before it becomes effective because many states require such certification. This language is more restrictive than what is required by many states. If your state does not require such certification (such as in Arizona), explicitly stating in your document that you do not require any formal certification of incompetency may save precious time in an emergency situation. Additionally, state laws change frequently and there are currently no plans to update this form as state laws change. In addition to the form attached, an editable version is available at www.alcor.org/cryonics-medical-power-of-attorney.doc.

III. HOW TO USE THIS FORM

a. Use this form after consulting your state specific statute

No one should use the attached template without consulting with their state-specific statute. The Charles P. Sabatino article referenced above contains legal citations for each state as of 2005 which may be a good starting point for locating your state's current statute. After consulting the laws in your state, you may wish to change or modify the document to better comply with your state's requirements. Additionally, if you live in a state that is currently not covered by this document as written, you may find that by appending your state's mandatory disclaimers, the format otherwise complies with your state requirements.

b. Use this form as a guide to discussions with your attorney

Nothing can substitute for state-specific legal advice from a good attorney who understands your wishes and desires. And, while efforts have been made to draft this form so that it meets the legal requirements of as many states as possible (currently 41), at this time no attorney licensed to practice in any of the 41 states covered has reviewed the template. Many cryonicists lament that it is difficult to find an attorney who understands their wishes.[4] Hopefully by providing your attorney with a starting point like the attached template, you will be better able to explain your unique objectives. Additionally, if you do not live in one of the covered states, you may benefit from the assistance of an attorney in crafting legal documents which meet the same intent but comply with the laws of your home state.

c. Use this form in an emergency or as a stop-gap measure

This form may also be useful in an emergency situation or as a stop-gap measure while selecting an attorney to assist you in creating a more comprehensive document. If the status quo situation for health care guardians and medical decisions does not satisfy you, this form is one way to communicate your wishes to your doctors or loved ones, even if it is not legally enforceable. Thus, you may decide to use this form if a sudden need for a health care power of attorney or advance directive arises and you are unable to hire an attorney or perform a thorough review of your state law or if you have specific family members who you are concerned may try to interfere with your cryonics arrangements.

d. Use this form to capture your unique wishes

Cryonicists tend to update their beliefs about end of life care as science and technology advance. Thus, this form is intended to be customizable to your unique preferences. For example, you could include specific language addressing care and treatment if you are diagnosed with Alzheimer's or specifics on cooling procedures that you have determined will lead to a better cryopreservation. Whether you use the form after consulting your state law or with the assistance of an attorney, ultimately you should ensure that it clearly expresses your specific wishes and desires when you are unable to express them yourself.

IV. CONCLUSION

Hopefully the attached form will help you to better document your wishes so they will be followed when you are unable to speak for yourself. Please send any suggestions or recommendations regarding future versions of the form to negative196C@gmail.com.

Additionally, I am working on a list of cryonics friendly attorneys by jurisdiction. If you've found an attorney in your state who understood your wishes, please send me their contact information. ■

REFERENCES

1. Rebecca K. Lively, How to Protect Your Cryonics Arrangements from Third Parties (2010) (available at http://www.alcor.org/BecomeMember/toprotectarrangements.html) or tinyurl.com/cryomed1
2. Sample Five Wishes Form (2011) (available at https://agingwithdignity.org/docs/default-source/default-document-library/product-samples/fwsample.pdf) or tinyurl.com/cryomed2
3. Charles P. Sabatino, National Advance Directives: One Attempt to Scale the Barriers, NAELAJ (2005) (available at (http://www.americanbar.org/content/dam/aba/administrative/law_aging/2012_aging_arth5025_ntnadvncdrctvs_tb.authcheckdam.pdf) tinyurl.com/cryomed3
4. NOTE: I am currently working on compiling a list of cryonics-friendly attorneys by jurisdiction. If you are an attorney with cryonics arrangements and are willing to help in an emergency, please contact me. Additionally, if you have worked with an attorney to produce legal documents such as wills and powers of attorney that respect your cryonics arrangements, please provide me with your recommendations at negative196C@gmail.com

ADVANCE DIRECTIVE AND MEDICAL POWER OF ATTORNEY INSTRUCTIONS

Disclaimer: This document is meant to help you express your wishes in a form that substantially complies with your state's requirements for an advance directive and medical power of attorney. This is not intended as legal advice and cannot answer every question you may have. This form is not regularly updated to incorporate changes in state law. Nothing can substitute for advice from your attorney and your doctor. If you have a specific question or concern, consult your doctor or attorney.

If you are 18 years or older, this form substantially complies with the requirements for the District of Columbia and the following states:

Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, North Dakota, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, Washington, West Virginia & Wyoming

If you are currently a resident of an institution in California, Connecticut, Delaware, Georgia, New York, North Dakota, South Carolina, or Vermont, special rules apply. Contact a social worker or patient advocate at your institution for more information.

INSTRUCTIONS FOR COMPLETING THIS DOCUMENT

This document is an important legal document which you can use to communicate your wishes about medical treatment at some time in the future when you are unable to make your wishes known because of illness or injury. This document also names individuals who you want to make medical decisions for you if you are unable to make them for yourself. These wishes are usually based on personal values. This particular form is designed for people who have elected to be preserved through cryonics after legal death.

You are encouraged to discuss your values and wishes with your family or chosen spokesperson, as well as your physician. Various options are listed below. Initial the options which pertain to you and the treatment choices that best reflect your personal preferences. Provide a copy of your directive to your physician, usual hospital, and those who you appoint to make medical decisions for you if you cannot care for yourself. Consider a periodic review of this document. By periodic review, you can best assure that the directive reflects your preferences.

ADVANCE DIRECTIVE AND MEDICAL POWER OF ATTORNEY

Definitions:

"Artificial nutrition and hydration" means the provision of nutrients or fluids by a tube inserted in a vein, under the skin in the subcutaneous tissues, or in the stomach (gastrointestinal tract).

"Irreversible condition" means a condition, injury, or illness:

(1) that may be treated, but is never cured or eliminated;

(2) that leaves a person unable to care for or make decisions for the person's own self; and

(3) that, without life-sustaining treatment provided in accordance with the prevailing standard of medical care, is fatal.

Explanation: Many serious illnesses such as cancer, failure of major organs (kidney, heart, liver, or lung), and serious brain disease such as Alzheimer's dementia may be considered irreversible early on. There is no cure, but the patient may be kept alive for prolonged periods of time if the patient receives life-sustaining treatments. Late in the course of the same illness, the disease may be considered terminal when, even with treatment, the patient is expected to die. You may wish to consider which burdens of treatment you would be willing to accept in an effort to achieve a particular outcome. This is a very personal decision that you may wish to discuss with your physician, family, or other important persons in your life.

"Life-sustaining treatment" means treatment that, based on reasonable medical judgment, sustains the life of a patient and without which the patient will die. The term includes both life-sustaining medications and artificial life support such as mechanical breathing machines, kidney dialysis treatment, and artificial hydration and nutrition. The term does not include the administration of pain management medication, the performance of a medical procedure necessary to provide comfort care, or any other medical care provided to alleviate a patient's pain.

"Terminal condition" means an incurable condition caused by injury, disease, or illness that according to reasonable medical judgment will produce death within six months, even with available life-sustaining treatment provided in accordance with the prevailing standard of medical care.

Explanation: Many serious illnesses may be considered irreversible early in the course of the illness, but they may not be considered terminal until the disease is fairly advanced. In thinking about terminal illness and its treatment, you again may wish to consider the relative benefits and burdens of treatment and discuss your wishes with your physician, family, or other important persons in your life.

MY INFORMATION

Name: _____

Address: _____

_____

Phone Number: _____

DIRECTIVE

I, _____, recognize that the best health care is based upon a partnership of trust and communication with my physician. My physician and I will make health care decisions together as long as I am of sound mind and able to make my wishes known. If there comes a time that I am unable to make medical decisions about myself because of illness or injury, I direct that the following treatment preferences be honored:

I have entered into an agreement dated _____ with *(initial your selection)*

_____ Alcor Life Extension Foundation, Inc., (800) 367-2228, 7895 East Acoma Drive, Suite 110, Scottsdale, AZ 85260

_____ Cryonics Institute, (586) 791-5961, 24355 Sorrentino Court, Clinton, Township, MI 48035

_____ _____
Insert name, telephone number, and address of your provider if not listed above

The entity selected above will hereafter be referred to as "Cryonics Provider." If at the time of my incapacitation, I have changed to a different Cryonics Provider than listed above, I direct that this agreement be interpreted to reference my new Cryonics Provider rather than the one indicated above.

I have a strong personal belief in cryopreservation. My agreement with my Cryonics Provider is related to the disposition of my remains after death. Immediately after my legal death, it is my desire that my human remains be donated to my Cryonics Provider without embalming or autopsy. While I strongly object to autopsy, if it is determined that an autopsy is legally necessary, it is my desire that the autopsy be conducted at a low temperature and in as non-invasive a way as possible without damaging or dissecting my brain. Nothing in this document should be construed as contrary to my arrangements with my Cryonics Provider.

IF I HAVE A TERMINAL CONDITION

If in the judgment of both my physician and another health care professional I am suffering with a terminal condition from which I am expected to die within six months, even with available life-sustaining treatment provided in accordance with prevailing standards of medical care, I direct the following *(choose any or all of the following by placing your initials beside your selection):*

_____ I direct that all health care decisions be guided by the objective of preserving my brain throughout the terminal and dying phase and ensuring cryopreservation can begin as soon as possible after my legal death.

_____ I direct that measures to prolong my life should only be initiated or accepted if they result in less damage to my brain.

_____ I direct that my Cryonics Provider be called as soon as possible at _____ so that, if possible, a stand-by team can be present prior to my legal death.

_____ I direct that my Cryonics Provider or the entity aiding in my cryopreservation be consulted to assist in making decisions about my care that will optimize my future cryopreservation.

(continued)

Additionally, I direct the following *(provide your wishes in the space below or cross out these lines)*:

_____

_____

IF I AM IRREVERSIBLY MENTALLY DISABLED

If in the judgment of both my physician and another health care professional I am suffering with an irreversible condition so that I cannot care for myself or make decisions for myself and am expected to die without life-sustaining treatment provided in accordance with prevailing standards of care, I direct the following *(choose ONLY ONE of the following by placing your initials beside your selection):*

_____ So long as my brain is not deteriorating, I direct that life-sustaining treatment be continued until my Cryonics Provider is available to provide a stand-by team to be at my bedside as life-sustaining treatment is discontinued.

_____ So long as my brain is not deteriorating, I direct that I be kept alive in this irreversible condition using available life-sustaining treatment to include artificial nutrition and hydration.

(choose any or all of the following by placing your initials beside your selection)

_____ I direct that all health care decisions be guided by the objective of preserving my brain and ensuring cryopreservation can begin as soon as possible after my legal death.

_____ I direct that measures to prolong my life should only be initiated or accepted if they result in less damage to my brain.

_____ I direct that my Cryonics Provider be called as soon as possible at _____ so that, if possible, a stand-by team can be present prior to my legal death.

_____ I direct that my Cryonics Provider or the entity aiding in my cryopreservation be consulted to assist in making decisions about my care that will optimize my future cryopreservation.

Additionally, I direct the following *(provide your wishes in the space below or cross out these lines)*:

_____

_____

_____

OTHER SITUATIONS WHERE I AM NEAR DEATH

If neither of the two above sections apply but I am or may be near death, my primary goal is to be returned to a healthy life or to a conscious state so I can make my own health care decisions. If that is not possible or likely, I direct the following *(choose any or all of the following by placing your initials beside your selection)*:

_____ I direct that all health care decisions be guided by the objective of preserving my brain and ensuring cryopreservation can begin as soon as possible after my legal death.

_____ I direct that measures to prolong my life should only be initiated or accepted if they result in less damage to my brain.

_____ I direct that my Cryonics Provider be called as soon as possible at _____ so that, if possible, a stand-by team can be present prior to my legal death.

_____ I direct that my Cryonics Provider or the entity aiding in my cryopreservation be consulted to assist in making decisions about my care that will optimize my future cryopreservation.

Additionally, I direct the following *(provide your wishes in the space below or cross out these lines)*:

_____

_____

_____

MEDICAL POWER OF ATTORNEY

When selecting your agent, please select someone who is at least 18 years old (21 years in Colorado) and who is NOT your health care provider (including an owner or operator of a health or residential community serving you), an employee or spouse of an employee of your health care provider, OR a person who is already serving as an agent or proxy for ten or more people (unless they are also your spouse or close relative).

If I am no longer able to make my own health care decisions, I name the below individuals to make these decisions for me consistent with my directives above. This person will be my health care agent (or other term that may be used in my state, such as proxy, representative, or surrogate). This designation takes effect if I become unable to make my own health care decisions and this fact is certified in writing by my physician and another health care professional. If my state has a different way of finding that I am not able to make health care choices, then my state's way should be followed.

I appoint the following to be my health care agent:

Name: _____

Address: _____

_____

Phone Number: _____

If the person designated as my agent is unable or unwilling to make health care decisions for me, or if the person designated above is divorced or legally separated from me after the date of this agreement, I designate the following persons to serve as my agent to make health care decisions for me as authorized by this document, who serve in the following order unless divorced or legally separated from me after the date of this agreement:

SECOND CHOICE:

Name: _____

Address: _____

_____

Phone Number: _____

(continued)

THIRD CHOICE:

Name: _____

Address: _____

_____

Phone Number: _____

LIMITATIONS ON THE DECISION-MAKING AUTHORITY OF MY AGENT ARE AS FOLLOWS:

In addition to the limits discussed in my directive, I request my agent contact my Cryonics Provider as soon as possible at any time they believe that I have a significant chance of death or brain damage. After contacting my cryonics provider, I request that all medical decisions be made with the primary goal that I be returned to a healthy life. However, if that is not possible, I request that my agent consult with my Cryonics Provider to make health care decisions consistent with my wish to be cryopreserved as soon as possible following my legal death.

The following listed individuals have made it known to me that they are unwilling or unable to follow my wishes with regard to cryopreservation. Accordingly, I direct that the following individuals be excluded from serving as my health care agent under any circumstance (list names only below – you should only list people who might have a legal reason to assert themselves as your health care proxy. Generally, there is no need to list non-family members):

_____

_____

_____

This document should be executed before two witnesses *(and in some cases a notary)*

I, _____, direct that my doctors, my health care agents, and all others, follow my wishes as communicated in this Advance Directive and Medical Power of Attorney. This document becomes valid when I am unable to make decisions or speak for myself. If any part of this document cannot be legally followed, I ask that all other parts of this document be followed. I also revoke any health care advance directives or medical powers of attorney I have made before.

Signature:_____

Print Name:_____ Date:_____

Address: _____

Phone: _____

WITNESSES *(you should choose witnesses who can attest to the following statement)*

We, the witnesses, declare that the person who signed or acknowledged this form (hereafter "person") is personally known to me, that they acknowledged this document in my presence, and that they appear to be of sound mind and under no duress, fraud, or undue influence. Additionally, I am over 18 years of age and am not any of the following: the individual appointed as health care agent or alternate in this document, the person's health care provider, including owner or operator of a health, long-term care, or other residential or community care facility serving the person, an employee of the person's health care provider, financially responsible for the person's health care, an employee of a life or health insurance provider for the person, related to the person by blood, marriage, or adoption, to the best of my knowledge, a creditor of the person or entitled to any part of their estate under a will or codicil, or by operation of law.

We declare that the person who signed or acknowledged this form is personally known to me, that he or she signed or acknowledged this document in my presence, and that he or she appears to be of sound mind and under no duress, fraud, or undue influence.

(Not all of the above restrictions apply in every state. However, unless you know your states rules, please follow all of the above.)

SIGNATURE OF FIRST WITNESS.

Signature:_____

Print Name:_____ Date:_____

Address: _____

SIGNATURE OF SECOND WITNESS.

Signature:_____

Print Name:_____ Date:_____

Address: _____

NOTARIZATION *(Required in Missouri, North Carolina, South Carolina, and West Virginia)*

For Missouri, only your signature need be notarized, in other states, you should have your signature and the signatures of your witnesses notarized.

STATE OF _____

COUNTY OF_____

On this_____day of _____, 20_____, the said _____, _____, and _____, known to me (or satisfactorily proven) to be the person named in the foregoing instrument and witnesses, respectively, personally appeared before me, a Notary Public, within and for the State and County aforesaid, and acknowledged that they freely and voluntarily executed the same for the purposes stated therein.

My Commission Expires: _____

Notary Public

Super Dewars!

The first Alcor SuperD was delivered to Alcor in Scottsdale, AZ via semi-trailer on September 30, 2016.

By Steve Graber, Technical & Readiness Coordnator

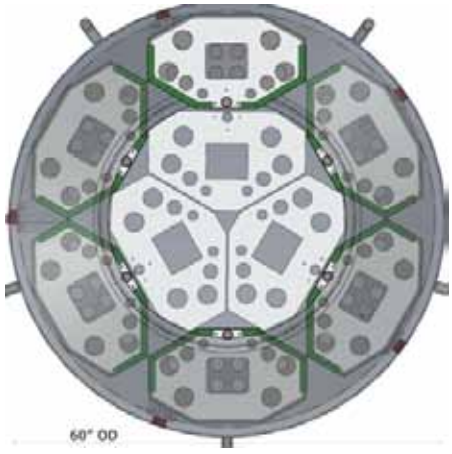
Earlier this year I completed the design for a large volume Dewar capable of holding at least double the patient load of a BigFoot Dewar in a similar floor footprint. The SuperDewar has a 60" outer diameter with a 34" inner diameter neck and stands 12' tall. In late August, 2016 construction of the first SuperD was completed. On September 7, 2016 the initial boil off performance test was completed and has been reported to us by the manufacturer as 11.7 liters per day. This is approximately 3.3 liters per day better performance or ~22% better than all previously calculated estimates.

When the Dewar first came off the trailer it was positioned horizontally in a large shipping cradle, and in that position it did not appear to be very large. However, once we righted the Dewar and rolled it into the Patient Care Bay we could see how large the Super Dewar really is. In this photo, part-time employee Jacob Graber who is 6'6" tall looks short in comparison.

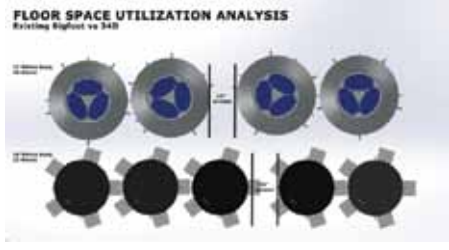
If this new Dewar design is used in conjunction with a standard Alcor aluminum-shell whole body pod design it will significantly improve patient storage capacity per building square foot. An Alcor Bigfoot Dewar holds 4 whole body patients and up to 5 neuro patients.

Keen eyes will note that this new storage design does away with a dedicated 'Central Column' as used in the Bigfoot design. However, each pod is capable of supporting 10 N with a shelf insert. This means more flexibility since therefore we can store up to nine WB or 90 N per SuperD in pods.

Although it boils off approximately the same amount of LN2 as a BigFoot, because it holds double the patient load this means we are consuming half the amount of LN2 per patient as the BigFoot design.



Here is a graphic demonstrating floor space utilization vs the existing BigFoot Dewar design in a typical row.



POD HANDLING – INSERTION AND REMOVAL DEVICE

Due to the small neck and taller design of the Super Dewar a new pod handler design was required. I came up with the following design (see photos).

We recently ran a series of LN2 immersion tests on an existing BigFoot patient pod that was modified to include the new receiver tube and found the new

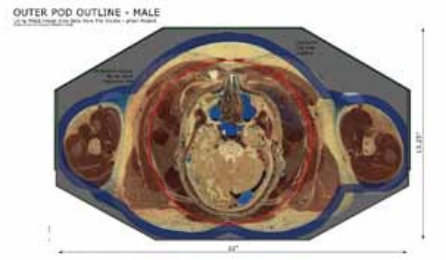
system to be much easier to use than our existing T-bar and slotted ear design. The eccentric locking cam design not only improves ease of insertion and removal of the tool into a pod it also creates the possibility for major space saving changes to the pod design as well.

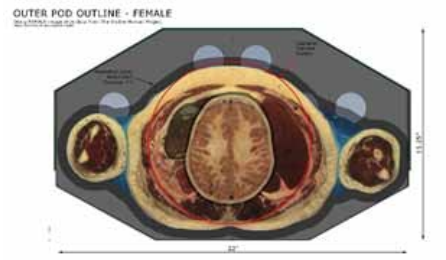
PODLESS WHOLE BODY STORAGE

We should be able to improve our patient storage density by an additional 10 to 20% per Dewar by replacing the one-size-fits-all aluminum pod with a podless patient backboard. I am able to demonstrate how we can increase the patient storage density in the SuperDewar from 8 WB and 10 N to 9 WB and 20 N, or even 11 WB up from 9 WB.

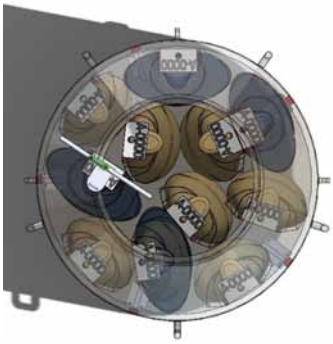
Using human slice images from the Visible Human Project I created a series of full scale drawings to see just how the Viz human male and female bodies fit into our existing aluminum pod. Let me just say that I have plenty of experience loading WB

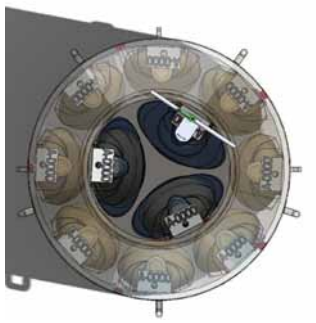
pods with our own patients and understand the sizing requirements. I would point out that both the Viz humans shown below are of rather large girth. The issue of girth plays a major role in reduction of per-patient space allocation within the Dewar. Most of our patients are noticeably smaller than these two examples. Nevertheless, this data gives us a good reference for our plausible non-pod storage scenario.





Below are two very rough examples demonstrating how we can more efficiently pack the SuperD by using the podless storage system. The larger outline patients in grey are the visible male at 22" across the shoulders with 13" and the tan color patients are the visible female at 19" width across the shoulders. It's my opinion that the visible female size is most likely the average shape and size of both male and female Alcor membership. But this size will vary, so we might possibly fit 16 or more Bonnie sized patients (not shown) in one SuperD while we might only fit 9 Steve sized patients. It's important to note then

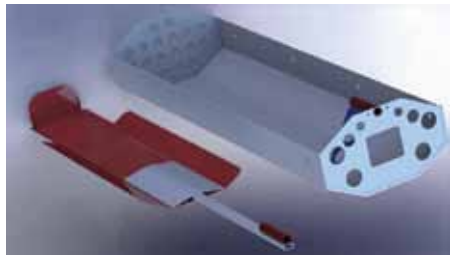




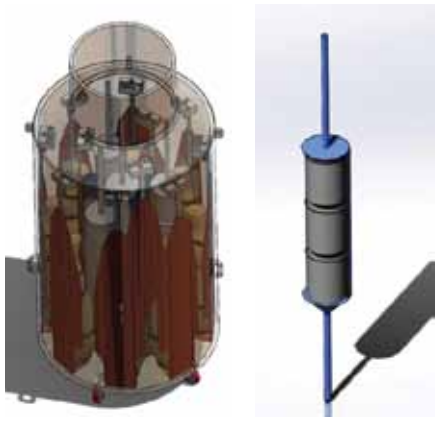
that the podless storage system patient capacity is variable, due to the obvious variances in individual patient girth. Let's assume 11 WB as an average capacity.

The podless WB patient backboard is a stripped down version of the existing whole body pod system. The patient continues to be placed inside of a sturdy and fluffy mummy-style sleeping bag. Within this bag their head is enclosed within an aluminum neurocanister. This patient within the bag is securely strapped to an aluminum backboard. This backboard utilizes the same secure strapping as the existing pod system. The straps are not shown correctly in the following rendering.

This is how the podless system compares to the standard pod. The ideal pod handler receiver tube location is yet to be determined. The exact shape, size and method of manufacture of the backboard is also TBD.



Due to the tapered spaces made available between the legs of each WB by elimination of the pods it may also be possible to design a shortened neurocolumn with standoff that takes advantage of this otherwise



unused area. In this way we might be able to include a significant number of additional cephalon only patients (8 to 12?) without any reduction of whole body patients within the Dewar.

Below is a cutaway rendering that demonstrates the backboard within the SuperDewar with the new pod handler device positioned for insertion into the receiver tube. Make note of the rectangular identification box at the top of the stem. That device contains a float that prevents the backboard from tipping over during the time that the Dewar has not been fully populated with patients.

Podless storage will invariably include a discussion regarding potential reduction of patient safety. I have heard the following arguments. Snagging of the sleeping bag

during insertion and removal. Reduced protection during a potential rescue scenario where access to the patients requires cutting away a failed Dewar. Reduced protection from impacts. More patients within the Dewar reducing the per-patient LN2 volume. Can the SuperD be transported while filled? There will be other objections we are certain to hear about.

Some of those arguments I believe can be addressed quickly; for example, the volume of LN2 per patient is actually increased in the SuperD. SuperD LN2 capacity is ~4,200 liters compared to the BigFoot at ~1,700l. In addition, the SuperD at 11.7L/day will boil off approximately 0.27" of LN2 level per day or about one inch every 4 days. The distance between the top of a pod and the full LN2 level is a minimum of 18". Therefore, the SuperD should be able to operate 72 (4 x 18) days before the top of a regular pod is even exposed. Patient feet are further below that level so the emergency margin is even greater. As for snagging, the sleeping bag and carrier both have smooth rounded corners and this design offers very little in the way of snag points. Testing will be in order. For impacts, we need to understand what type of impacts might occur to a fully loaded Dewar that could injure a patient, noting that any such impact would also certainly affect a patient in a pod. In any case we will want to perform a series of experiments to determine if there is a potential for increased danger to the patient.

It's also possible that the increased risk for any potential danger although real is so minimal compared to the benefit of additional space efficiency that it can be overlooked. I would point out that it is impossible to fully mitigate all potential hazards in any scenario, including the existing BigFoot with full Pod system.

PATIENT CARE BAY EXPANSION – DEWAR LAYOUT AND FILL SYSTEM

Here we will demonstrate potential Alcor PCB Dewar/patient capacities for the patient care bay expansion utilizing three proposed Dewar layouts, along with their corresponding LN2 fill system manifolds. All three of the following scenarios are based on retaining our existing fleet of 15 BigFoot Dewars and two scenarios utilize Pods. Two scenarios include the recently constructed but as yet unproven SuperDewars while the other uses only BigFoot Dewars. In addition, the LN2 fill system manifold design has been kept as similar as possible between these layouts. This to keep the system somewhat 'future-proof' in the case that we should have to change the Dewar composition at a later date.

Version 1 of the Alcor PCB expansion features a capacity of 34 total Dewars comprising 15 existing BigFoot models and 19 yet to be implemented SuperDewars. Capacity of 212 WB and 265 N patients.

PCB Dewar Layout version 2 has a

capacity of 39 BigFoot Dewars. Capacity of 156 WB and 195 N patients.

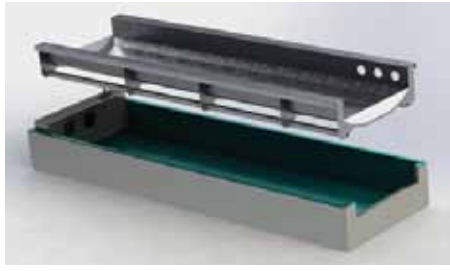
Version 3 presents us with one additional

PCB patient storage scenario featuring the previously discussed SuperD podless storage method. The Dewar composition remains the same as in 'scenario 1' with 34 total Dewars comprising 15 existing BigFoot models and 19 yet to be implemented SuperDewars. This layout creates the capacity of 60 WB and 75 N stored in 15 BigFoot Dewars, along with 209 WB and 228 N stored in SuperDewars, for a total of 269 whole body and 303 neuro patients.

- Version 1 – 15 pod Bigfoots and 19 pod SuperDewars – 212 WB / 265 N
- Version 2 – 39 pod Bigfoots – 156 WB / 195 N
- Version 3 – 15 pod Bigfoots and 19 podless SuperDewars – 269 WB / 303 N

NEW OPERATING ROOM TABLE WITH INTEGRATED PATIENT FORMER/COOLDOWN TRAY

The existing O.R. table has reached the



end of its serviceable life. Over the years it has developed several cracks and is now quite badly warped. I designed a new steel and aluminum O.R. table featuring a polished stainless steel outer shell with an inner aluminum liner (shown in teal in the rendering). The space between the inner and outer shells is insulated with 1" foam for improved efficiency over the current Acrylic table. A novel feature of this design is that the patient surgery tray is also the post-surgical cooldown tray, and it doubles as a patient 'former'. In the rendering this tray is shown in an elevated position to indicate that the patient is transferred directly out of the O.R. into cooldown while still contained within the tray. The transfer is performed using a hoist into our cooldown box in the PCB. The tray is the same shape as our existing pods and also the podless backboard, if that works out. The goal is to ensure that the patient properly fits into their pod once the cooldown process has reached the point where we transfer them into the sleeping bag. While this

table incorporates the same LN2 injection and air circulation concept as the Acrylic table, it now has the additional benefit that the aluminum former tray will transfer heat very efficiently with the patient, essentially being one large cooling plate.

Additional features of this table, seen still

under construction in the photo, are the inclusion of a patient hoist compatible base that will make transferring patients onto the table much easier. The base is also height and tilt adjustable which allows us to set the drain angle and adjust the venous return pressure to the mixing reservoir. The use of wide format cling-wrap plastic to cover the patient during the perfusion phase of the surgical procedure is another novel idea that allows us to circulate cold nitrogen gas under and around the patient and then dispose of the cling wrap as medical waste at the conclusion of the procedure. A set of disposable foam spacers placed on the chest of the patient provides the required air gap for circulation.

In November of this year I'll be adding a new feature to the current Alcor perfusion process control system. This this an Omega FMG80A electromagnetic flow meter. With no moving parts this electromagnetic flow meter is designed to measure the flow rate in circuits pumping viscous fluids such as Alcor B1 washout and M22 perfusate solutions. Changes of temperature, density, viscosity, concentration or electrical conductivity (minimum conductivity of 50 µs/cm) of the fluid do not affect the output signal.

The FMG80A meter can be used in areas where flow sensors with moving parts e. g. paddle wheel sensors, cannot be applied due to contamination/particulate in the media. The sensor is intended for continuously measuring of flow rates of electrically conductive liquids (minimum conductivity 50 µs/cm). The output current is proportional to the flow, and because this output is 4-20mA this will allow direct integration into our existing O.R. systems. ■

Suicide, Coroners, and the (Shattered) Dream of a Better Tomorrow

By Christine Gaspar, RN

The consensus among cryonicists, from what I have observed over the years, is that death, in its corporeal, or even, for some, its ineffable form, is undesirable and repugnant. The entire premise of cryonics is based on the need to develop a method of extending one's life successfully after current efforts have failed. Many cryonicists cannot imagine a condition so harsh or unendurable that it would compel them to terminate their very own existence. Other cryonicists decide to place limits on how far a Cryonics Service Organization (CSO) should go in acquiring and cryopreserving their remains but still maintain similar core principles.

Generalizations rarely apply to all members of a group, and this group is no exception.

There was a recent discussion on *New Cryonet* surrounding a published case, where members expressed surprise and confusion over a fellow cryonicist's attempt at suicide. The word attempt is used because, despite the individual's best efforts to end his life, Alcor decided to honor his wishes, which were to cryopreserve him regardless of the condition of his remains. The question that seemed to appear most frequently was "Why?" Some seemed worried and perplexed that someone who wanted cryonics as he did, could then decide to create a scenario where he would attempt to obliterate his most precious organ- his brain.

Aspects of this topic have been discussed in cryonics forums, and in publications in the past. It is important to bring them forward for discussion from time to time and to reinforce key concepts that are so critical to the success of a good cryopreservation. Lives have been lost in recent memory in terms of individuals attempting to create an ideal set of circumstances to hasten their cryopreservation, only to have in fact unwittingly inflicted catastrophic damage on themselves.

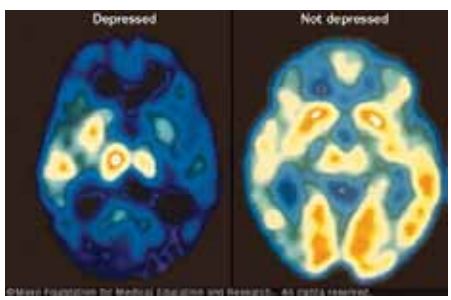
It would be fitting, in any discussion about suicide and its impact on one's plans for cryopreservation to discuss some of the causes of suicidal ideation (thinking about suicide) and committing suicide. This also speaks to those who do not understand how one's views can change so radically as to compel them to commit such acts.

Suicide is almost always due to multifactorial causes. Rarely is it triggered by one event. Over 90 percent of Americans who commit suicide had a mental illness at the time of their death. Untreated depression is the number one cause of suicide commission. That 90 percent is also made up of other inadequately treated disorders such as bipolar disorder, schizophrenia, post-traumatic stress disorder (PTSD), and postpartum depression.

http://www.suicide.org/suicide-causes.html

Suicide is the 10th leading cause of death in the US, according to the Centers for Disease Control and Prevention (CDC), claiming 42,773 individuals in 2015.

To make matters worse there exists a *Substance Use Disorder* epidemic in North America. The CDC reported that drug overdose deaths in the United States hit record numbers in 2014. From 2000 to 2014, nearly half a million people died from



drug overdoses. According to SAMHSA, about 21.5 million Americans over age 12 in 2014 had a substance use disorder.

http://www.samhsa.gov/data/sites/default/files/NSDUH-FRR1-2014/NSDUH-FRR1-2014.pdf

There is a significant overlap in individuals with concurrent disorders, which means having an untreated mental illness and a substance use disorder. These risk factors can easily alter a person's judgment, his outlook on life, and his sense of purpose.

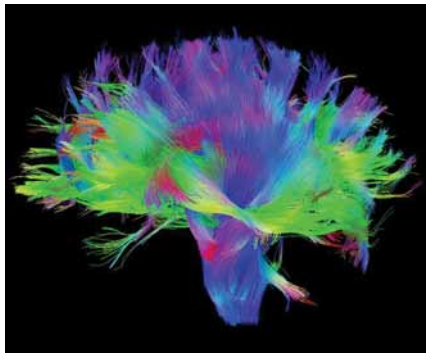
Any further discussion on the impact of mental health issues or substance use disorders on suicide rates is beyond the scope of this article and will be addressed in greater detail in a future article.

There are many other less obvious causes of suicidal ideation. These can include a growing list of routine medications which can cause adverse behavioral changes and lead otherwise stable individuals to commit suicide. Some medical causes of erratic, aggressive and even psychotic behavior include CVA (stroke), infection, hyperglycemia (high blood glucose) and unintentional poisonings that can, for example, be induced by cyanide, mercury, lead, or pesticide exposure.

The subject of legal medically-assisted suicide is also beyond the scope of this article but will be addressed at a later date. The only point that is urgently a part of this discussion is to note that just because medically-assisted suicide has been legalized in certain regions, does not mean that one should travel to those areas to attempt their own, unattended suicide. This would be considered a suspicious death and the individual would be placed in the custody of the Coroner's Office and, unless a very compelling argument could be made, he or she would be autopsied to rule out foul play.

This beautiful image has been added to illustrate one of the most challenging and often overlooked aspects of cryonics, which is the actual complexity of the human brain.

There are approximately 1 quadrillion synapses in the human brain. That's 1,000,000,000,000,000 synapses! This is equal to about a half-billion synapses per cubic millimeter.



Diffusion MRI of the Human Brain- courtesy of the Human Connectome Project.

(Changeux, J-P. moreover, Ricoeur, P., What Makes Us Think?, Princeton: Princeton University Press, 2000, p. 78)

The point of this is to hammer home the idea that it is critical that a patient get cryopreserved in the best possible condition, using the best available resources as fast as humanly possible. Even then, it will not be an easy road to success for cryonics reversal. As a potential patient, one needs to consider that they should do everything in their power to facilitate their procedure. That must include taking care of oneself to the best of their ability, in order to live as long as possible. It also means putting thoughtful effort into creating the best possible conditions for one's cryopreservation. Of course, one cannot possibly be expected to predict the nature of their own death, but there are some important tasks for the member to consider.

It is essential that the member's documentation be in order. This includes having made it very clear to family about one's wishes. It also means keeping the CSO up-to-date on any health concerns, including upcoming procedures or hospitalizations and changing medical needs over the span of one's lifetime. Document one's opposition to autopsy. This can help avoid an autopsy based on medical curiosity rather than one ordered due to legal need.

Try not to create the opportunity for one's legal death to become the subject of police and forensic investigation, and then inevitably a Coroner's Case. Losing a patient defense to an autopsy order is a devastating event. Winning an injunction on a patient's autopsy sounds magnificent, until one then calculates how much of a delay in care this has caused, and thus how much additional damage the patient's brain has endured.

It would behoove readers to learn more about autopsy practice, but for the purpose of a better quality patient outcome, the most important aspect of an autopsy to know is how to avoid one, or how to reduce its impact if all else fails. Quite simply, what that means is making some simple requests of the officials at the Coroner's Office, which include asking for an expeditious process, requesting that the patient remain cold but not frozen, and if examination of the brain can be limited to non-invasive study. It is also very helpful to explain the (medical) rationale for each request, demonstrate legal consent for cryonics, and have the support of the CSO. Most of the time, these terms are negotiated by the stabilization/ retrieval team leader, but it is worth knowing just the same.

Knowledge and preparation always serve to improve one's experience and outcome. It is also extremely valuable to gain insight into how disastrous outcomes occur, how there is never one easy answer to why people choose to commit suicide, and how to better help these individuals to improve the outcome of their lives. More will be written in greater detail in the coming months about the issues raised here.

We are all (still) human and therefore all vulnerable to the frailties that entails. The point of all of this work is to be alive as long as possible, and experience the best quality of life while we are here. Human evolution was defined, in part, by our ability to cooperate in groups and show empathy toward one another. Compassion and understanding play an equally important part in moving us forward. ■

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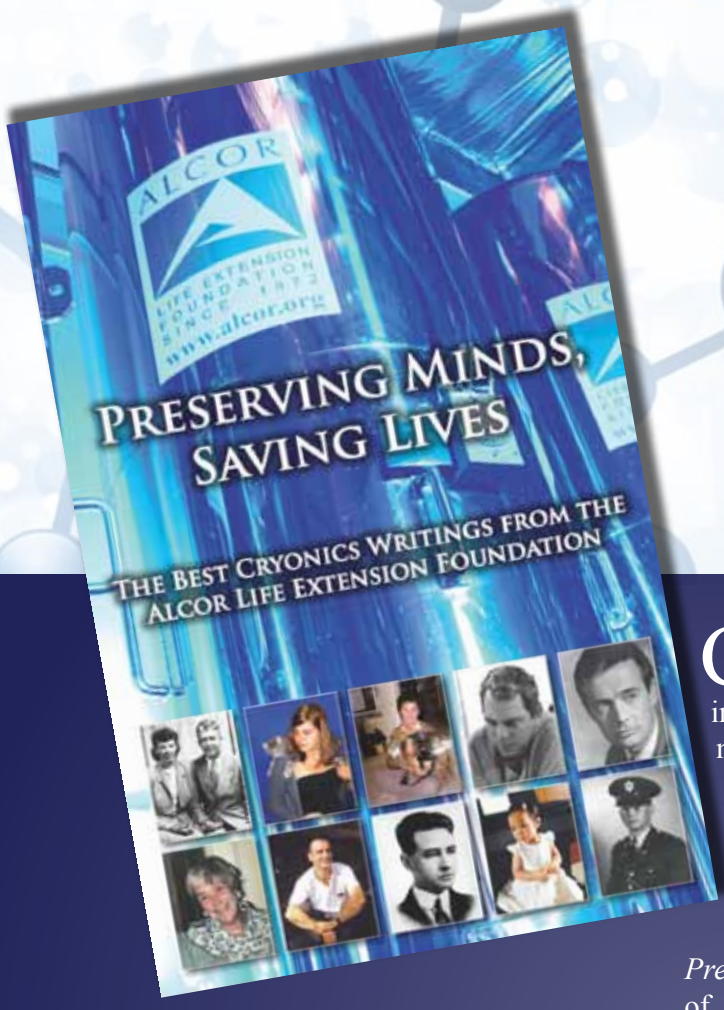

*"*Cryonics *magazine introduced me to Alcor and cryonics at its best back in 1983. The visions and technological breakthroughs that you will read about in this book continue to shape Alcor's mission to preserve life through science."*

– Max More, Ph.D.
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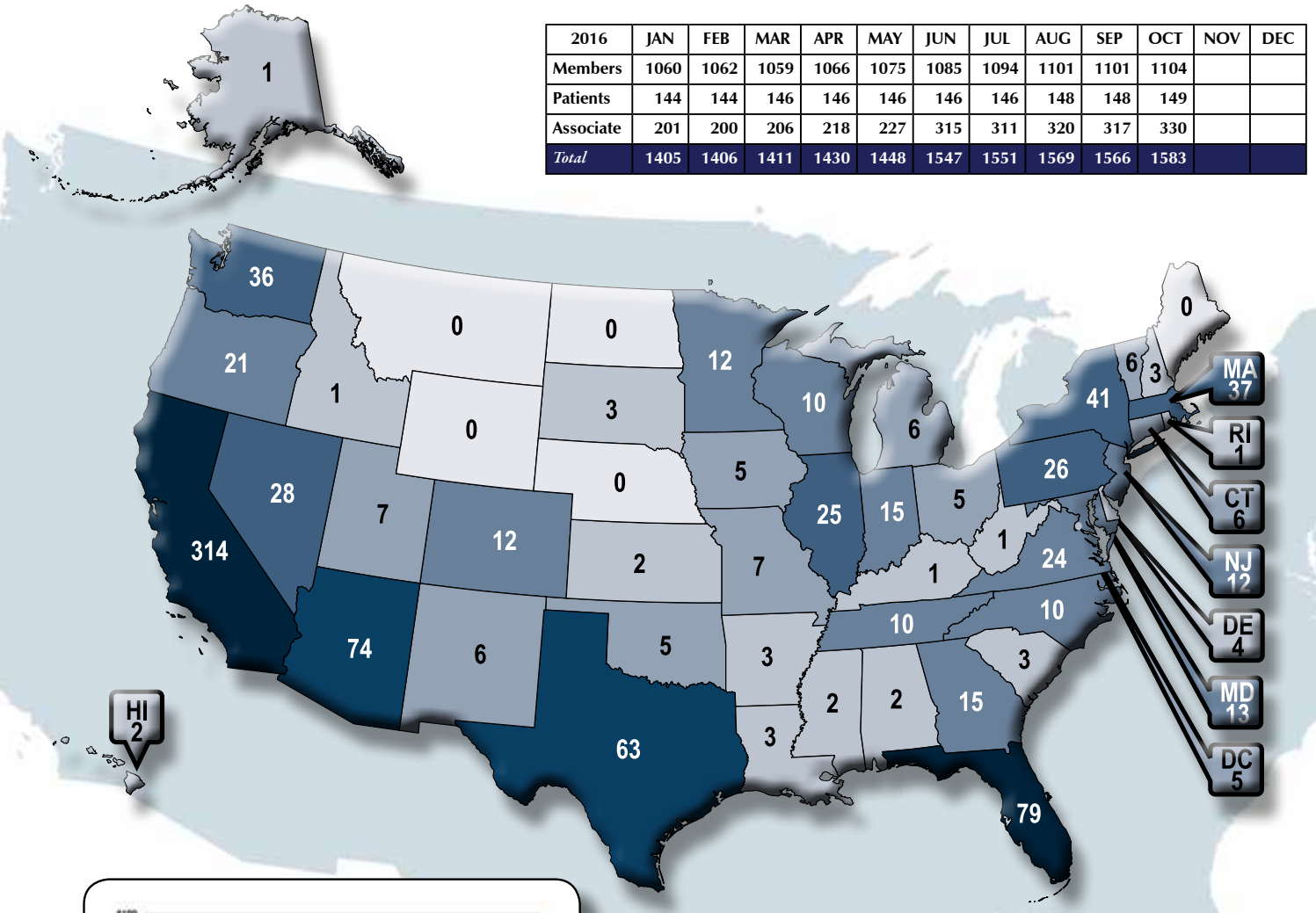
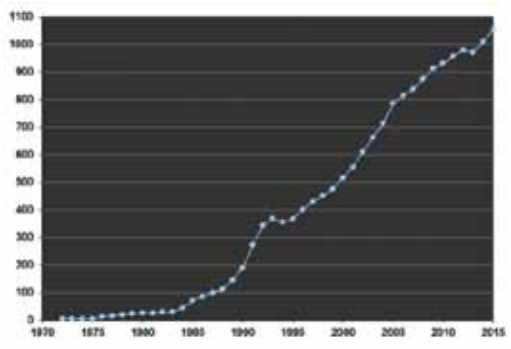
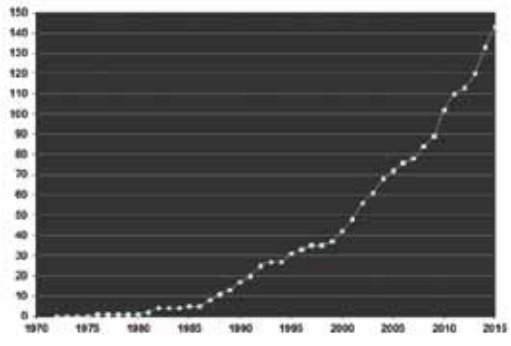
2016	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Members	1060	1062	1059	1066	1075	1085	1094	1101	1101	1104		
Patients	144	144	146	146	146	146	146	148	148	149		
Associate	201	200	206	218	227	315	311	320	317	330		
Total	1405	1406	1411	1430	1448	1547	1551	1569	1566	1583		





Number of Alcor members



Number of Alcor patients

- 0 Members
- 1–4 Members
- 5–9 Members
- 10–24 Members
- 25–49 Members
- 50–74 Members
- 75+ Members

International

Country	Members	Patients
Australia	14	3
Canada	50	2
Chile	2	0
China	0	1
Germany	10	0
Hong Kong	2	0
Israel	1	1
Italy	3	0
Japan	4	0
Luxembourg	1	0
Mexico	4	0
Monaco	1	0
Netherlands	1	0
New Zealand	1	0
Norway	1	0
Portugal	4	0
Singapore	1	0
Spain	3	1
Thailand	4	1
United Arab Emirates	1	0
United Kingdom	29	3
TOTAL	137	12

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Alcor members pay general dues to cover Alcor's operating expenses and also make annual contributions to the Comprehensive Member Standby fund pool to cover the costs of readiness and standby. Benefits of Comprehensive Member Standby include no out-of-pocket expense for standby services at the time of need, and up to $10,000 for relocation assistance to the Scottsdale, Arizona area.

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FOR THE FUTURE

THE MEANING OF LIFE NOW AND YET TO COME

By R. Michael Perry

M33_Triangulum Galaxy Alexander Meleg

A NEW COLUMN

Here we inaugurate a new column. F*or the Record*, which has appeared in many issues of *Cryonics* going back to 1990, was focused on the past and all its glories and heartaches. *For the Future*, which is intended to supplement or replace it, will have eyes instead on things yet to come. For us there are very important things we should be thinking about, with the mission we are trying to accomplish, to make it possible for us to see more and experience more of the future than our biology has presently allotted us. The ground we will explore in this column is much less certain than before: the future hasn't happened yet and we can't be sure just what it will be like. Arguably though, if civilization endures, the future will involve very profound changes in how we live our lives and what will be our values and concerns. If the main thing we are hoping for above all else, the radical extension of our healthy lives, comes to pass, that alone will have a profound impact.

Take reproduction and family life, for instance. If people live for centuries and beyond, replenishing the species loses its urgency. Populations that live indefinitely and, we hope, grow ever wiser, more enlightened, and more godlike all around, (also more joyous,) will not be concerned so much with making new individuals but with the life of those already present. Efforts at enhancing and perfecting one's life will hopefully occur under a free choice of options, but with due respect and consideration for others, particularly for any less fortunate beings who can also be helped. Regarding the latter, will we find ourselves involved in such exotica as what could be called a resurrection project, recreating past individuals using technology many of today strongly doubt is possible, then nurturing them as we now nurture children? And what sort of habitats will we inhabit, and what values will we think appropriate in regard to our environment: planet earth, the solar system and beyond? Is a new "rational religion" in the making, or should it be? And if it or something like it materializes, or if it doesn't, what really should our roles in future life be, what purpose and meaning will seem appropriate?

In any case we are committed to the position that life today is too short and we want more of it. Cryonics offers a possible escape from current clinical death and a possible pathway to a future beyond present natural limits. Taking that prospect seriously means we need to think seriously about the kind of world and society we will inhabit if we can realize that hope.

So how do we "plumb the depths" or "scale the heights" of things that haven't happened yet? Lacking a time machine or magic crystal ball, we have to rely on existing sources and our own ingenuity. For this first foray our starting point will be John G. Messerly's recent book on the meaning of life[1], where the thinking on this important topic is surveyed from several different perspectives: religious, philosophical, transhumanist, and scientific. Cryonics is mentioned, and gets what I hope is its due in this article (rather more than in the book which is still to be commended for mentioning it at all). I've chosen the form of a dialogue to present the different sides of the issue; this I think is especially suitable where there are deep differences of opinion and the thinking is often highly speculative. (It also adds a human touch.) I should add that, while various sources are used, overall the article is not a report or survey of these sources but uses them as foundation material which then may be elaborated upon.

THE DIALOGUE

In our dialogue the main characters are the moderator, Marty M; along with John H, a humanist and scientist; Sister Theresa, a theist and religious ascetic; and Craig C, a cryonicist who also has a humanistic and scientific bent.

Marty M: Welcome to our little, private panel discussion on the meaning of life, now and yet to come. "Meaning" itself can have different meanings, so, without trying to be

too overly formal, we understand "meaning" here to be more or less synonymous with purpose, value, worth, and such. Is life, your life in particular, worth something, does it have meaning, and what can you tell us about it? That's the sort of issue we'll be considering. Glad you could all attend today's event, it ought to be interesting. And I hope nobody will be intimidated. We're broaching an issue that has exercised the minds of humankind as long as we know, and "the jury's still out," at least for many if not most of us. But today we live in times where more possibilities exist than before. We have scientific advances, which translate to benefits ranging from cell phones to organ transplants to self-driving cars, to name just a few. So we might hope that there would be increased prospects of arriving at a good answer about the meaning of life, one that nearly all will accept, though no doubt we are still some distance away from that. But let me just say at the outset, that we are exploring our topic, the meaning of life, from what you might call the "thinking person's perspective," with emphasis on science and rationality. This is not to say that we are insisting throughout on scientific verification for all opinions expressed, far from it. So, I'll mostly let you people do the talking, with a little stage direction from me—everybody speak your mind. I want to start our discussion with John, who has what might be called a "mainstream" perspective on science-based thinking. Then we'll go to Sister Theresa with her strong commitment to theism, and finally, to Craig with his interesting plan to reach the future by putting his body in cold storage. So John, tell us where you're coming from in all this.

John H: Thank you, Marty. Well, I represent two basic traditions or points of view, which can be called humanist, on one hand, and secular-scientific, on the other. Humanism, in a nutshell, is a philosophical outlook, you could call it a world-view or life stance, that makes humanity the important thing. Human beings, not space aliens or gods or what not. This fits in with the scientific viewpoint, the second part of my outlook, that belief should be proportional to the evidence supporting it. And most of us who would call ourselves scientific or secular humanists, like me, would say that the evidence tells us that reality is what our telescopes and microscopes and other measuring and detecting instruments tell us it is. Life evolved from primitive origins. Species are created by natural not supernatural means. Our universe too started with some natural event or process, and its fate will similarly be determined by physics, not some kind of outside or divine intervention, as far as we know. We are born, we live, and we die, and we must make our peace with that, and find our meaning in life with that in mind.

Marty M: So what can you say about the meaning of life, what meaning do you see in it?

John H: Well, to start off, though I don't think the universe was consciously designed, and it's not struggling to "say something," it's not just chaotic either. Instead, we see underlying beauty, symmetry, and fantastic properties we can detect or predict. So really you don't need a God to give meaning to things, it's out there if you want to look for it.

Marty M: Yes, out in the depths of space. But what about things closer to home, our lives as we live them on this one planet Earth (or wherever we may inhabit someday, if we have space travel)?

John H: Sure. I wasn't going to overlook that, sorry if I gave that impression. So, to focus on things closer to home, we want to know what is the meaning of our lives, and I think that this meaning, what we are trying to pin down, is also something real and definite and not arbitrary, not just anything anybody says it is. But I also think it is not a solution to a problem, but instead is a matter of living life a certain way. Not metaphysical, but ethical. I also think happiness is tied in with it: Meaning and happiness go together. And the best route to happiness I think is to disconnect from narrowly selfish concerns and cultivate a love of humanity. The term for it I've heard is agape—from the Greek—a kind of brotherly, sisterly love of one for others. It translates to saying that I, one individual, want others to benefit in this world and be happy, and if we work together with this idea in mind, we can make it happen and all benefit mutually, and benefit better than if we just pursued separate paths and, for instance, just avoided interfering with each other. So with agape the world could be a far better place, with minimum violence and other discord, and we could all or nearly all find our happiness and our meaningful life along with it.[2] Meaning would also be enhanced, I think, by our efforts to understand reality through science and technology. It's a marvelous universe and we can live very well within it, doing good to one another and growing in knowledge and wisdom.

Marty M: That was nicely put. I think you've pretty well articulated your position, the secular, scientific, humanist view of things and what life means as you see it. So now it's time to hear from another of our guests. Sister Theresa, why don't you tell us where you're coming from in all this?

Sister Theresa: Sure, Marty. And by the way, I want to say that I realize my views are not the most popular ones among the scientific crowd, which I think is the type of people we have here, other than me, so I especially appreciate your including me in this discussion.

Marty M: We're glad to have you, and no doubt your views are important and worth listening to. *[General agreement]*

Sister Theresa: *[Smiling]* Okay. I make no secret of the fact that I *am* a theist. I believe in a God, a good, loving and all-powerful being who made the world with the people in it, ourselves and those who came before us, with provision for those who will come after us. This God will one day reward people who have behaved well in this life. So there is a hereafter, life after death, and eternal bliss for those who seek it earnestly, and it doesn't depend on status or power in this life but on our good conduct and the will of the One who is above us. There are things we need to do for the best outcome, of course, but the One who is above us can make the right things happen to complete the process, and will do so.

Marty M: Okay, thank you Sister. So now what can you say to those who doubt what you believe in, and ask why you persist in your beliefs?

Sister Theresa: *[Again smiling.]* Well, we've been answering skeptics for a very long time now, we're used to it, so I'll give my personal take on it. In fact there's a lot I could say, but I have to be brief. What it boils down to is that selecting a world view, what you want to believe about life and where it's heading, is likely to involve a tradeoff, like so many other choices you make. On one hand you want verification, on the other hand you want assurance. You want to have the scientific evidence as far as possible, that what you believe about reality is true, but you don't want it to add up to the conclusion, as one possibility, that life is pointless.

John H: But don't you think your first obligation is to uncover and accept the truth, wherever it leads?

Sister Theresa: I think everybody convinces themselves they are doing this, but we really fall short, all of us.

John H: No reason not to try, I should think.

Sister Theresa: Well, if the evidence, interpreted narrowly, seems to be that life is pointless, do you really have much to lose to cling to a belief that it isn't pointless at all but meaningful instead? There's a lot we don't know in any case, nothing to rule out theism for instance.

John H: Yes, but also not enough to rule it in either, at least in my view and many others'. In any case I've found a way to think of life as meaningful even though I don't believe in an afterlife like you.

Sister Theresa: I'd say that's where we differ. But perhaps I belabor a point?

Marty M: No, not at all. I think we'd all like to hear more on your views. *[General agreement]*

Sister Theresa: Okay, good. Well, to start then, let's think about religious belief. Religious belief, theism especially, holds that life is meaningful. It is meaningful both objectively and subjectively, that is, from the standpoint of the world at large or reality as a whole, and also from the standpoint of each individual. We are part of a great chain of being that extends from the heavenly world where God is, down to the world we know, what we can observe scientifically, and mainly, what affects us in our daily lives.[3]

Marty M: So what implications do you see in terms of what actually makes our life meaningful?

Sister Theresa: Well, I can say something about what John mentioned—agape, universal, unconditionial love. It's "from the Greek"—the best source is the New Testament in the Greek original. And there you find one of the greatest things ever written. It is St. Paul's discourse on love (agape) which takes up the 13th Chapter of First Corinthians. Paul doesn't say in this short section that you have to believe in God, or believe this or that, but that you have to have love. If you don't have it, no matter what else you do have—you are nothing. He says that, while faith, hope and love are things that "abide" and thus have importance, the greatest of the three is love. It isn't faith, though that may be important too, it is love. He says other things too, that life is a progression, that someday we will see things clearly or "face to face" that for now are just dimly perceived, like faint images in a mirror.

John H: I think we are in basic agreement on agape.

Craig C: I haven't spoken yet, and will have more to say when my turn comes, but I also agree about agape, plus I have some agreement with the "progression" idea, even though I'm not a theist either.

Sister Theresa: Okay, let me go on and maybe you'll see why I am a theist. I'll go back again to what John was saying, that love of fellow humans is important to finding life meaningful. And of course it is, but you have to ask what do you do in life, what else is there that makes life worthwhile. What is everybody going to be doing, thinking, wishing, what games, what pastimes, what work, what interactions should we be engaged in? Aristotle said that what you want is happiness. Happiness might be furthered by love of others, but that isn't the whole story. You want creative work, good food, friends, music, aesthetic enjoyment, wealth, freedom, and so on. You'll note that nothing is said about any divine element, Aristotle's approach is perfectly possible without it. And I see problems with this approach (and I am not alone).[4]

To start with, there are a lot of things to desire. You are torn by different impulses, and you will not find the peace that comes from devotion to a single end. Another problem is that you will be captive to desires that depend on the external world. Then there is the problem that not all these things are intrinsically valuable, so you have to ask what is really important and why. Finally, and very important, there is the problem that different people have very different amounts of what is supposed to be needed for happiness, take wealth for instance. What about all the poor? This inequality should be deeply troubling to any caring human being.

Marty M: I think we all agree with that. *[General assent]* But I think you have more to say.

Sister Theresa: Yes, a bit more. This world is so full of problems and woes that real, pure happiness is impossible to any really caring person. How can you be truly happy when so many in this world are miserable: starving, hurt, sick, dying? Then there's the other things I mentioned; much of our enjoyments in this life are superficial and unsatisfying. So putting your hopes in the things of this world is not enough. You have to put your hopes in something else, and that's where a divine authority comes in.

John H: Well, if there is a God, the evil goes on, and you have to account for that.

Sister Theresa: Yes, you certainly do. The problem of evil—the great problem of theism, along with the scientific issue, and others—these are certainly real issues to confront. We theists don't deny these problems exist and many of us don't think they've been perfectly addressed. But we think God has reasons for making a world like this rather than perfect from the start with no chance of ever degrading.

John H: And these problems haven't undermined your basic belief.

Sister Theresa: No, they haven't. I think it finally comes down to something like Pascal's Wager. Maybe not exactly as he put it, where you suffer eternally if you don't believe and turn out to be wrong, where otherwise the penalties are less, much less in fact, including an infinite reward if you do believe and are right.[5] I won't pass judgment on that. I'll just say that, without my belief in an afterlife, and a God who'll set things right, life for me would lose its meaning, and that price I'm not willing to pay. If I'm wrong and I die and there's no afterlife after all, I'll never know it, and I'll die, not *perfectly* happy, but I think happy, with confidence and hope. If I'm right, of course, I *think* all's well, and I'll get an eternal reward. Some raise the objection that maybe some religion is true but I could have the wrong one so even if I believe, it would be just as if I didn't, and I might even get eternal punishment. I don't worry about that. It's an act of faith. And meanwhile, if I try to do good in this life and help others and not just myself, well, that's a worthwhile life for me with lots of meaning.

Marty M: That is very well put, and your commitment to helping others is inspiring. It's clear, though, that your happiness doesn't just come from hopes of a reward in an afterlife, but also from what you are doing in this life.

Sister Theresa: Yes, you're right. This life has its troubles, of course, plenty of that, but at bottom I find happiness and meaning in the here and now—as well as from hopes in the future.

Marty M: So now I think it's time to go on to our other guest. Craig?

Craig C: I'll say too that I found Sister Theresa's thoughts about helping others inspiring. John, though, is not to be slighted either. Like him I like to think of myself as a scientific realist. The universe and life within it came into being by physics, not divine intervention—as far as I can see. We are born, we live, and, well, what then?

Marty M: Yes, I think we'd all like to hear about your "what then," what's it called, cryogenics?

Craig C: Cryonics. Cryogenics is more generic, the study of materials at low temperature. Cryonics is the practice of storing people at legal death at low temperature indefinitely, in hopes they can someday be restored to consciousness and good health, when technology is developed for the purpose. And I've signed up for the procedure.

Marty M: And you're hoping to have an afterlife that way, to come back after your death?

Craig C: After my *clinical* death, though if cryonics works, I wasn't really dead after all, just in a kind of deep coma.

Sister Theresa: I'd say that's quite a leap of faith.

Craig C: Yes, of course there's an element of faith in it, a good, strong element, but a faith in the possibilities of future technology, and in humanity surviving and developing this technology.

John H: And also deciding you are worth reviving. I think here would be a need for agape.

Craig C: It would help.

Sister Theresa: Definitely. But what makes you think people will be motivated that way, unless they perhaps have some kind of religious faith?

Craig C: You raise a very interesting issue. We who have chosen cryonics hope our organizations will honor their commitments and just do the right thing—revive us if and when they can, as they've promised. But our hopes that this will happen do rest on an assumption of basic good will on the part of "our friends of the future." Having something extra would be good. What form it might take, if it materializes, I don't know.

Marty M: In any case, Craig, I believe you've found a "third way"—an approach to the meaning of life that neither relies on the supernatural to provide for an afterlife, nor gives up hope of some kind of life after what most of us would call death. Instead, you are hoping that science can somehow address the problem.

Craig C: Well, we've seen many scientific advances, you referred to some of these earlier, so in some ways revival of cryonics patients might not be so remarkable, given enough time. Of course, not every imagined advance is really going to happen, and many doubt cryonics will ever lead to the hoped-for revivals. Yet our hopes that this will happen rest on details such as the fact that brain structure can be very well preserved by the processes that are used, including long-term storage at temperatures so low that essentially all biological activity is halted.

Marty M: And I think more generally you are holding out hope that science will address the problems of life and lead to a better world, eliminating aging and terminal illnesses, for instance.

Craig C: Indeed, that is our hope. In a better world, we will be better, greater beings ourselves, and open to further improvement. On and on, into a future we can scarcely imagine, of wonders untold.

Sister Theresa: My head is spinning! *[Laughs]* But you're certainly putting a lot of weight on just human endeavors, whereas to date such endeavors haven't exactly produced a paradise.

Craig C: Not yet.

John H: Well, it's hard for me to imagine that a glorious, paradisiacal future is waiting in store for us, something far beyond what we have today, just as soon as we can master enough high-powered technology. Yes, "we've come a long way, baby" from, say, the 1500s, but our physiology hasn't changed much if any, we're still the same biological creatures, aren't we? And technology is not exactly always used for good purposes. I think we've got a long ways to go, all around.

Craig C: Clearly we have a good ways to go, and I could talk at length about it. But in any case those like me who have confidence in the future are counting on humanity coming around to the idea that there are great benefits in store, if only we can curb our destructive tendencies and, well, keep going on the positive things.

Marty M: Your stance really involves the idea that humankind can seize control of its own destiny, and that we should be trying to do this, right?

Craig C: Yes. And we who think this way also think it is our best hope for a kind of outcome like people have wanted since history began, and before that also. I mean, given the scientific worldview, we will have to do it ourselves, but with all that's happening and all that seems to be promised by our scientific discoveries, engineering, and research, it's far from a forlorn hope.

Marty M: So I wonder if you could further summarize some of the important features of this vision you and others like you have, mainly, of addressing the problem of death scientifically. What can you say about that?

Craig C: Well, actually there are a number of points of view here. There are life-extensionists whose main focus is on slowing or reversing the aging process. If that happened, we wouldn't need cryonics, or not very much. Then there's cryonics. Cryonics is important because it's the first practice in history with the serious intention of reversing clinical death and restoring the patient to health. It hasn't actually done that yet, but our people are at least put "on hold" so something arguably can be done for them in the future. Even if cryonics works, though, it won't be the full answer to the problem of death.[6] *[Pauses]*

Sister Theresa: I was just thinking that. What about all the ones who don't get the cold storage? What about all the ones throughout history that are dead now and couldn't benefit from it?

Craig C: Yes, that's really a problem. Some of us, though, have hopes that technology will eventually be able to address even that problem, though the arguments for it are technical and would take us too far afield, I think.

Sister Theresa: Well, they must be technical indeed. To me it seems like grasping at straws, and I mean the whole cryonics thing and everything else that is just the natural world—science has its limits. I don't think humankind can solve the problem of its own destiny on its own—it will need outside assistance for anything like a really good and proper outcome. However I respect your point of view and that of the many who don't have confidence in my kind of world view.

Craig C: Yes, and I appreciate that.

John H: And I do, too.

Marty M: And me too, of course. But talking about human destiny does raise the question of really where we are and should be heading and what life in the future will

be like. I'd like to hear some thoughts from all of you on that; include some personal details if you like. John, would you like to start?

John H: Sure. I'm a humanist. I think humanity is going somewhere, and if we can just learn to have a basic love of humankind and even other creatures, things will work out well. All the violence and evil we find in this world doesn't daunt my hopes of this happening. Where are we going? Maybe to the stars, maybe to an existence with much longer life spans, it's hard to say—I do believe in using science and technology to further the good cause as far as possible. Our descendants will clearly have a different, I hope better, world than we do today, if all goes reasonably well, just as overall life has improved for us over what it was in centuries past. It doesn't bother me that I won't live to see it and probably won't have life after death, one life is enough, really, and I find mine enjoyable and rewarding, with the work I do, helping the disadvantaged, and the family I've raised. Life has meaning for me, and its limitations I can accept.

Marty M: Okay, good. Sister Theresa?

Sister Theresa: Thank you, Marty. Well, I've lived a life of religious devotion and it's been a good life also. I help the disadvantaged too, but I feel a sense of destiny that goes beyond this life. My life I think is in good hands that are more than human hands and I hope for an eternal reward. Yes, I too think that science and technology can and should be used to further the good of humanity—and I tremble at how these are so evidently misused so often, one of the reasons I put my trust in a higher power. So my life has purpose and meaning, both here and now, and, I think, forever and ever.

Marty M: Thank you, Sister Theresa. Craig, what do you have to say?

Craig C: Well, I work as a computer programmer. I think of that as advancing civilization and helping humanity even though I'm not directly involved in any service professions or charitable work. As for meaning in life, like John I think humanity is "going somewhere" and I want to further the right sort of progress as far as I can. I think probably we will "go to the stars" and will probably have a world free of aging and illness, and very long lived, maybe even immortal, people. But I'm not content to leave that to future generations. I'd like to have a personal stake in it, and cryonics gives me a hope of that. I'm not insensitive, though, to the issue Sister Theresa brought out, about people in general who die and have died without cryonics—plus you have to allow that even cryonics might not work. So the problem of death is very much still with us. But I'm actually optimistic that eventually a solution to that hard problem will be found, a scientific solution. Part of my optimism has to do with my background in computer science, where I see that "persons" can be thought of as software rather than hardware, like computer programs running. This has some deep implications, when coupled with other thinking about the nature of physical reality.[7] So overall, life is meaningful for me too, and I'm glad to be alive and am looking to the future with hope.

Marty M: Thank you Craig, and thank you all. Our discussion is nearly at an end, time is running short, but I wanted to raise one further point. You all have your different world views and viewpoints on what life means to you but you all agree it is meaningful. Otherwise, while there are many differences, you all agree on the importance of good relations, brotherly-sisterly love, agape. *[General agreement]* I think this is important for whatever the future may hold in store. You also don't think ill of science and technology, at least not per se, but feel they can and should be used to better the lot of humankind, to do good in this world. On that note I think we can adjourn. ■

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GJ. Greg Jordan, "Fearless in the Face of Death," http://www.evidencebasedcryonics.org/fearless-in-the-face-of-death/, accessed 1 Nov. 2016.

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MP. R. Michael Perry, "Religion, Science, and Reductionist Prospects for an Afterlife: Amending the Thought of Einstein and Others," in Charles Tandy, ed., *Death and Anti-Death 13*, Ann Arbor, MI: Ria University Press, 2015, 129-155, updated version at https://mega.nz/#!kYt0mAZK!kEnf3YXCzRxRGfnOAGrvajtC7FOlH96I-QIByZx999Y, accessed 1 Nov. 2016.

PW. "Pascal's Wager," Stanford Encyclopedia of Philosophy, http://plato.stanford.edu/entries/pascal-wager/, accessed 1 Nov. 2016.

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1. JM.
2. This view (upholding agapeistic love) is largely Terry Eagleton as described in JM, 178-79, and somewhat similarly by Julian Baggini, JM, 144-47.
3. The view of Huston Smith as described in JM, 47-48.
4. The view of David Swenson as described in JM, 34-35 (also next paragraph).
5. PW (also later in this paragraph).
6. This paragraph is summarized from GJ.
7. See, for example, MP.

New Imaging Tool for Live Monitoring of Common Brain Disorders

A Yale-led team of researchers developed a new approach to scanning the brain for changes in synapses that are associated with common brain disorders. The technique may provide insights into the diagnosis and treatment of a broad range of disorders, including epilepsy and Alzheimer's disease. The study was published July 20 in *Science Translational Medicine*. Certain changes in synapses — the junctions between nerve cells in the brain — have been linked with brain disorders. But researchers have only been able to evaluate synaptic changes during autopsies. For their study, the research team set out to develop a method for measuring the number of synapses, or synaptic density, in the living brain. To quantify synapses throughout the brain, professor of radiology and biomedical imaging Richard Carson and his coauthors developed a radioactive tracer that, when injected into the body, binds with a key protein that is present in all synapses across the brain. They observed the tracer through PET imaging, using both baboons and humans as subjects.

Ziba Kashef / YaleNews
20 Jul. 2016
http://news.yale.edu/2016/07/20/yale-scientists-apply-new-imaging-tool-common-brain-disorders

This Is How Norovirus Invades Cells to Make Us Sick

Norovirus is the most common viral cause of diarrhea worldwide, but because of an inability to grow it in a lab, scientists still know little about how it infects people and causes disease. Now, researchers have identified the protein that norovirus uses to invade cells. The discovery in mice may offer new ways to study the virus, which is notoriously difficult to work with in the lab. "Our inability to grow the virus in the lab has limited our ability to develop anti-viral agents. If you can't get the virus to multiply in human cells, how are you going to find compounds that inhibit multiplication?" says Herbert "Skip" Virgin, professor and head of the pathology and immunology department at Washington University in St. Louis. "This discovery provides a good basis for our mouse model, which we can then use to understand noroviral pathogenesis and search for treatments in people." Norovirus is infamous for causing outbreaks of diarrhea, vomiting, and stomach cramps on cruise ships, in military barracks, on college campuses, and in other places where people live in close quarters.

Tamara Bhandari / Washington University
25 Aug. 2016
http://www.futurity.org/norovirus-cells-infections-1234132-2/

Researchers Activate Repair Program for Nerve Fibers

Neural pathways that have been injured can only regenerate if new connections arise between the affected cells. In a sense, the neurons have to stretch out their arms, i.e. the axons have to grow. In fact, this happens in the early stages of embryonic development, but the ability disappears in the adult. Can it be reactivated? This was the question neurobiologist Frank Bradke and co-workers at the German Center for Neurodegenerative Diseases (DZNE) asked themselves. Now the scientists have succeeded in releasing a molecular brake that prevents the regeneration of nerve connections. Treatment of mice with Pregabalin, a drug that acts upon the growth inhibiting mechanism, caused damaged nerve connections to regenerate. Bradke's team report on these findings in the journal *Neuron*. In mice and cell cultures, they started an extensive search for genes that regulate the growth of neurons. "That was like looking for the proverbial needle in the haystack…," says Bradke. "To analyze the large data set we heavily relied on bioinformatics. …"

DZNE
6 Oct. 2016
https://www.dzne.de/en/about-us/public-relations/news/2016/press-release-no-16.html

More Progress in Building Functional Human Tissues

Imagine engineering human tissues and organs that can mimic native function. Uses could involve drug screening, disease modeling, and regenerative medicine. A team led by Jennifer A. Lewis of the Harvard School of Engineering and Applied Sciences (SEAS) has made another foundational advance toward this ultimate goal using three-dimensional (3D) bioprinting. The work builds upon their demonstrated ability to bioprint tissue constructs composed of multiple types of living cells patterned alongside a vascular network in an extracellular matrix. The Harvard team has also previously shown that these constructs could be scaled up to create thick, vascularized tissue constructs, sustained viable for more than a month in vitro. Now, in close collaboration with Roche scientist Annie Moisan, they have leveraged their bioprinting and materials expertise to construct a functional 3D renal architecture containing living human epithelial cells, which line the surface of tubules in the kidney. The study appears online in the journal *Scientific Reports*.

Harvard SEAS
11 Oct. 2016
https://www.seas.harvard.edu/news/2016/10/more-progress-in-building-functional-human-tissues

Gene-Editing System Cures Blood Disorder in Mice

A gene-editing system has successfully cured a genetic blood disorder in living mice using a simple IV treatment. Unlike the popular CRISPR gene-editing technique, the new technology can be administered to living animals and it significantly decreases unwanted, off-target gene mutations. The findings, reported in *Nature Communications*, offer a new therapeutic approach to treat genetic diseases of the blood like beta thalassemia and sickle cell disease by targeting faulty genes in hematopoietic stem cells. The system relies on state-of-the-art peptide nucleic acid (PNA) molecules, a synthetic nucleotide technology that has been pioneered at Carnegie Mellon University's Center for Nucleic Acids Science and Technology. "We have developed a system that uses FDA-approved nanoparticles to deliver our PNA molecule along with a donor DNA to repair a malfunctioning gene in living mice. This has not been achieved with CRISPR," says Danith Ly, professor of chemistry in Carnegie Mellon's Mellon College of Science.

Jocelyn Duffy / Carnegie Mellon University
12 Oct. 2016
http://www.futurity.org/gene-editing-blood-disorder-1282572-2/

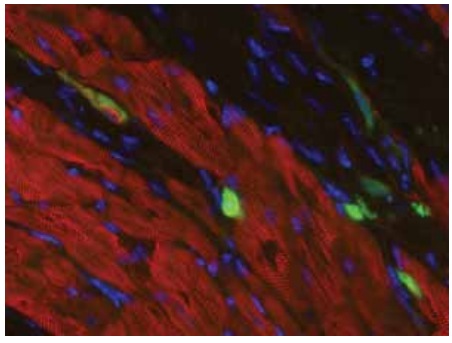
Atomic-scale MRI Holds Promise for New Drug Discovery

Researchers at the University of Melbourne, Australia have developed a way to radically miniaturize a Magnetic Resonance Imaging (MRI) machine using atomic-scale quantum computer technology. Capable of imaging the structure of a single biomolecule, the new system would overcome significant technological challenges and provide an important new tool for biotechnology and drug discovery. The work was published today in *Nature Communications*, and was led by Prof Lloyd Hollenberg at the University of Melbourne, working closely with researchers at the ARC Centre of Excellence for Quantum Computation and Communication Technology (CQC2T) to design the quantum molecular microscope. The team propose the use of atomic-sized quantum bits (qubits) normally associated with the development of quantum computers, but here would be employed as highly sensitive quantum sensors to image the individual atoms in a bio-molecule.

Melbourne Neuroscience Institute
13 Oct. 2016
http://neuroscience.unimelb.edu.au/news-and-events/atomic-scale-mri-holds-promise-for-new-drug-discovery

Using Skin Cells to Repair Damaged Hearts

Scientists at Shinshu University in Japan, used heart muscle stem cells from one monkey, to repair the damaged hearts of five other monkeys. In the study, published in the journal Nature, the researchers took skin cells from a macaque monkey, turned those cells into induced pluripotent stem cells (iPSCs), and then turned those cells into cardiomyocytes or heart muscle cells. They then transplanted those cardiomyocytes into five other monkeys who had experienced an induced heart attack. After 3 months the transplanted monkeys showed no signs of rejection and their hearts showed improved ability to contract, meaning they were pumping blood around the body more powerfully and efficiently than before they got the cardiomyocytes. It's an encouraging sign but it comes with a few caveats. One is that the monkeys used were all chosen to be as close a genetic match to the donor monkey as possible. This reduced the risk that the animals would reject the transplanted cells. But when it comes to treating people, it may not be feasible …



Heart muscle cells derived from skin cells

Kevin McCormack / The Stem Cellar / CIRM
13 Oct. 2016
https://blog.cirm.ca.gov/tag/shinshu-university/

3D-Printed Heart-On-A-Chip with Integrated Sensors

Harvard University researchers have made the first entirely 3D-printed organ-on-a-chip with integrated sensing. Built by a fully automated, digital manufacturing procedure, the 3D-printed heart-on-a-chip can be quickly fabricated and customized, allowing researchers to easily collect reliable data for short-term and long-term studies. This new approach to manufacturing may one day allow researchers to rapidly design organs-on-chips, also known as microphysiological systems, that match the properties of a specific disease or even an individual patient's cells. The research is published in *Nature Materials*. "This new programmable approach to building organs-on-chips not only allows us to easily change and customize the design of the system but also drastically simplifies data acquisition," said Johan Ulrik Lind, first author of the paper and postdoctoral fellow at the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS). Organs-on-chips mimic the structure and function of native tissue and have emerged as a promising alternative to traditional animal testing.

Leah Burrows / Harvard SEAS
24 Oct. 2016
https://www.seas.harvard.edu/news/2016/10/3d-printed-heart-on-chip-with-integrated-sensors

New Neurons for the Brain

Neurodegenerative diseases such as Alzheimer's or Parkinson's disease, but also stroke or certain injuries lead to a loss of brain cells. The mammalian brain can replace these cells only in very limited areas, making the loss in most cases a permanent one. Now, in a recent joint study, researchers of the Max Planck Institute of Neurobiology, the Ludwig Maximilians University Munich and the Helmholtz

Zentrum München have specifically asked whether transplanted embryonic nerve cells can functionally integrate into the visual cortex of adult mice. "The very fact that the cells survived and continued to develop was already very encouraging," researcher Max Hübener remarks. But things got really exciting when the scientists took a closer look at the electrical signals of the transplanted cells. In their joint study, PhD student Susanne Falkner and Postdoc Sofia Grade were able to show that the new cells formed the synaptic connections that neurons in their position in the network would normally make, and that they responded to visual stimuli.

Max Planck Institute
26 Oct. 2016
https://www.neuro.mpg.de/3378043/news_publication_10801776

Where is my mind? New Study Looks for the Cortical Conscious Network

Our brain is a very complex network, with approximately 100 billion neurons and 100 trillion synapses between the neurons. To cope with its enormous complexity, and understand how the brain works and eventually forms our conscious mind, science uses advanced mathematical tools. A team physicists from Bar-Ilan University in Israel, led by Prof. Shlomo Havlin and Prof. Reuven Cohen, used network theory to cope with this complexity and to determine how the structure of the human cortical network can support complex data integration and conscious activity. The gray area of the human cortex, the neuron cell bodies, were scanned with MRI imaging and used to form 1,000 nodes in the cortical network. The white matter of the human cortex, the neuron bundles, were scanned with DTI imaging, forming 15,000 links or edges which connected the network's nodes. At the end of this process, their network was an approximation of the structure of the human cortex. The research was recently published in *New Journal of Physics*.

Bar-Illan University
31 Oct. 2016
http://www1.biu.ac.il/indexE.php?id=33&pt=20&pid=117&level=2&cPath=33&type=1&news=2806

A Roadmap to Revival

Successful revival of cryonics patients will require three distinct technologies: (1) A cure for the disease that put the patient in a critical condition prior to cryopreservation; (2) biological or mechanical cell repair technologies that can reverse any injury associated with the cryopreservation process and long-term care at low temperatures; (3) rejuvenation biotechnologies that restore the patient to good health prior to revival. OR it will require some entirely new approach such as (1) mapping the ultrastructure of cryopreserved brain tissue using nanotechnology, and (2) using this information to deduce the original structure and repairing, replicating or simulating tissue or structure in some viable form so the person "comes back."

The following list is a list of landmark papers and books that reflect ongoing progress towards the revival of cryonics patients:

Jerome B. White, "**Viral-Induced Repair of Damaged Neurons with Preservation of Long-Term Information Content**," Second Annual Conference of the Cryonics Societies of America, University of Michigan at Ann Arbor, April 11-12, 1969, by J. B. White. Reprinted in *Cryonics* 35(10) (October 2014): 8-17.

Michael G. Darwin, "**The Anabolocyte: A Biological Approach to Repairing Cryoinjury**," *Life Extension Magazine* (July-August 1977):80-83. Reprinted in *Cryonics* 29(4) (4th Quarter 2008):14-17.

Gregory M. Fahy, "**A 'Realistic' Scenario for Nanotechnological Repair of the Frozen Human Brain**," in Brian Wowk, Michael Darwin, eds., *Cryonics: Reaching for Tomorrow*, Alcor Life Extension Foundation, 1991.

Ralph C. Merkle, "**The Molecular Repair of the Brain**," *Cryonics* 15(1) (January 1994):16-31 (Part I) & *Cryonics* 15(2) (April 1994):20-32 (Part II).

Ralph C. Merkle, "**Cryonics, Cryptography, and Maximum Likelihood Estimation**," First Extropy Institute Conference, Sunnyvale CA, 1994, updated version at http://www.merkle.com/cryo/cryptoCryo.html.

Aubrey de Grey & Michael Rae, "**Ending Aging: The Rejuvenation Breakthroughs That Could Reverse Human Aging in Our Lifetime**." St. Martin's Press, 2007.

Robert A. Freitas Jr., "**Comprehensive Nanorobotic Control of Human Morbidity and Aging**," in Gregory M. Fahy, Michael D. West, L. Stephen Coles, and Steven B. Harris, eds, *The Future of Aging: Pathways to Human Life Extension*, Springer, New York, 2010, 685-805.

Chana Phaedra, "**Reconstructive Connectomics**," *Cryonics* 34(7) (July 2013): 26-28.

Robert A. Freitas Jr., "**The Alzheimer Protocols: A Nanorobotic Cure for Alzheimer's Disease and Related Neurodegenerative Conditions**," *IMM Report* No. 48, June 2016.

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.

PHOENIX

VALLEY OF THE SUN:

This group meets monthly, usually in the third week of the month. Dates are determined by the activity or event planned. For more information or to RSVP, visit http://cryonics.meetup.com/45/ or email Lisa Shock at lisa@alcor.org.

AT ALCOR:

Alcor Board of Directors Meetings and Facility Tours—Alcor business meetings are generally held on the second Saturday of every month starting at 11:00 AM MST. Guests are welcome to attend the fully-public board meetings. Facility tours are held every Tuesday at 10:00 AM and Friday at 2:00 PM. For more information or to schedule a tour, call Marji Klima at (877) 462-5267 x101 or email marji@alcor.org.

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 (650) 772-1251 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.

NEW YORK CITY

Alcor members in the NYC area can contact Javier Guaristi at javier.elhage@yahoo.com for information about local meetings.

PACIFIC NORTHWEST

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

OREGON:

The contact person for meetings in the Portland area is Aschwin de Wolf: aschwin@alcor.org. See also: https://www.facebook.com/portland.life.extension.

BRITISH COLUMBIA (CANADA):

CryoBC, a special interest group within the nonprofit Lifespan Society of BC (http://www.lifespanbc.ca/) holds meetings for cryonicists in the Vancouver area. To be notified of meetings join the CryoBC mailing list: https://groups.yahoo.com/neo/groups/cryobc/info.

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:

A new group for the Austin area has been started for those interested in discussion and understanding of the relevant technologies and issues for cryopreservation, genomics, epigenetics and medical research for increased life/health span. Contact Tom Miller, 760-803-4107 or tom@blackmagicmissileworks.com.

JAPAN

Cryonics meetings are held monthly in Tokyo. Send queries to grand88@yahoo.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.

UNITED KINGDOM

Alcor members in the UK can contact Garret Smyth at Alcor-UK@alcor.org for information about local meetings.

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 $90 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.

Not ready to make full arrangements for cryopreservation? Then ***become an Associate Member*** for $5/month (or $15/quarter or $60 annually). Associate Members will receive:

- ***Cryonics*** magazine by mail
- Discounts on Alcor conferences
- Access to post in the Alcor Member Forums
- A dollar-for-dollar credit toward full membership sign-up fees for any dues paid for Associate Membership

To become an Associate Member send a check or money order ($5/month or $15/quarter or $60 annually) to Alcor Life Extension Foundation, 7895 E. Acoma Dr., Suite 110, Scottsdale, Arizona 85260, or call Marji Klima at (480) 905-1906 ext. 101 with your credit card information. You can also pay using PayPal (and get the Declaration of Intent to Be Cryopreserved) here: http://www.alcor.org/BecomeMember/associate.html

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