CRYONICS

Nov/Dec 2005

A Publication of the ALCOR Life Extension Foundation

Volume 26:6

MEET DR. SERGEY SHELEG, SENIOR RESEARCH SCIENTIST

Whole Body Cryopreservation Upgrade

Cryopreservation Summary: A-2071

Member Profile: Rudi Hoffman

Patient Profile: Jerry Leaf

ALCOR LIFE EXTENSION FOUNDATION SINCE 1972

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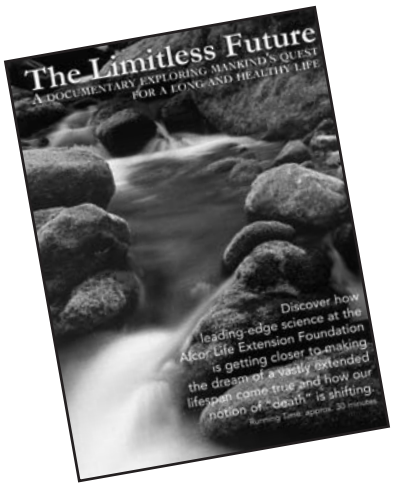
What is cryopreservation?

Cryopreservation (cryonics) is the ultra low temperature preservation (biostasis or cryostasis) of patients who cannot be maintained in a normal, living state by present day medical practice. The goal is to move these patients into the future (with as little further damage as possible) to a time when cell and tissue repair technology far beyond today s capabilities are readily available, and where a more comprehensive evaluation of these patients chances can be made, where restoration to full function and health may be a realistic possibility. In principle, this is no different from bringing a seriously ill person out of the jungle and to a modern hospital. Applied to cryotransport, the concept is that the only way out of the jungle is to travel forward in time. The modern hospitals we need can be reached only by traveling decades into the future.

As human knowledge and medical technology continue to expand, people who today are considered hopeless will be easily restored to health. Throughout history, this has been the hallmark of medical progress. Rapidly evolving control of biological and molecular structures promises to soon permit the synthesis of medical devices far smaller than living cells. Through molecular repairs, these devices should be able to eliminate virtually all of today s diseases and allow us to intervene in the aging process, ultimately curing and eliminating it. These technologies will also allow us to attempt the repair and recovery of patients waiting in cryostasis. The challenge for us today is to devise techniques that will give these patients the best chances for survival. ▲



How do I find out more?

The best sources of detailed introductory information about Alcor and cryonic suspension are our website (www.alcor.org) and our free information package. Our free information package can be requested on the website *(see "Free Information" section)* and includes:

- A 30 minute DVD documentary *The Limitless Future*
- 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 about 2 weeks.

The complete package will be sent free in the U.S., Canada, and the United Kingdom. In all other countries, the package will not include the sample magazine due to shipping limitations.

For those considering Alcor Membership...

Cryonics is published six times a year by the Alcor Life Extension Foundation. The magazine is an important benefit of membership and is mailed to all members. Read about the latest findings from cryonics experts, keep up with happenings at Alcor Central, and learn about special events and conferences in cryonics and related fields.

Alcor's toll free number for membership inquiries or donations is 1 877 GO ALCOR. For other services, call (480) 905 1906. For inquiries and member services, contact Membership Services Coordinator Diane Cremeens at diane@alcor.org.

Don't miss a single issue of *Cryonics* - BECOME A MEMBER TODAY!

Cover by Jill Rucker
Meet Alcor s new Research Scientist (pg.14)

CRYONICS

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ALCOR
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To Our Readers

Research is high on everyone's agenda, be it members, financial supporters, or Alcor officials. More research means not only better cryopreservations for those involved with cryonics today but more acceptance of the field in the future. For the first time ever, Alcor is engaging in a sustained effort to perform publishable research. Much of the research performed by Alcor over the years has been developmental engineering, building better equipment for use during cryopreservations. In the 1980's, Jerry Leaf did experiments with dogs, and there were some brief experiments with rats in 1996. Now, in 2005, Dr. Sergey Sheleg is reopening the experimental doors and putting Alcor's protocols under the microscope. Read about his groundbreaking research initiatives in our cover story.

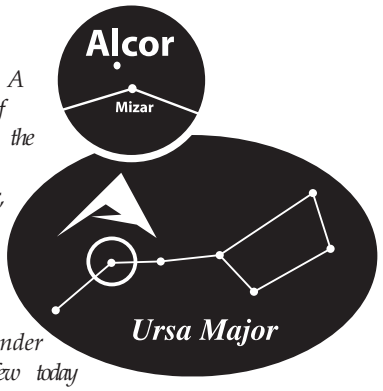
Don't miss the major announcement being made about whole body cryopreservation in this issue. For those of you who want your brain vitrified and also want to cryopreserve your body, it is now possible to do so as a whole body member. Alcor is extending this upgrade to all whole body members, unless precluded by circumstances beyond our control. If you are already signed up for whole body cryopreservation, there is no need to change your contracts or increase your funding. Those signed up for Open Option will now also receive whole body cryopreservation with brain vitrification, and neurosuspension patients will continue to receive brain vitrification. We look forward to hearing from many of you about this much anticipated upgrade.

Our profiles in this issue are of Rudi Hoffman, Alcor member, and Jerry Leaf, Alcor patient. We hope you enjoy learning about their lives and contributions to cryonics. We continue to value the opportunity to meet our members and remember our patients.

We want to hear from you!
articles@alcor.org ▲

Alcor ~ Seen By Few

Did you know Alcor is a star? A star barely within the threshold of human vision, Alcor is located in the Big Dipper s handle. Only with excellent vision can one see Alcor, which is quite close to, but dimmer than, Mizar. The name, Alcor, chosen for its symbolism and its historical use as a test for vision and focus, serves as a reminder that the distant dreams seen by few today may become the reality of tomorrow.



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Submissions may be sent via e mail to **articles@alcor.org** in ASCII, Word or PDF format. Mailed submissions should include a PC disk with the file in any previously mentioned format (although printed text alone will be considered). All submitted media become property of the Alcor Life Extension Foundation unless accompanied by a self addressed stamped envelope. The Alcor Life Extension Foundation assumes no responsibility for unsolicited manuscripts, photographs, or art. Send all correspondence and submissions to:

Cryonics
Alcor Life Extension Foundation
7895 East Acoma Drive, Suite 110
Scottsdale, AZ 85260

How To Join Alcor

Your research is finally complete. You browsed our web site (www.alcor.org), presented your questions to our Membership Coordinator, and toured our facility. Now you are ready to establish your membership with the Alcor Foundation. Congratulations and welcome!

Upon receipt of your completed application for membership and $150 application charge, Alcor will send you various membership documents (samples available upon request). After reviewing these documents, you will need to sign them in the presence of two signing witnesses. At least one document requires the services of a notary public. After returning all of your documents to Alcor for approval, you can expect to receive one original copy of each for your personal records.

Most people use life insurance to fund their cryopreservation, although cash prepayment is also acceptable. If you do not already have an insurance policy, Alcor recommends that you apply for one at your earliest convenience, as the underwriting process can last several weeks. Diane Cremeens, Membership Coordinator, can provide you with a list of insurance agents who have previously written policies for this purpose. These agents can assist you with satisfying Alcor's various funding requirements, such as naming Alcor as the owner and irrevocable beneficiary of your policy and ensuring that your benefit amount is sufficient.

With your membership documents completed and your funding approved by Alcor, you will be issued emergency identification tags engraved with your personal Cryopreservation Number. This is your confirmation that Alcor will respond should our emergency technicians ever receive a call on your behalf. Certainly, we hope that you will not need us anytime soon, but as a member you can feel confident that we will care for you and your future to the best of our ability. Please call toll free (877) 462 5267, ext. 132 today to request your application. ▲

Alcor Membership Status

As of October 1, 2005, Alcor has 773 cryopreservation members (including 111 Life Members) and 69 cryopreservation patients. These numbers are broken down by country. See accompanying graph. ▸▸▸

Attention All Members and Applicants

Please! Please! Please! When you move, change phone numbers (work numbers as well), change e mail addresses, or plan to undergo any medical procedure where general anesthesia is used, please inform us as far ahead of time as you can.

Too many times we have tried to contact our members and found out the contact information we have is no longer valid. Other times we find out well after the fact that a member has undergone a medical procedure with life threatening potential.

Help us to serve you better! Keep in touch!

Country	Members	Applicants	Subscribers
Argentina	0	0	1
Australia	8	2	0
Austria	0	0	1
Canada	29	4	7
France	0	0	1
Germany	2	1	2
Ireland	0	0	0
Italy	0	2	3
Japan	0	0	1
Mexico	2	0	0
Monaco	2	0	0
Netherlands	3	0	1
Spain	0	1	0
Sweden	0	0	1
Switzerland	1	0	2
Taiwan	0	0	0
Thailand	1	0	0
U.K.	18	5	2
USA	707	53	129
Totals	**773**	**68**	**151**

Rudi Hoffman

An Interview With

Rudi Hoffman

Alcor Member

Rudi Hoffman, a long time Alcor member living in Florida, is a certified financial planner, accountant, and insurance agent licensed in 23 states. He has written life insurance policies for the vast majority of Alcor's members and is actively involved in the cryonics community. He is married to Dawn Hoffman, who helps him run his insurance agency. Those interested in contacting Rudi can send an email to: rudihoffma@aol.com

CM: *Rudi, tell us about your first exposure to the topic of cryonics.*
RH: In 1994, I read an article in OMNI magazine about cryonic suspension. It was one of the most exciting concepts I had ever seen. In that same issue was an ad for Alcor. I called the 800 number and was thrilled to soon get a package from Alcor.

CM: *When did you join Alcor and what motivated you to become a member?*
RH: After reading the information Alcor sent me in 1994, I investigated and researched for about three months. To find that there was an organization doing this was tremendously exciting to me. I especially appreciated that my questions were answered with tremendous candor, including questions about the amount of damage caused by the cryonic process, the possibilities of multiple variables going wrong and resulting in suboptimal cryopreservations, and all the "dirty laundry". While cryonics remains a "best efforts" activity, I was very impressed by the integrity and dedication of the people I talked with at Alcor. I was in 1994, and remain today, greatly enthusiastic about the concept.

CM: *How does your membership impact your life plans or lifestyle?*
RH: I tend to take fewer "irretrievable" risks, such as hiking or trail riding alone. Even flying or leaving the U.S. is considered carefully in light of whether my brain and body would be available for optimal cryopreservation if something unlikely happened. My wife Dawn and I often laugh about the mechanics of getting an optimal cryopreservation. She does her part to remind me to avoid risks that have substantial chances of "permanent" death, in which there would be little or no chance of a timely cryopreservation.

CM: *What do you consider the most challenging aspect(s) of cryonics?*
RH: There are many. Probably in order, these would include:

1. Lack of public awareness, understanding and support. Under this would fall the outrageous lack of funding and dearth of cryonics research, compared to how much money and effort is spent on other public risks. The United States is currently spending 80 billion a year to combat the risk of you being killed by terrorists. The odds of you being killed by terrorists, especially if you live in the United States, are miniscule. The odds of you dying of one of the diseases of aging are almost 100 percent. Does anyone else see the huge disconnect here? Yet there is no government initiative to research and stop the disease of aging. Instead of government helping solve the main issue facing every human on the planet, it tends to actively inhibit research which could save your life.

Rudi has many hobbies including ping pong.

2. Because we cryonicists are so few in number and this is still considered "leading, bleeding edge" activity, we face numerous challenges. While I understand this may be changing, where are the mainstream peer reviewed scientific journals, regular and systematic scientific conferences, or PhD career track devoted to cryonics? While the science of cryonics is legitimate and honest and Drs. Greg Fahy, Brian Wowk, Stephen Harris, Sergey Sheleg and Yuri Pichugin are doing some great work, we need hundreds of labs throughout the world working on the technological barriers to reversible vitrification. Regular conferences, breakthroughs announced in the mainstream press, repeatable and verifiable protocols leading to the resuscitation of various animals and humans these are all still in the future.

3. The ideological issues brought up by cryonics are obviously nontrivial and perhaps still remain among the most perplexing questions as to why there are less than 2000 signed "Cryonauts" in the world. While this is an extremely rational thing to do, we have a fraction of the participation of virtually any interest group you can name. I live in Daytona Beach. Each spring we get about 500,000 motorcycle enthusiasts for "Bike Week." Many of these people happily, gleefully, enthusiastically spend more on their motorcycles and the toys that go with them than it would cost to pay for cryonics dues and life insurance.

CM: *What specific areas of Alcor's program would you like to see developed over the next 5 10 years?*
RH: While I am a vocal and unabashed ideologue of the cryonics concept, I am certainly aware of the limitations of current cryonics technology. In one sense, cryonics already "works" in that it preserves most of the patterns that make up "you" from further deterioration upon "death." But in another sense it is a constant source of surprise to many that we don't have a single small animal successfully resuscitated from liquid nitrogen temperatures. I would like to see more research on reversible cryopreservation, along with full body vitrification, which would seem to me to give our technicians in the future as much as possible to work with.

Rudi decorating his house for Halloween.

CM: *What kind of lasting contribution would you like to make to cryonics?*
RH: Good question! For the last two years, as near as I can tell, it has been my privilege to write insurance policies for 80 percent of the folks who have signed up for cryonic suspension on the planet. While this is a gratifyingly high percentage, in total numbers it is still quite small. It is my passion to show and demonstrate to literally hundreds of thousands of people that cryonics is an affordable and practical option. I would also like to finish my book, "The Affordable Immortal", which is about how to sign up for cryonics and the details of why life insurance funding makes sense for most people. I would also like to continue to develop alternate funding methods, such as annuity funding, and to develop the field of cryonics estate planning, enabling you to (maybe) be resuscitated rich. Finally, as time goes by and I can afford to do so, I want to donate substantial sums towards both cryonics research and marketing.

CM: *What could Alcor do that would benefit you as a member?*
RH: Continue to promote the local "CryoFeasts" and gatherings. Most of those reading this belong to one of the most exclusive "clubs" in the world. It would be nice to have both local and large scale conferences, learn from each other, and develop networks that may save our lives down the road.

CM: *What do your friends and family members think about your cryopreservation arrangements?*
RH: Well, it varies. My wife, Dawn, is very supportive. My siblings are quite supportive and interested. My mom and extended family, who are wonderful people and tend to be quite religious in the Christian tradition, think I am a bit "nuts." It is ironic, in the extreme, that the scientific, rational choice of cryonic suspension is viewed as "kooky." If some of your relatives think you're "kooky," you have good company! Most of our friends are aware of my cryonics interest and that I am signed up with Alcor. They are respectful, if sometimes humorously so, of this choice.

CM: *What are your hobbies or special interests?*
RH: Bicycling, square and round dancing, racquetball, badminton, ping pong, and camping are all among my favorite things to do. One of the reasons I am signed up for cryonics is because I enjoy life, and I want to have more time to continue enjoying it. I read, perhaps two or three hours a day. I receive some sixteen monthly science, philosophy, and finance journals. Just reading "Cryonet" can take a lot of time!

CM: *Finally, what would you like to say to other members reading this interview?*
RH: In closing, may I share a story that is deeply meaningful to me? While I have been signed up with Alcor since 1994, my wonderful wife and administrator, Dawn, has not been. We were prescient enough to get her life insurance in place some five years ago, simply keeping her options open. Valentine's Day of 2005 will be memorable for me forever. As a gift, Dawn gave me a small sculpture, with the title, "Together for Eternity," along with a mysterious envelope. In this envelope were Dawn's Alcor papers! The reason I share this personal anecdote is to remind us all to be patient, loving, and constant with people we care about. The march of progress is on our side. Mind boggling advances and breakthroughs are going to happen in the future, adding to the joy and quality of your life. I want to be there to be a part of them. My deepest gratitude goes to those who are making this a realistic possibility, and my heartiest congratulations go to my fellow "Cryoneers." ▲

Rudi joined Alcor because he enjoys life.

Cryopreservation Case Summary:

The Cryopreservation of Patient A 2071

By Tanya Jones, *Director of Technical Operations*

Background

When member A 2071 entered the application process in May 2004, his medical history included diabetes and colon cancer. His diabetes was controlled, but he was receiving aggressive treatment for his cancer. He was 79 years old, and he had no remaining family except a godson. His membership was approved on July 16, 2004.

Our emergency response system was initially activated on July 11, 2005, when the member's godson called us to say that the cancer treatments had proved ineffective. We provided him with emergency instructions for his physician and a funeral director (both in case of sudden death). A week later, we launched a standby reconnaissance of the area.

Our reconnaissance team flew to San Antonio, Texas, on July 19 with the intent of scouting the member's home, answering questions for the member and his godson, and making arrangements with a local funeral home for post pronouncement assistance.

We were hoping to deploy our new transport vehicle, in its first operational test, and immediately encountered a slight logistical problem. The member lived on the second floor of an apartment complex. To get to the front door, we had to walk through an open courtyard, and the stairs up did not have a foyer that was large enough to hold the mobile rescue cart.

The member's godson was a gracious and caring individual. He briefed us on the member's condition before we went in to meet him. We introduced ourselves, explained the procedure and answered all questions thrown our way. A brief patient assessment indicated that it would still be weeks before we would be needed.

We went with the godson to visit the funeral home they had found on our behalf. It was fortunate this was a reconnaissance mission and not the actual case, because we got terribly lost trying to find the mortuary. When we finally arrived, we negotiated with the local funeral home for priority access when called at pronouncement; we arranged for a funeral director to perform the femoral cannulation, and for assistance with obtaining the death certificate and the necessary permits to leave the state. This negotiation went well, as the funeral home was affiliated with a group that we had worked with on a previous case.

Flying home, we were confident that this case was well positioned to proceed smoothly, depending upon what kind of notice we received. The godson understood the urgency of keeping us informed of the member's condition, and he promised to brief hospice personnel, once they began 24 hour care. As with previous patients, we left monitoring equipment for the family and hospice nurses, so they could keep us informed of any changes in vital signs.

Standby and Pronouncement

The member took a sudden turn for the worse on August 10. At 8:00 that morning, his vital signs were blood pressure of 80/54, pulse tachycardic at 105, oxygen saturation of 70 percent, and his mental state was confused. To ensure we would be prepared to provide the best service, half the team flew out carrying a transport kit; and the second half of the team began the 1,000 mile drive in the new transport vehicle.

While our team was deploying, hospice personnel arranged to have a liter of saline administered to the member, in the hopes of prolonging his life long enough for the team to arrive and set up. Due to hospice limitations, the saline had not been fully administered by the time the flight team arrived; but the remaining saline was still administered in the hopes that the member would be sustained until such time as the transport vehicle arrived.

We arrived at the member's home at 17:12 local time and found the patient still conscious and feeling better. He was conversing coherently, even joking with us.

Once the emergency transport vehicle arrived on the scene, we began preparing it for the stabilization. Despite not having time to organize the supplies before leaving Arizona, it took the team only a half hour to prepare. With the patient's condition being much improved after his morning decline, we settled in for what would ultimately be a five day standby.

During the standby, we monitored the patient's condition closely. We knew from general monitoring that his tachycardia was normal, as his pulse had registered below 90 beats per minute only twice in the intervening month. His level of consciousness was fairly good, and he responded appropriately to questions. There were no signs that he was suffering from kidney failure. He did not become confused and was not obviously in pain until a couple days before cardiac arrest. In many ways, this was an unusual agonal decline, in that the patient was not dehydrating and his vital signs resembled none we have on record. Our timing for the standby was not too far off. Cardiac arrest occurred at 23:25 local time on August 15, 2005, with two team members nearby.

Stabilization

Following pronouncement, the patient was transferred to the living room using a new sling. The mobile rescue cart (MRC) was being moved from the vehicle to the front door and the patient's head was packed in ice to start the cooling process. The first medications were administered and circulated using manual chest compressions. An airway was placed and standard ventilation protocols applied. (Because of tumors in the throat, the Combi tube could not be inserted, and standard endotracheal intubation was used.) Once the medications had circulated sufficiently, the patient was transferred to the MRC.

By 23:42, the patient had been transferred to the emergency transport vehicle. Mechanical cardiopulmonary support using the LUCAS was initiated, and the patient was covered with more ice. Oxygen support, in concentrations

higher than room air, failed at this time. This highlighted that our team needs additional training on using the MRC.

Medications were still being administered. By 00:04, we had placed our new respiratory monitor, and the patient's oxygen saturation levels read 85 percent, his "pulse" was 85, and his temperature was 34.5°C. Priming of the circuit was done simultaneously, and all but the last large volume medications had been administered when the funeral director arrived to perform the femoral cut down.

The funeral director began operating at 00:31, and mechanical CPS was terminated. By this time, the patient's temperature had dropped to 31.6°C. The funeral director took longer than anticipated completing the cannulation. Blood washout began at 01:05. No clots were visible at this time, indicating that the early medications had been administered and circulated properly.

We lost volume in the early part of the washout due to a cannula leak. Closed circuit perfusion began at 01:14 with the patient's temperature at 19.7°C. This cooling rate was slower than expected. After examining the heat exchange portion of the circuit, we discovered that the pump in the ice bath had formed a shell of ice. By breaking up the shell and replacing the pump, cooling rates improved.

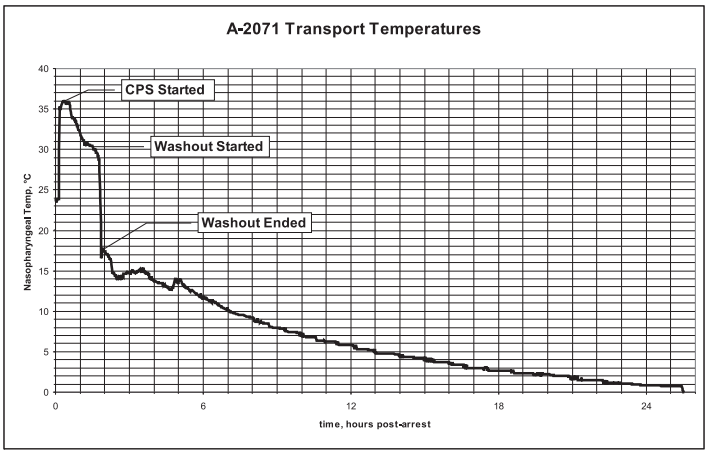
Washout switched from continuous perfusion to intermittent at 01:46 in an attempt to eke out additional cooling. The typical volume loss seen in a circuit was problematic in this case, but we were able to recover enough volume in the circuit by letting it rest for a few minutes before turning on the pumps again.

Because of the heat exchange difficulties, the patient's temperature was only lowered to 12.8°C when washout concluded at 02:15. Our goal is a maximum of 10°C with the desired temperature being closer to 5°C. Washout was stopped because of a combination of volume loss and a new member of the team stepping on the circuit, causing a breach. When we next deploy the MRC, we will be sure to raise all parts of the circuit off the floor to eliminate this hazard.

With the patient stabilized, we headed to the funeral home to arrange for paperwork processing and shipment to Alcor. We had previously established the general guidelines of driving a patient to Scottsdale when they are within a five or six hour radius of the facility, and continuing perfusion during that drive. For this patient, with a 20 hour distance, flying was the preferred option, especially given that we already had to wait until 08:00 to obtain the transit permit.

Upon arriving at the funeral home, we packed the patient for shipment to Alcor using our new ice bath liner for insulation. The patient was ready by 05:15; and the team waited for the Office of Vital Statistics to open and for the death certificate to be signed.

Unfortunately, the hospice physician who pronounced legal death was unwilling to sign the death certificate, and we had to track down the patient's personal physician. This was not an easy task, and we eventually enlisted the aid of the patient's godson. Furthermore, all flights to Phoenix were completely booked. Though we were able to secure a flight for the patient once the paperwork was prepared, he traveled unescorted. Two team members took a different flight on an airline that does not accept human remains and arrived a few hours in advance of the patient, while the two remaining team members drove the vehicle back to Arizona.



Temperature descent in patient from time of cardiac arrest to arrival at Alcor.

CRYOPROTECTION

The patient arrived at Alcor at 22:35 MST on August 16, 2005 (approximately 25 hours after cardiac arrest), in a 525 lb. container with ice bags intact and still cold. The new liner had worked extremely well.

For this case, Alcor was attempting its first whole body cryoprotection using the cryoprotectant M22 and was attempting to vitrify the brain without separation from the rest of the body. The surgery was standard, but the patient enclosure, perfusion equipment, and cryoprotectant were all being used for the first time.

When the patient was transferred to the operating room table, we found the patient sling worked well. The Teflon we had placed on the base of the table worked too well. We had hoped the Teflon would help us slide the patient into the enclosure easily, and that part worked; but later, the patient slid around too much and had to be held in place.

The first incision was made at 22:55, and pleural additions were found in the chest cavity. The patient's colon cancer had spread throughout his body, and tumors were in his lungs. When the atrium was located and a temperature probe and monitor with display functions were placed, the patient's nasopharyngeal temperature was 0.97°C.

Cannulation was completed by 00:09 on August 17, and the patient was prepped for burr holes. Once bubbles had been removed from the circuit, bypass began at 00:21. We immediately saw leakage in the chest and had to find the source and repair it. By 00:37, we saw good perfusion in the extremities. We also observed edema in the lungs and retraction in the left brain hemisphere.

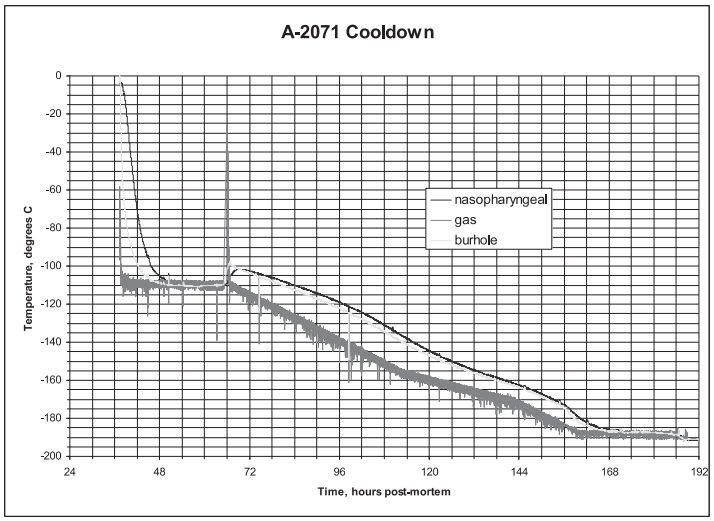
The cooling system on the patient enclosure initially caused some visibility problems. When nitrogen vapor was being circulated to maintain the external environment around the patient, the clouds impaired visibility. External cooling was turned off for the surgery but re started later.

Cryoprotection proceeded smoothly until 02:01, at which time an arterial air embolism occurred while the

perfusionist was away from his station and remaining staff had difficulty monitoring the recirculating reservoir level. One of the components in the M22 cryoprotectant has very strong foaming properties, causing the recirculating reservoir to fill with foam, obscuring the fluid level. Foam was pumped into the patient in unknown volume, and we then spent 90 minutes removing the bubbles from the aorta prior to resuming the cryoprotection. Based on this experience, the perfusion circuit will be modified to prevent foam formation in future cases.

During the later stages of the cryoprotection, we found ourselves losing volume from an unknown source. The chest leakage was controlled via cardiotomy suction, but there were additional losses that required time to locate. The source proved to be the femoral vessels, which had been jostled loose during transit.

Cryoprotection was concluded at 09:20, with the patient achieving target concentrations. Serious edema in the torso made closing difficult, but the patient was prepped and transferred for deep cooling at 10:22.



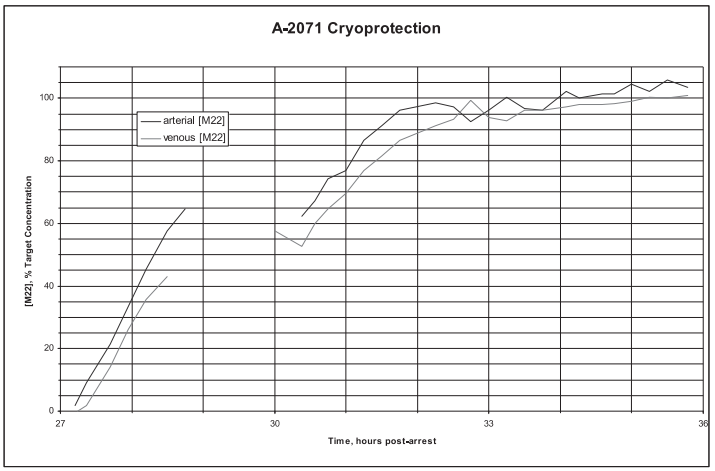
Cryoprotectant uptake during the vitrification procedure in patient A 2071, the gap represents a portion of the procedure during which samples were not being taken.

COOLING

Cooling occurred in accordance with usual protocols, a plunge to just above the glass transition temperature for the cryoprotectant followed by slower cooling at 1°C per hour. The cooling was changed to 0.5°C per hour for the interval from 155 to 170°C because of delays in our liquid nitrogen delivery schedule. Fifteen acoustic events were observed, with the first occurring at 121.9°C and the last at 171.4°C. Halving the cooling rate did not prevent cracks, nor did resuming the 1°C per hour cause additional events to occur.

CONCLUSION

This case, like all, had its good points and bad. On the positive side, the new transport vehicle performed well, with the exception of a generator problem that was fixed in the field. Use of the transport vehicle highlighted design deficiencies in the older equipment, which will be added to the list of things to improve. The entire stabilization was performed within the vehicle, and the funeral director had no concerns about performing femoral cannulation in it. Communication with the patient and his family was good throughout, from preliminary emergency activation to the resolution of paperwork problems.



Cooling curve and patient temperature, the spike in the gas represents the transfer of the patient to the single person dewar for the final stage cooling, when the gas line was temporarily disconnected.

This was the world's first attempt at vitrification in a whole body patient, and we are confident the brain was vitrified for the first time without separation. Some of the engineering done to implement the new whole body cryoprotection protocol needs to be re thought in light of the foaming properties of the cryoprotectant and vapor visibility issues, but overall the system performed as anticipated. We know how to solve these problems and plan to have implemented the necessary changes before our next whole body case.

Edema was an issue, and we believe it also reflects some interesting physical properties of the cryoprotectant; but this swelling was also the direct result of a long transit time between stabilization and cryoprotection. More investigation is needed on this issue, but we have made a couple modifications to the protocol that might be sufficient to reduce or eliminate edema in patients with less cold ischemia.

On the less positive side, we had paperwork problems again. Plus, the perfusionist left his station unattended, which resulted in foam being introduced to the patient's circulatory system. Field perfusion had heat exchange problems, and perfusion was stopped because the lines were breached. Transport teams need training on using the MRC, which has not been used for several years.

It was not until we were beginning to assemble and share the case data that we realized the operating room computer had not been set up properly. Cryoprotection data, aside from what was collected manually, was lost, hence the gap in refractive readings in the cryoprotection graph above. LabView has proven problematic in the past, and we are looking into placing it with something more user friendly. ▲

TechNews

by R. Michael Perry, PhD

HEALTH & LONGEVITY

New Alzheimer's Research Shows Reversal of Memory Loss. University of Minnesota researchers have figured out a way to reverse memory loss in mice with dementia. The discovery could lead to new treatments for Alzheimer's disease in humans. The findings are published in the journal *Science*. In the study, mice were genetically altered to develop a rare form of dementia found in humans. To do that U of M researchers used a special gene, known as a transgene, that contained a mutant form of a common protein called tau. The scientists then created a way to turn the defective tau protein on and off using a common antibiotic. Dementia and forgetting were induced in mice by turning the protein on. Turning off the defective protein resulted in not merely halting the progressing dementia but restoration of earlier memories that had seemingly been lost; it was conjectured that perhaps the disease had not progressed far enough at this point to cause the actual death of neurons which would occur in its more advanced stages.

Minnesota Public Radio 7/14/05
http://news.minnesota.publicradio.org/features/2005/07/14_bensonl_alzheimers/

Study Says Folic Acid Lowers Alzheimer's Risk. A growing consensus that the B vitamin folic acid can prevent Alzheimer's disease has been strengthened by a new study showing that people who consumed sufficient amounts of the nutrient had substantially less risk of getting the disease. The study looked at a number of nutrients, including vitamins E, C, B6, B12 and carotenoids, but it was folic acid that stood out as having the strongest association with a reduced risk of getting Alzheimer's. Those who consumed at least the recommended daily allowance of 400 micrograms had 55 percent less risk of getting Alzheimer's.

Milwaukee Journal Sentinel 8/11/05
http://www.jsonline.com/alive/news/ aug05/347889.asp

Brain Activity in Youth May Presage Alzheimer's Pathology. Researchers who used five different medical imaging techniques to study the brain activity of 764 people, including those with Alzheimer's disease, those on the brink of dementia, and healthy individuals, have found that the areas of the brain that young, healthy people use when daydreaming are the same areas that fail in people who have Alzheimer's disease.

ScienceDaily 8/27/05
http://www.sciencedaily.com/releases/2005/08/050827125911.htm

Gene Engineered Stem Cells Help Heal Severed Rat Spines. Genetically engineered stem cells can help rats' severed spinal cords grow back together, according to a study published July 26. Rats given the treatment, using stem cells taken from rat embryos, could move their legs again after their spines were severed in the lab, said the researchers' report in the *Journal of Neuroscience*. The scientists hope the approach, which generated a new fatty cover for the spinal cord cells called the myelin sheath, also could be shown to work in people. The key is using the right stem cells and then stimulating them correctly, said the researchers, who were led by Scott Whittemore of the University of Louisville School of Medicine in Kentucky. Spinal cord injuries can be caused by accidents or infections and affect 250,000 people a year in the United States alone, costing $4 billion annually, according to the National Institute of Neurological Disorders.

Reuters 7/27/05
http://www.msnbc.msn.com/id/7279844/did/8717240/

Growing Bone For Grafts Within A Patient's Body. An international team of biomedical engineers has demonstrated for the first time that it is possible to grow healthy new bone reliably in one part of the body and use it to repair damaged bone at a different location. The research, which is based on a dramatic departure from the current practice in tissue engineering, is described in a paper published by the *Proceedings of the National Academy of Science*. "We have shown that we can grow predictable volumes of bone on demand," says V. Prasad Shastri, assistant professor of biomedical engineering at Vanderbilt University who led the effort. For people with serious bone disease, it may even be possible to grow replacement bone at an early stage and freeze it so it can be used when it is needed, says Prasad.

ScienceDaily 7/29/05
http://www.sciencedaily. com/releases/2005/07/050726080028.htm

Spinal Regeneration

Spinal cord injuries have afflicted cryonicists and would-be cryonicists who may find themselves unable to work for a living and thus unable to afford the signup fees. (A case in point is James Swayze who became a near-quadriplegic after a spinal injury but was helped by generous contributions from the cryonics community so he could have cryopreservation arrangements.) Needless to say, the benefits of the ability to restore function in such cases would be beyond reckoning, and are one major reason to pursue stem cell research. This work is also of interest because it suggests that, for neurosusupension patients, a recreated body with its spinal cord could be connected with the brain relatively easily and allow for normal function.

Nanobodies. Antibodies, often described as magic bullets, are actually more like tanks: big, complicated and expensive. Tinier "nanobodies" may be able to infiltrate a wider range of diseases at lower cost. That is the hope of one small start up in Belgium, Ablynx. Its minimal staff has a simply stated mission: find the tiniest sliver of protein that will do the job of a full size antibody, then turn it into a billion dollar medicine or better yet, into the first of a whole new class of "nanobody" drugs against cancer, rheumatoid arthritis, inflammatory bowel disease, perhaps even Alzheimer's disease.

Scientific American.com 8/1/05
http://www.sciam.com/article.cfm?chanID=sa006&colID=1&articleID=0004C949 F886 12DB B88683414B7F0000

Nanotubes Yield More Effective MRI Contrast Agent. A U.S. and Swiss research team has created a new class of magnetic resonance imaging contrast agents at least forty times more effective than those now in use. Researchers at Rice University, the Baylor College of Medicine, the University of Houston and the École Polytechnique Fédérale de Lausanne in Switzerland say the new agents use the same highly toxic metal, gadolinium, that is given to more than a quarter of MRI patients today, but the metal atoms are encased inside a hollow tube of pure carbon called a nanotube. Shrouding the toxic metals inside the benign carbon is expected to significantly reduce or eliminate the metal's toxicity. The study was published in the journal *Chemical Communications.*

ScienceDaily 8/11/05
http://www.sciencedaily.com/upi/index.php?feed=Science&article=UPI 1 20050811 21481100 bc us gadonanotubes.xml

Scientists Make Nerve Stem Cells. The world's first pure nerve stem cells made from human embryonic stem cells have been created by scientists at the Universities of Edinburgh and Milan. It is hoped the newly created cells will eventually help scientists find new treatments for diseases such as Parkinson's and Alzheimer's. Nerve stem cells are those which help build the brain and central nervous system. Robert Meadowcroft, of the Parkinson's Disease Society, welcomed the news: "The purity of these cells should prove particularly valuable in studying the possibilities for transplantation and replacement of damaged tissue."

BBC News 8/16/05
http://news.bbc.co.uk/1/hi/sci/tech/4155016.stm

Step Toward Making Human Lungs. Scientists say they have made a significant step towards making human lungs for transplantation. The UK team at Imperial College London took human embryonic stem cells and encouraged them to grow into cells found in adult lungs. These lung cells are known as mature small airway epithelium, which line the part of the lung where oxygen is absorbed and carbon dioxide is excreted.

BBC News 8/23/05
http://news.bbc.co.uk/1/hi/health/4175822.stm

"Miracle Mice" Created That Regenerate Organs. Scientists have created a "miracle mouse" that can regenerate amputated limbs or badly damaged organs, making it able to recover from injuries that would kill or permanently disable normal animals. The experimental animal is unique among mammals in its ability to regrow its heart, toes, joints and tail. The researchers have also found that when cells from the test mouse are injected into ordinary mice, they too acquire the ability to regenerate. The discoveries raise the prospect that humans could one day be given the ability to regenerate lost or damaged organs, opening up a new era in medicine. Details of the research will be presented next week at a scientific conference on aging, Strategies for Engineered Negligible Senescence, at Cambridge University. Ellen Heber Katz, professor of immunology at the Wistar Institute, an American biomedical research center, says that the ability of mice at her laboratory to regenerate appears to be controlled by about a dozen genes.

Cryonics & Regeneration
The results with mice suggest that re-generation of missing body parts may be relatively easy, which has implications for cryonics patients, especially head-only cases or "neuros." Other possibilities could be improved healing techniques to delay clinical death or, with sufficient progress, avoid it altogether.

The Peninsula 8/28/05
http://www.thepeninsulaqatar.com/Display_news.asp?section=world_news&month=august2005&file=world_news2005082825258.xml

Landmark Discovery Extends Longevity in Mice. Researchers at UT Southwestern Medical Center, led by assistant professor of pathology Dr. Makoto Kuro o, have discovered a protein prolonging life in mice. Named klotho, the protein is found in several species. In mice it acts as a hormone, circulating through the blood and binding to cells, where it works by controlling insulin. Therapies based on this hormone could prove to be a way to extend life or slow the effects of aging, said Dr. Kuro o, who is senior author of a study published in an online issue of *Science Express.* For the current study, a mutant mouse strain was created in which the klotho gene generated more of the protein than in normal mice. Mice with the extra klotho lived between 19 and 31 percent longer than normal.

ScienceDaily 8/26/05
http://www.sciencedaily.com/releases/2005/08/050826073745.htm

Anti Cancer Drugs May Hold Promise Against Progeria. In a surprising development, a research team led by the National Human Genome Research Institute, part of the National Institutes of Health, has found that a class of experimental anti cancer drugs also shows promise in laboratory studies for treating progeria, a fatal genetic

disorder that causes accelerated aging. In a study published August 29 in the online edition of the Proceedings of the National Academy of Sciences, Brian Capell and his colleagues reported that drugs known as farnesyltransferase inhibitors, which are currently being tested in people with myeloid leukemia, neurofibromatosis and other conditions, might also provide a potential therapy for children suffering from Hutchinson Gilford Progeria Syndrome. A related study from Stephen Young, MD, and colleagues at the University of California at Los Angeles is being published in the same issue of PNAS.

ScienceDaily 8/30/05
http://www.sciencedaily.com/releases/2005/08/050830065132.htm

Caloric Restriction: Is It Worth It?
If we assume a 4 percent increase in life span, this works out to about 3 years for someone who would otherwise die at age 80; that is to say, you could expect to live to 83. Is it worth it? Each person, of course, must decide on their own. Possible risks to health from being extra-lean, such as lessened ability to survive an illness, must also be considered. In the case of cryonics, on the other hand, there might be a special benefit to living a few extra years, to take advantage of better cryopreservation techniques in a fast-moving field.

Caloric Restriction Won't Dramatically Increase Human Life Span. Severely restricting calories over decades may add a few years to a human life span but will not enable humans to live to 125 and beyond, as many have speculated, evolutionary biologists report. "Our message is that suffering years of misery to remain super skinny is not going to have a big payoff in terms of a longer life," said UCLA evolutionary biologist John Phelan. Scientists have known for six decades that cutting the caloric intake of rodents by 40 or 50 percent results in dramatically longer lives for them. "You can practically double their life span," Phelan said. "The same result has been found in fish, spiders and many other species. If it works for them, some thought, it should work for us; I'm here to tell you it doesn't." He and Michael Rose, professor of ecology and evolutionary biology at the University of California, Irvine, published their findings in the August issue of the peer reviewed journal *Ageing Research Reviews.* Their mathematical model shows that people who consume the most calories have a shorter life span and that if people severely restrict their calories over their lifetimes, their life span increases by between 3 percent and 7 percent far less than the 20 plus years some have hoped could be achieved by drastic caloric restriction. He considers the 3 percent figure more likely than the 7 percent.

ScienceDaily 8/30/05
http://www.sciencedaily.com/releases/2005/08/050830065729.htm

Nanotubes Promise Better Healing of Broken Bones. Scientists have shown for the first time that carbon nanotubes make an ideal scaffold for the growth of bone tissue. The new technique could change the way doctors treat broken bones, allowing them to simply inject a solution of nanotubes into a fracture to promote healing. The report appears in the June 14 issue of the American Chemical Society's journal *Chemistry of Materials.*

ScienceDaily 7/8/05
http://www.sciencedaily. com/releases/2005/07/050708055156.htm

South Korea Unveils First Dog Clone. Scientists in South Korea have produced the first dog clones, they reported recently in *Nature* magazine. One of the puppies died soon after birth, but the other, an Afghan hound named Snuppy, is still doing well after sixteen weeks, the researchers say. Snuppy joins a host of other cloned animals including Dolly the sheep, CC the cat and Ralph the rat. Scientists hope dog clones will help them understand and treat a range of serious human diseases. Snuppy, whose name stands for Seoul National University puppy, was made from a cell taken from the ear of a three year old male Afghan hound. Scientists took the genetic material from the ear cell and placed it into an empty egg cell. This egg was then stimulated to start dividing and develop into an embryo. Although many other animals have been successfully cloned, dogs are notoriously difficult: the South Korean team only obtained three pregnancies from more than 1,000 embryo transfers into 123 recipients. Of these, one miscarried and one died soon after birth; only Snuppy remains.

BBC News 8/3/05
http://news.bbc.co.uk/1/hi/sci/tech/4742453.stm

Researchers Discover Key to Human Embryonic Stem cell Potential. What exactly makes a stem cell a stem cell? The question may seem simplistic, but while we know a great deal of what stem cells can do, we don't yet understand the molecular processes that afford them such unique attributes. Now, researchers at Whitehead Institute for Biomedical Research working with human embryonic stem cells have uncovered the process responsible for the single most tantalizing characteristic of these cells: their ability to become just about any type of cell in the body, a trait known as pluripotency. Oct4, Sox2, and Nanog are master regulators, silencing genes that are waiting to create the next generation of cells. When Oct4, Sox2, and Nanog are inactivated as the embryo begins to develop, these networks then come to life, and the stem cell ceases to be a stem cell. The new work provides the first wiring diagram of human embryonic stem cell regulatory circuitry.

ScienceDaily 9/11/05
http://www.sciencedaily.com/releases/2005/09/050911104655.htm

Nanoparticles Pass Muster As Vectors For Gene Therapy. Gene therapy, in which a viral vector is used to modify defective genes or replace missing ones, has shown significant potential as a way of treating disease in animal models. But its use in humans has been hampered by safety concerns, including some fatalities in clinical trials. Researchers have thus been looking into the possibility of using nonviral vectors, which should carry fewer inherent risks, to deliver therapeutic genes. In a paper published online by the Proceedings of the National Academy of Sciences, scientists report that silicon nanoparticles can perform this task successfully in mice.

Scientific American.com 7/26/05
http://www.sciam.com/ article.cfm?chanID=
sa003&articleID=000DDC77 621D 12E5
A21D83414B7F0000

TECHNOLOGY

New Technique Produces 10 Carat Artificial Diamond. Researchers at the Carnegie Institution of Washington, D.C., have produced 10 carat, half inch thick single crystal diamonds at rapid growth rates using a chemical vapor deposition (CVD) process. The size is approx imately five times that of commercially available diamonds produced by the standard techniques. In addition, the team has made colorless single crystal diamonds, transparent from the ultraviolet to infrared wave lengths with their CVD process.

ScienceDaily 5/29/05
http://www.sciencedaily.com/
releases/2005/
05/050527105139.htm

Supercomputer's Key to the Brain. The quest to simulate the mammalian brain on the world's most powerful supercomputer is neuroscience's most ambitious project yet. Humanity has long wanted to discover the secrets of the brain and has done so with varying degrees of success. Recently advances in this area have been limited by the power of computers. But at Switzerland's École Polytechnique Fédérale de Lausanne, the Blue Brain Project aims to change this by simulating the structures and functions of the brain. The project's head, Professor Henry Markram, says that in the past there was no software environment capable of simulating the brain. Now, Blue Gene, a commercially available supercomputer, will help scientists to peer into the most inscrutable part of ourselves.

BBC News 8/19/05
http://news.bbc.co.uk/ 1/hi/programmes/
click_online/4165420.stm

A Future Full of Hopes and Fears. Science and technology have powered huge leaps in understanding but our biggest challenges lie ahead, is the take home message of the recent Technology, Entertainment and Design conference in Oxford, UK. The science of complexity is perhaps the greatest challenge of all, English Astronomer Royal Sir Martin Rees believes. The cosmologist said that in the 21st Century science had changed the world faster than ever before and in many new ways. "Our century is very, very special. It is the first where humans can change themselves." Advances such as drug implants may have changed human beings profoundly already the effects of which we could see this century. One man who is set on trying to unfold the complexity of life, and how we are made up and came to be in order to understand our future, is Craig Venter. He led the private effort to sequence the human genome the genetic code that creates life. His next big challenge is to create living, artificial organisms from a kit of genes, and he says he is well on his way.

BBC News 7/16/05
http://news.bbc.co.uk/1/hi/technology/4685231.stm

Nanotech Transistor Powers Up. The first electrical switch made entirely from carbon nanotubes has been unveiled. Its inventors hope that it could help to replace silicon chips with faster, cheaper, smaller components. The device is a Y shaped nanotube that behaves like a transistor, such as those found in every electronic device in your home. Current flowing from one branch to another can be switched on and off by applying a voltage to the third. "The small size and dramatic switching behavior of these nanotubes makes them candidates for a new class of transistor," says Prabhakar Bandaru, a materials scientist at the University of California, San Diego, who led the team of inventors. Nanotubes can also be made using cheaper chemical methods that avoid the laborious layering and etching used to make today's circuits. "This allows us to go for devices with much smaller size but much more complex functionalities," explains Hongqi Xu, a physicist from Lund University in Sweden.

news@nature.com 8/14/05
http://npg.nature.com/news/2005/ 050808/pf/050808
17_pf.html ▲

Diamonds and the Future
Inexpensive, large diamonds might have a number of uses. Some possibilities are: hard and durable substitutes for glass in windows; lenses with high focusing power (high refractive index); and hard, transparent, protective coatings on metals or other materials subject to weathering or chemical attack. Diamond fiber should be strong, durable, and relatively light-weight, and might find uses in textiles or as a structural re-inforcement in rigid materials such as concrete, or as a fiber optic material. Large, gem-quality diamonds would no doubt find many artistic and decorative applications. For some purposes diamond may be outpointed by other new materials such as carbon nanotubes but its own unique properties could still make it highly useful.

Executive Director's Report

By Steve J. Van Sickle

First, I would like to thank the Board for the confidence they have shown me in making me Alcor's Executive Director. I hope that I can help make things better for Alcor, that a permanent replacement can be found, and that my tenure is a short one. The staff here has been working hard in the transition, and the mood is up beat.

Since taking on this role, I have been largely devoted to understanding the financial health of the organization. As of the end of August, I had discovered financial oversights that were considered to be violations of Alcor policy. The accounting system is being corrected to ensure such breaches do not happen again in the future. The Board has voted to transfer $250,000 from the Endowment Fund to cover all past due bills. This transfer is independent of the $150,000 that was transferred from the endowment to cover the funds stolen from a member's pre paid cryopreservation account, leaving the Endowment Fund with a balance of $530,000. These transfers are due to unusual cash needs this year, not any insolvency in the organization. Although significant upcoming expenses will not be covered by these transfers, we are not requesting additional disbursements at this time.

Fester & Chapman, a local accounting firm, is completing its accounting review of our records for 2004. The results of their investigation will include recommendations for improving our accounting protocols, which we will be implementing. A cash flow projection for the remainder of 2005 has been created and distributed to the Board of Directors as of October 1. For those who are interested, Alcor is providing copies of its Financial Statements in the Library section of our website (under "The Alcor Foundation"). Visit this link for direct access: http://www.alcor.org/Library/index.html#alcorfoundation

On September 10, 2005, the Alcor Board of Directors held its annual meeting, which included elections of directors and officers of the corporation. Those elected include:

BOARD OF DIRECTORS:

Saul Kent
Jerry Lemler, MD
Ralph Merkle, PhD
Carlos Mondragon
Michael Riskin, CPA, PhD
Michael Seidl, PhD, JD
Stephen Van Sickle
Brian Wowk, PhD

CORPORATE OFFICERS:

Michael Riskin, CPA, PhD, *Chairman of the Board / Vice President*
Stephen Van Sickle, *Executive Director / Acting President*
Joseph Hovey, *Secretary / Treasurer*

Alcor continues to grow and advance during this turbulent time. This issue of the magazine highlights some of the achievements we announced recently, including brain vitrification for whole body patients (pg. 21), the whole body vitrification research matching grant offer (pg. 22), and the medical doctor we hired as a full time researcher (cover story, starting on pg. 14). Construction at Alcor continues to progress at a steady rate. We have accepted delivery on the second set of operating room lights, more of the extensive electrical and ducting work has been completed, and the large door for moving dewars has been framed and is ready to be installed. We anticipate most construction being completed by the end of the year.

One challenge we recently faced was handling two cryopreservation cases within a 24 hour period. Both went reasonably well, although we experienced a difficult time getting one of our patients out of Louisiana. (Members are encouraged to call us if they ever find themselves dealing with a natural disaster.) More details on these cryopreservation cases will be provided in upcoming issues of *Cryonics* magazine.

I am working closely with the Board of Directors to keep Alcor on a progressive path and welcome the opportunity to keep the membership informed of the current state of affairs. Membership Services welcomes your questions, so feel free to call toll free at (877) 462 5267 ext. 132 if you need further insight.

Alcor members are also encouraged to meet and chat with other members on Alcor United (www.alcorunited.org), an Internet forum for Alcor members created and moderated by James Conaway, a nine year member of Alcor.

Respectfully,

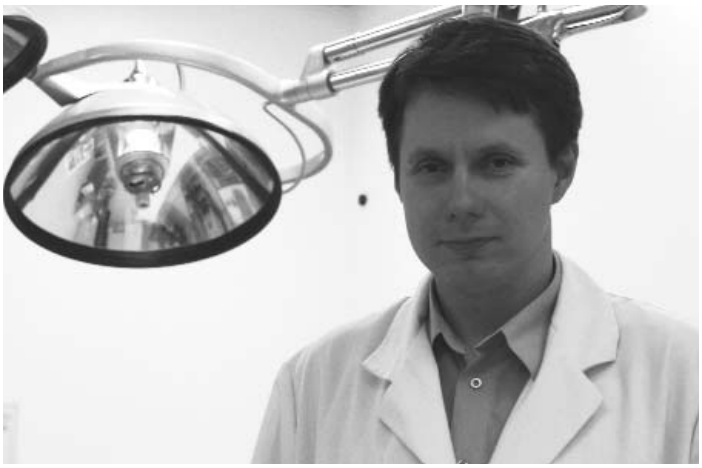
Steve Van Sickle
Executive Director

Meet Dr. Sergey Sheleg,

Senior Research Scientist

By Staff of Cryonics Magazine

Research is high on everyone's agenda, be it members, financial supporters, or Alcor officials. More research means not only better cryopreservations for those involved with cryonics today but more acceptance of the field in the future. For the first time ever, Alcor is engaging in a sustained effort to perform publishable research. Much of the research performed by Alcor over the years has been developmental engineering, building better equipment for use during cryopreservations. In the 1980's, Jerry Leaf did experiments with dogs, and there were some brief experiments with rats in 1996. Now, in 2005, Dr. Sergey Sheleg is reopening the experimental doors and putting Alcor's protocols back under the microscope.



Sergey Sheleg, MD, PhD in Alcor s operating room.

CM: *Dr. Sheleg, let's start with a little about your educational background.*
SS: In 1994, I graduated from the Minsk Medical School in Belarus (a former country of the Soviet Union). Then I had a residenceship for three years at the Research Institute of Oncology and Medical Radiology (also in Belarus) in the field of pediatric oncology.

CM: *You have held a number of positions in your career as a researcher. Tell us about some of your experiences.*
SS: In 1997 (three years after graduating as an MD), I got a Research Associate position at the Research Institute of Oncology and Medical Radiology. I worked in the Department of Chemoradiotherapy and Experimental Oncology. In 1998, I started to work on the problem of local chemotherapy of malignant brain tumors (malignant gliomas) using the anti tumor drug cisplatin. I worked under the supervision of Prof. Eugenie Korotkevich, a nationally and internationally recognized expert in neuro oncology.

CM: *So you were working on a treatment for brain cancer?*
SS: Yes. The median survival of patients with malignant brain gliomas is less than one year. I tried to design a new method for treatment of this incurable and rapid death causing disease. My results could significantly improve the outcome of malignant brain gliomas treatment. Based on this research in 2002, I received a Ph.D. degree in medical oncology. In 2004, a patent was received for this new, effective method of local chemotherapy of malignant brain tumors. Later that year, I had training at the Center for Biologics Evaluation and Research of the U.S. FDA and was invited by Prof. Henry Brem (Head of the Neurosurgery Department at John Hopkins University Medical School in Baltimore, Maryland, and a nationally and internationally recognized expert in neuro oncology) to present our results of local chemotherapy of malignant brain tumors using anti tumor drug polymer implants.

CM: *From 2002 to 2004, you held a Postdoctoral Fellow position at the Center for Biologics Evaluation and Research of the U.S. FDA (Bethesda, Maryland) in the field of molecular cell biology.*
SS: Yes, my supervisor was Dr. C.D. Atreya, a nationally recognized expert in molecular biology of rubella virus and rotaviruses. I received much experience in molecular biology, and I am very thankful to Dr. Atreya and all colleagues at his laboratory for their efforts to help me gain such important experience in molecular cell biology.

CM: *After that, you worked at the National Institute of Allergy and Infectious Diseases (NIH)?*
SS: Yes. For a year and a half, I worked as a Visiting Fellow Researcher at the Laboratory of Molecular Microbiology at the National Institutes of Health in Bethesda, Maryland. My work was in the field of molecular oncology (malignant transformation of cells by human herpetic viruses 8) under Dr. K. T. Jeang's supervision. Dr. Jeang is an internationally recognized expert in the fields of molecular biology of HIV (AIDS's viral agent) and in malignant transformation of the cells by viral proteins. Dr. Jeang is an extremely intelligent, wonderful, and remarkable person. I consider him to be one of my best teachers in science. I would like to express my gratitude for all his help and advice as to my becoming a real scientist.

CM: *What kind of advice did Dr. Jeang give you?*
SS: He told me many times that only a real researcher knows how to continue and, by the end, to finish a research project even when non expected research results are gotten. I especially liked his saying, "Do not allow the perfect to be the enemy of the good," which has a very deep meaning.

CM: *So how did you get your job at Alcor?*
SS: In November 2004 (during the third year of my research training at the NIH), I wrote a letter to the former President of Alcor, Mr. Joe Waynick, asking about the possibility of doing research work related to experimental neuro resuscitation after a cryonics procedure. I was invited for an interview at

Alcor and to visit 21st Century Medicine. I had a conversation with the leading researchers in the world in the field of experimental resuscitation and cryobiology Dr. Steve Harris (Critical Care Research) and Drs. Gregory Fahy and Brian Wowk (21st Century Medicine). I told them about my experience in the field of experimental neuro resuscitation. Very soon I received the job offer, and in August 2005, I started to work at the Alcor Foundation.

Dr. Sheleg has his own research lab at Alcor.

CM: *How will your past research in the field of oncology help you with your work at Alcor?*
SS: During my study at the Minsk Medical School in 2002, I started to work on the problem of neuro resuscitation after prolonged cardiac arrest and studied the dynamics of hypoxic brain damage. I did some experiments in this field and published one peer reviewed paper. After several years, I designed an experimental protocol for neuro resuscitation after prolonged cardiac arrest which was different from the conventional cardiopulmonary resuscitation (CPR) procedure. In 1997, I experimentally tested my method on the isolated human brain and found significant improvement of cerebral microcirculation. I am currently working on designing a new procedure to prevent development of severe hypoxic brain damage after prolonged cardiac arrest. It will be extremely useful, especially in long distance cryonics cases. This procedure also helps with reanimation of a cryonics patient because increasing the temperature of the biological specimen during re warming increases the risk of developing severe hypoxic brain damage.

CM: *For the benefit of our readers, could you explain hypoxic brain damage?*
SS: Hypoxic brain damage occurs during oxygen deprivation pathologic conditions (stroke, brain trauma, cardiac arrest). They first happen on a biochemical level, followed by depletion of the cellular energy substrates. Soon, the intracellular ultrastructures and organelles (mitochondria, lysosomes, euchromatin) will be severely damaged by the activated intracellular enzymes. Brain death (an irreversible pathologic condition) is caused by severe hypoxic damage to the cortical neurons.

CM: *Tell us about on some of the peer reviewed papers you have published.*
SS: I have been doing research work for more than 10 years. I have published more than 20 peer reviewed papers, some of them in English. I have engaged in a variety of research fields (neuro resuscitation, neuroinfectious diseases, neuro oncology) and all my research was related to understanding the pathogenesis of human brain pathologic conditions. I also took part in many international scientific congresses in different countries.

CM: *You mentioned that some of your papers were published in English. Tell us a little about your background, where you are from and the different places you have lived or visited.*
SS: Originally, I am from the Republic of Belarus, near Russia. In 1995, I had training in Germany (in the Muenster University Clinic) in the field of experimental neuro oncology. In 1997, I had training in Austria in Medical Oncology and in Russia (Moscow Research Oncological Institute) in the field of photodynamic therapy of malignant tumors. The experience I gained in photodynamic therapy allowed me to design and test an experimental protocol for measuring brain microcirculation. I also took part in many international scientific conferences in Belarus, Greece, Germany, and the U.S.

CM: *What originally got you interested in the field of cryonics?*
SS: My previous research work in brain death and neuro resuscitation is related to cryonics because sooner or later the cryonics industry will need technologies allowing for reanimation/resuscitation of biological specimens. The possibility of designing such technologies with its application for cryonics got me interested in this field.

CM: *How did you initially find out about Alcor?*
SS: Since anabiosis (a kind of natural suspended animation) was discovered in 1912 by Russian Researcher Dr. Bahmetiev, cryonics became a plot for science fiction novels and movies. Cryonics was a plot of several science fiction novels I read in my childhood. Also, I occasionally watched the American documental movie "Faces of Death." There was one episode about the cryopreservation of a human. I started to read more and more about cryopreservation and found Alcor on the internet. I visited Alcor's web site and read about different aspects of brain death (medical, philosophical, religious). During the third year of my research training at the NIH, I had already decided to apply for the opportunity to do research at Alcor.

CM: *What experiments are you working on right now at Alcor?*
SS: Currently I am studying the dynamics of hypoxic (oxygen deprivation) brain damage after prolonged normothermic cardiac arrest. Then I am going to test two new protocols to improve Alcor's cryonics procedures. The first one (based on the concept of chemical temporary anabiosis) should prevent development of severe hypoxic brain damage after prolonged cardiac arrest. As I already mentioned, the protocol will have benefits especially for long distance cryonics cases. The second protocol was designed for improving cerebral microcirculation using special functional electric stimulation. Then, I plan to test a brain re warming procedure after prolonged cryonic suspension/neurovitrification followed by the application of my neuro resuscitation protocol. The most important purpose of my research work is to design a procedure to prevent the development of severe hypoxic brain damage after prolonged cardiac arrest before starting the cryonic suspension. Please notice, I am not saying severe hypoxic brain damage after *death*. I am only saying after *cardiac arrest*.

CM: *Why is it important to make this distinction?*
SS: The human death diagnostic criterion has a long history

and has changed many times. The first criterion for human death was prolonged unconsciousness. The next death criterion became cardiac arrest. At first, it did not matter how long had passed since cardiac arrest took place, but, in 1928, the isolated human heart was revived 100 hours after death by Prof. Brukhonenko. Very soon, cardiopulmonary resuscitation (CPR) after a short time in cardiac arrest was proposed by Prof. Negovsky (Moscow, Russia) and Dr. Safar (Pittsburg, U.S.). In 1967, a cardiac surgeon from South Africa, Dr. Barnard, made the first human heart transplantation in the world. Physicians considered the brain trauma sustained by the cardiac donor to be terminal, but her heart was still beating. On one hand, cardiac transplantation was a big stride for humanity. On another hand, many physicians considered it to be a vivisection. Before long, a new diagnostic criterion for human death was proposed brain death, which also became the conventional diagnostic criterion for legal death in many countries.

CM: *So it is reasonable to wonder how the human death criteria will change in the next 50 or 100 years?*
SS: Yes, and nobody can predict. A similar public resonance took place after the first cryopreservation on January 12, 1967. Many researchers considered this kind of suspended animation to be charlatanism. However, research at 21st Century Medicine shows the possibility of cryopreserving and rewarming an isolated mammal's kidney using modern cryoprotectants without severe cellular damage or loss of the organ's function. My previous research (1992 1993) showed the absence of severe damage to the human neurons' cellular ultrastructures after prolonged warm cardiac arrest. Yet this is only the beginning! Cryonics procedures and protocols are improving day to day.

CM: *What aspect of your research at Alcor excites you most and why?*
SS: My former supervisor, Prof. Nedzved, always told me, "The winner should always look back!" I think this is completely related to any research innovations which can bring many benefits to humanity. I am excited by the opportunity to pursue this innovation, resuscitation of the mammals' brain after prolonged normothermic cardiac arrest, with its application for the field of cryonic suspension.

CM: *So in addition to developing improvements to Alcor's cryo preservation protocols, you are doing reanimation research. That's quite a challenge. What do you consider the most challenging aspect of your work here?*
SS: I plan to start designing an experimental re warming protocol in the near future. It is a quite difficult problem to rewarm quickly, washout the cryoprotectants, and to resuscitate the biological specimen after cryopreservation. There are so many questions we should answer, but I do hope we will have progress pretty soon.

CM: *What areas of Alcor's technical capability would you like to see developed in the next few years?*
SS: In my opinion, Alcor has all needed capability for cryopreserving human lives. Alcor uses a cardiopulmonary bypass system and a new cryoprotectant (M22) that ensures the cryonics procedure is the most efficient according to current biomedical science. My research laboratory at Alcor is completely equipped for doing any research work related to experimental neuro resuscitation and cryonics protocols.


Dr. Sheleg is excited to pursue innovations in cryonics.

CM: *Tell us about some of the equipment in your laboratory.*
SS: We recently bought the new generation special optic spectro photometer which allows us to do real time measuring of cerebral microcirculation during our experiments and also during cryonics procedures. The ability to measure cerebral microcirculation during cryonics procedures allows us to control the cerebral perfusion during the neuro vitrification procedure. Using this device we can also test brain viability in real time. We also plan to buy some equipment for electric brain bioactivity registration for future experiments.

CM: *Tell us about your family and what they think of your job at Alcor.*
SS: I am married and have a little son. My wife is a U.S. licensed registered nurse. I told her about my work at Alcor, and I am sure she understands the importance of my research work for Alcor and for biomedical science.

CM: *What are some of your personal interests?*
SS: My personal interests include reading science fiction novels, especially those with a biomedical plot. Sometimes it is possible to find very interesting ideas in such novels. Most of the writers were or are researchers or physicians, and I am sure they are subconsciously sharing their thoughts with their readers. I am also spending much time with my little son. As for a hobby, I like numismatics.

CM: *What is numismatics?*
SS: Numismatics is collection of rare coins and bank notes. I have been collecting rare coins for a long time, and I already have an interesting collection.

CM: *We appreciate your time today, Dr. Sheleg. Is there anything else you would like to say to Alcor's members and supporters reading this interview?*
SS: We are living in a very beautiful time. We all can see how scientific progress is developing each day. I do hope that such death causing diseases like cancer and AIDS will be cured in the near future. I also hope the aging problem will be solved and human life expectancy will be significantly increased. I am sure future technologies will allow us to resuscitate cryonically suspended patients followed by treatment of their health problems and am very proud to be engaged in such interesting research. We are living only once. It is true. Cryonics gives us a second chance! ▲

Where Are We?

By Thomas Donaldson, PhD

For some time I have followed two questions: How do our memories work? How does our consciousness work? This article will give my sense of where we are with both questions. Neuroscientists have come close to a full understanding of how memories work in healthy people and animals, but remain some way from a similar understanding of consciousness. As cryonicists, we will need much more than that to deal with patients whose brains have been affected by cryopreservation, poor diffusion of cryoprotectants, prolonged ischemia, and even dissection. Still, it helps a lot if we know how our memories and our consciousness work when we are healthy. If nothing else, such knowledge helps us look for clues to both in damaged brains.

Memories

First, we have several different kinds of permanent memories handled by different parts of our brain. Personal and general memories (what happened to us? What is 2 x 5?) are first dealt with by our hippocampus but end up elsewhere. Our cerebellum and lower brain deals with conditioning and much physical learning, such as riding a bicycle. We can immediately see this to be true when we notice that patients with both sides of their hippocampus destroyed can still speak their native language, properly move around, and show some kinds of learning (which clearly do not use their hippocampus). It is also interesting that such patients can learn something without knowing they have learned it (the notions of consciousness and memory lie close to one another). Presently, memories dealt with by our hippocampus have gotten more attention than others, but no one denies there are other parts of the brain involved with memories.

We would all like to be assured that when revived we will be ourselves.

Second, our memories have at least two stages, and possibly more. We have systems for storing memories short term, LTP and LTD, involving change in the activity of our neurons, and a second system which changes our neurons themselves so that our memories persist even if we are not aware of them: *really* long term memories. Which memories persist depends not simply on our cortex, but on our emotions about them too. Personal memories, neuroscientists have found, change over time unless they turn out very important to us, so that what we remember of an event in our past does not always match what we saw or thought when it happened.

Third, virtually all neuroscientists believe that our true long term memories persist because acquiring them changes the synapses in our brains. However, no agreement yet exists on the exact nature of these changes: ideas range from the notion of a local change to a synapse, to the growth of new synapses to make a new connection for a new memory, all the way to growth of a new neuron which takes up proper connections. All neuroscientists agree on one major fact about how our brain works: that new neurons are constantly grown in two brain regions, the subgranular zone (in the dentate gyrus, a part of our hippocampus) and in the lining of our ventricles.

Preneurons from the lining of our ventricles, also known as SVZ, migrate to various positions in our brain. Until recently, most neuroscientists believed that in all mammals such new neurons migrated to the olfactory system. Not long ago, some neuroscientists proved that such preneurons went elsewhere in monkeys, and by implication in people too. Such migrating preneurons often fail to survive; however some still do (why would our brains make them if they all died off?). Yet, many neuroscientists still act as it they would rather ignore these new neurons, showing up in only restricted parts of our brain. I am among those who think we probably grow new neurons throughout our brain, to deal with new memories. Yes, this also means that some older neurons will disappear. In some parts of our brain new neurons may play only a small role, and few older neurons die off; in others I suspect we will see many more new neurons.

We still have many questions to answer about how our different kinds of memory work. At the same time, every one of these questions clearly has a precise answer. Lots more work is needed before we see entirely how our memories work, but lots of neuroscientists work on these questions and such an understanding will come soon.

CONSCIOUSNESS

For some time the whole question of consciousness got mixed up with unverifiable philosophical considerations. Do I see the same color as you when we both see something colored red? Now that we have ways to see just what is happening in a live human brain, even if only at very low resolution, we can look at consciousness in the same way neuroscientists looked at vision for decades: if our brains work just the same, then differences between the colors we see cease to matter at all. Some even thought this beforehand, but MRIs and CT scans make it very clear.

This hardly means that we have anything close to an understanding of how consciousness works. Presently, many scientists have made theories of how our consciousness might work, and other ideas from outside (such as the notion that quantum mechanics plays a role in memories and identity, to which almost all neuroscientists give no credit at all). To make any real advance in understanding, we need a commonly agreed upon theory of identity. A short article such as this one can hardly detail every such theory. As instances, some suggest that a center in our lower brain, perhaps part of our reticular formation (which surrounds the upper part of our thalamus) and/or the thalamus itself. These lower brain centers connect to areas all through the rest of our brain, and our reticular formation plays a major role in sleep. Others suggest that different centers throughout our cortex become activated by our thinking or what we notice at particular times and, after competing with one other, one becomes dominant and so gives us consciousness of whatever it is dealing with. Theories in between these, of course, also have arisen. Moreover, some suggest that a good explanation will also deal with what philosophers call qualia, just how what we sense feels to us. Others argue that the feelings of consciousness do not need any special explanation. Finally, some neuroscientists explore the different kinds of consciousness shown by brain injured people, hoping that these will tell us how our own non injured consciousness works.

We would all *like* to be assured that when revived we will be ourselves. It is clear at least to me that with effort, we will come to an understanding of consciousness, but the lack of agreement alone tells me we are still much farther from that than we are from understanding our memories. We may also find that each affects the other: so far, no patients show a complete loss of *all* kinds of memory. Without any memories at all, we could not be conscious of anything at all. ▲

For more information and many views, take a look at a few recent papers on memories and a book on consciousness:

Papers:

A review on new neurons:
DN Abrams *et al.* Physiological Reviews 85 (2005): 523ff.

Memory in fusiform cortex:
RJ Garoff *et al.* Neuropsychologia 43 (2005): 847ff.

Memory in caudate nucleus:
CA Seger *et al.* J. Neuroscience 25(11) (2005): 2941ff.

One of the early papers among those that first found new neurons in adult brains:
J Altmon *et al.* Anatomical Research 145 (1963): 573ff.

Books:

Book on consciousness:
J. Cornwall (ed). Consciousness and Human Identity, Oxford University Press, 1998.

Remembering Jerry Leaf

By R. Michael Perry, PhD

(reprinted, with minor changes, from The Alcor Phoenix, July Aug 1998)

I have been to war, and fought with valor.
I have explored the unknown, and discovered.
I have friends, and I care for them.
I have found a fine woman, and I love her.
I have fulfilled my commitments, and my name is integrity.
I could not share my grief nor my anger, and now I am alone.
I now have to decide, and live or die.

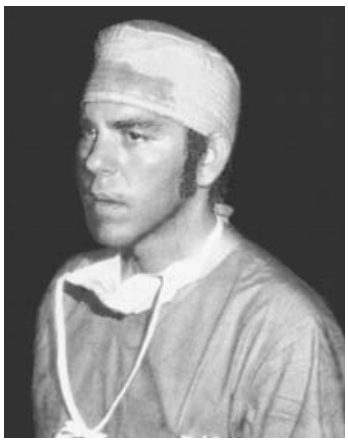
Jerry D. Leaf

In some ways this article is an easy one to write, in other ways hard. There is no shortage of information on Jerry Leaf, who was cryopreserved in July 1991 after years of most distinguished service to Alcor and cryonics. Back issues of *Cryonics* around that time and earlier are a good source that I have drawn on but Jerry too is a "patron saint." A short article such as this can hardly do him justice, though one must try I will have to stick to highlights.

Jerry Donnell Leaf was born April 5, 1941, in Artesia, California, close to Los Angeles, and spent much of his life in that vicinity, punctuated by excursions to places far around the globe. At the time of his cryopreservation he had been living in nearby Downey for many years.

As a toddler Jerry was already showing traits that would figure prominently in his later years. There was the time, aged three, that he went to the chicken pen to get some eggs and was chased back screaming by an angry rooster but he got the eggs out undamaged! Another time, about age four, he went "exploring" while at a street fair and was found, about an hour later, by his dad and older brother, a police officer on each hand. The young Jerry was not crying or asking for his mommy, just angry he had gotten caught. As he grew to manhood his attributes developed: a rare combination of dependability and independence; a desire for adventure; a cool competence informed by a rational outlook; a calm courage in the face of personal danger; a sensitivity to life, its values, and its problems.

After graduating from high school in 1959, Jerry and a friend, Doug Beverly, worked two months to buy equipment and supplies, then set off for the wilds of Guatemala, where they spent a month roughing it. Much later he would often talk about this trip, as Ralph Whelan remembered, and it seemed his opinions, values and ideals began to solidify with the adventure, "floating down a jungle river, meeting natives, hunting up dinner, encountering communists." Though "he would later hold his own presenting scientific papers at the Society for Cryobiology," Ralph said, "I will forever have the sense that this is what Jerry was all about. This was the sort of environment that allowed him to continually, moment to moment, prove to himself that whatever life had in store for him, he could take it. In fact, he would welcome it." Jerry himself would rather modestly comment, "I'm probably like most people who enjoy living; I like to use all my senses. I like to see things that look good, smell things that smell good and use my body and mind to the fullest."



Jerry Leaf at the Trans Time dog experiment ~ July 25, 1977 [1]

On returning from Guatemala, Jerry faced three job opportunities, none of which he liked, so he chose a fourth: the U.S. Army. Sent to Germany, he witnessed atrocities attributable to the East German communist regime and was there when they built the Berlin Wall. He wanted to strike back against world communism, so he volunteered for a Special Forces unit and was sent on a secret operation to Vietnam. Bluntly, he became an assassin, "delivering death," though under circumstances he felt were justified. "I do not regret having fought against an organized political system," he said in 1986, "which, even today, threatens the freedom of its own citizens and those of neighboring countries."

Combat took its toll; the casualty rate in his own unit would eventually exceed fifty percent. The extreme hardship provided its own hard won perspectives that would later bear fruit. "There is a special kind of chemistry and feeling that is shared by people who face death together over a period of time. I came away from these missions with the face of death having a very specific meaning; it was defined by a roll call of men we carried out of North Vietnam. They went home; there were no MIA's. I lived because of these friends, and it was the worst feeling not to be able to reciprocate."

Jerry's wartime experiences would in fact orient him toward an unusual career in trying to extend human life. He lost his own fear of death "somewhere in the jungles of Vietnam" but retained "the fear of not being able to save someone else that I care about" and he also retained a love of life. After Vietnam he returned to Germany, and then to the U.S. and "began to become increasingly concerned over the issue of life and death over the tremendous importance and preciousness of life." When he left the military he tried gold

Jerry and Kathy Leaf with daughter Kristen[2]

panning for a few weeks in northern California and roughed it for a few more weeks in Honduras, alone. In 1965, he married Kathy Connaughton; they would have two children. Meanwhile he had enrolled in Cerritos College. "I began to ask questions about life itself I started studying biology and philosophy in college and I became particularly interested in suspended animation." Then, in 1966, he heard a lecture on cryonics and was intrigued. He started corresponding with cryonics groups.

After receiving a bachelor's degree in philosophy, Jerry began doing graduate work in low temperature biology at the University of Nevada, but within two years gave it up. The university was oriented toward ecological studies; Jerry "began to realize that I knew more about low temperature biology from my independent studies than they did! That, coupled with the lack of equipment available for graduate research caused me to make the decision to return to Southern California."

Jerry never did get an advanced degree. Instead he started working in the operating rooms at UCLA. In time, he would become an instructor in thoracic surgery, coauthor over 25 papers from the UCLA laboratory, and set up a program for the cryogenic storage of heart valves and arteries for transplantation into children. Meanwhile he began to acquire equipment for his own use. In 1977, at Trans Time he directed the first total body washout and recovery of a dog by cryonicists. (The animal lived seventeen hours.) Later that same year he was the team leader in Alcor's first experiment, a cryonic suspension of a dog whose tissues were tested afterward for quality of preservation. (Recovery of live neurons from liquid nitrogen temperature was demonstrated.) Jerry soon set up an independent company, Cryovita, to further pursue this work, opening an office in Fullerton in 1978.

Jerry was also a longtime member of the Society for Cryobiology, where he tried to educate the scientific establishment about cryonics and win its acceptance. Unfortunately, this would prove elusive. In 1982, he campaigned, courageously if unsuccessfully, against an anti cryonics faction within the Society. They were able to rewrite the Society's bylaws to deny membership and expel existing members for "any practice or application of freezing deceased persons in anticipation of their reanimation." Though Jerry was never expelled, known cryonicists were afterward excluded. It was clear that the scientific mainstream was not the place to turn for support.

In the years following, Cryovita would instead work closely with Alcor, which would also be headquartered at the Fullerton address. (The two organizations moved to a facility in nearby Riverside in 1987.) In July 1984, Alcor/Cryovita under Jerry's direction, assisted by Mike Darwin and others, revived a dog after total body washout and hypothermia. It became a long term survivor without detectable deficits, which again was the first achievement of its kind by a cryonics group. (A non cryonicist, Gerald Klebanoff, had pioneered this work in the 1960's.) Soon Jerry and Mike were reviving dogs from four hours of bloodless perfusion at 4°C, which lent much confidence that at least the initial stages of a cryonic suspension were reversible. Their work led to such innovations as use of an extracorporeal membrane oxygenator for body washout, a better base perfusate, and silicone oil or "silcool" instead of isopropyl alcohol as a heat exchange medium in patient cooldowns as then performed (nonflammable and less injurious on contact with tissue).

When the Dora Kent crisis erupted at the end of 1987, Alcor's promising research was put largely on hold and Jerry's courage found a new outlet. His staunch dedication to Alcor and its patients during this well publicized confrontation cost him his job at UCLA, but his support never wavered, and it helped pull the organization through. By mid 1991, the crisis had been weathered and Jerry was eager to resume cryonics research but it was not to be. He was a heavy smoker who had tried to quit but had not succeeded. (Despite "sainthood," he was less than perfect in other ways too.) On the night of July 10, 1991, aged fifty, Jerry Leaf suffered a fatal heart attack and was cryopreserved. Alcor suffered because of his untimely demise but benefited greatly while he was active. Cryonics had achieved a new level of technical competence and respect. Jerry is still with us as a patient, and we share his vision, through which we hope one day to recover him and others who are entrusted to our care.

I thank Hugh Hixon and Joe Hovey for consultation during writing of this article. ▲

Photo credits:
[1] *Cryonics* Sep. 1991, 11
[2] *Long Life Magazine* Nov./Dec. 1977, 138

Sources: "Interview with Jerry Leaf," *Cryonics* Jul., Aug., Sep. 1986; "Cold War: the Conflict between Cryobiologists and Cryonicists" by Mike Darwin, *Cryonics* Jun. 1991; "Elegy for Jerry" by Ralph Whelan and "An Appreciation for Jerry Leaf," by Steve Bridge, *Cryonics* Sep. 1991; "For the Record" by R. Michael Perry, Cryonics 4th Qtr. 1994.

Whole Body Cryopreservation Upgrade

By Staff of Cryonics Magazine

Alcor has implemented a new whole body cryopreservation procedure. This procedure involves the use of a new cryoprotectant solution, M22, licensed from 21st Century Medicine. The new cryoprotectant is perfused throughout the entire body using the same procedures required for glycerol cryoprotection; but while it cryoprotects the torso, arms, and legs, we are confident that it is also vitrifying the brain. The main difference, beyond the composition of the solution, is that neurovitrification can be done without separating the brain from the rest of the body.

This new whole body procedure will now be standard for all members currently signed up as whole body, as well as for those whole body members who have executed an open option contract.

The important thing to realize about this process is what it cannot do. This is not whole body vitrification, in the sense that the entire body is vitrified. Significant portions of the body do not cryoprotect sufficiently to vitrify, mostly because things like fatty tissue and skeletal muscle are not well vascularized. This new procedure may not be as optimum for brain cryoprotection as a simple neuro procedure would be, because of the somewhat longer cryoprotection and cooling times. Conversely, compromises needed to protect the brain may lead to under cryoprotecting the body, in less ideal cases. But the good thing to remember is that brain vitrification is now available to those who wish to remain strictly whole body, and that the entire body is cryoprotected intact.

A significant amount of engineering work was done here at Alcor to ensure the proper use of M22. A new circulating chiller and perfusion circuit were needed, as were controlled temperature enclosures for both the patient and the perfusion circuit to allow safe perfusion at temperatures well below the freezing point of water. The patient enclosure allows further cooling after cryoprotection, to at least 30 or 40 degrees below zero, reducing the hazards of temperature fluctuations while moving the patient into the next stage of cooling. The credit for this engineering work belongs to Hugh Hixon and Tanya Jones, who have done a wonderful job implementing this new procedure.

Those interested in neurovitrification and whole body cryoprotection will no longer have to face the sorts of compromises they did in the past, and we believe this is a significant advance in our capabilities. For those who would like to know more about M22, the composition and effects have been published in the scientific literature listed below [reference 1]. Electron micrographs of the ultrastructure of brain tissue vitrified with M22 have also been published [reference 2]. Further information and micrographs explaining the switch to M22 for all Alcor cases is available at: http://www.alcor.org/Library/html/newtechnology.html

As explained in reference 1, M22 has been shown to be compatible with high viability of tissue slices and with consistent survival of kidneys after transplantation. This allows the unprecedented vitrification of the human brain within the intact human body using a solution that is in principle capable of preserving tissue viability as measured by present day methods. However, in order to be sure that the brain will vitrify in compromised human patients, Alcor currently must perfuse M22 for longer periods of time than those shown to preserve viability in model systems. In addition, M22 has not yet been shown to preserve the viability of the brain in model system studies.

Nevertheless, the use of M22 allows Alcor to come closer than ever before to achieving the goal of in situ brain vitrification using perfusion conditions that preserve tissue viability by current standards and puts Alcor on the road toward the possible eventual attainment of this goal. ▲

(1) Fahy GM, Wowk B, Wu J, Phan J, Rasch C, Chang A, Zendejas E. Cryopreservation of organs by vitrification: perspectives and recent advances. *Cryobiology*. (2004) Apr;48(2):157 78. (http://www.21cm.com/pdfs/ cryopreservation_advances.pdf)

(2) Lemler J, Harris SB, Platt C, Huffman TM. The arrest of biological time as a bridge to engineered negligible senescence. *Ann N Y Acad Sci.* (2004) Jun;1019:559 63. Review. (http://alcor.org/Library/html/annals.html)

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Who Have You Told?

By Bill Voice, *Alcor Transport Coordinator*

Many of our readers and members look forward to the case summaries published in this magazine because we put in the good, the bad, and everything else. This information is very important to pass along to our members and supporters, as it indicates both the successes and the problems that arise in a conventional cryonics case. As a paramedic, I am trained for the best and the worst outcomes. I have run many emergency calls to the same home for the same patient. Although every call is different, communication is always one of the critical elements for success.

So the question that we must ask is, "Who have you told?" Many cryopreservation cases would have been more successful if the member had passed along cryonics information to their family, friends and health care providers. This does not mean you have to tell the world; but there are several key people that should be informed about your cryonics arrangements and key steps that should be taken to help you or your loved ones.

Access to Medical History

One of the current challenges for cryonics patients is the Health Insurance Portability and Accountability Act (HIPAA) of 1996. When drafted, the HIPAA legislation had four primary objectives:

1. Assure health insurance portability by eliminating job lock due to pre existing medical conditions
2. Reduce healthcare fraud and abuse
3. Enforce standards for health information
4. Guarantee the security and privacy of health information

The Standards for Privacy of Individually Identifiable Health Information are designed to help guarantee privacy and protect the confidentiality of patient medical records. However, this can cause a problem for Alcor if we are notified of a member being admitted to a hospital for treatment. What is likely to happen when we arrive on the scene, since we are not family and probably have no authorization that deals with pre mortem access to information, is that the facility will neither confirm nor deny that the member is even present. Consent is required from the patient or the next of kin before any information can be released to Alcor personnel.

This happened not too long ago when I was doing a standby for a member having a surgical procedure. Prior to the surgery, the member indicated to me that his doctor and nurse knew of his wishes, but when I knocked on the door, the staff denied my entry into the facility; in accordance with the law, they would tell me nothing about the member's presence at the facility. There was a 45 minute delay before I could contact a family member, explain the situation, and have them arrive at the facility to give permission for Alcor's presence. Once the family member arrived, the medical staff said, "OK, that is all we need to know."

It is very important to have a written medical release stating that the Alcor Foundation is authorized to access your health information.

This member recovered nicely after the procedure, but if the situation had gone poorly, the member would have received a less than ideal cryopreservation.

Besides the immediate need in emergency situations, the importance of medical records also relates somewhat to restoring your health in the future. Just imagine some time in the future when you are to be removed from liquid nitrogen. The Alcor medical staff is looking at you, and they are trying to figure out the cause of your demise. Your file contains no record of previous health problems, just a relative cause of death listed on the death certificate and records of Alcor's procedures, things done after the pronouncement of legal death. Where would you start on the puzzle? Full access to your medical history is essential to your successful reanimation.

Inform Others

Family, we love them with all of our heart, for good or bad. Did you know they have significant control over you even if there is documentation of your wishes? As an Alcor member, you need to inform and educate your loved ones of your wishes. When there is resistance from the patient's family, a great deal of time can be wasted before the Alcor transport team can start its stabilization procedures.

According to the American Heart Association, brain damage can occur within 4 6 minutes without oxygenation. One of the primary goals of Alcor's transport team and stabilization protocol is to reduce ischemia and infarction in the tissues after the heart stops. Imagine if the transport team is prevented from reaching the patient for hours, imagine the damage then. Imagine the damage done if gaining access to the patient took days. What is the outcome of the cryopreservation going to be?

It is very important to have a strong, sympathetic advocate on your side to see that your wishes are going to be fulfilled. The choice of an advocate is critical. If you read this magazine regularly, you have probably already seen some unfortunate cases where the advocate has actually slowed Alcor's access to a patient. This may even be a family member that is supportive until the patient becomes unable to communicate due to unconsciousness or another medical reason.

This individual, entrusted with an important task, still has a personal agenda and may not believe in your wishes or, even worse, may stand to benefit financially from your death. Humans are odd creatures, and they do unexpected things under stress. Some members have set up their wills with provisions stating that any interference with the cryopreservation will result in the family member receiving very little or no inheritance. It is not in your best interests to rely on people who do not share your desires.

Your family has power over you in a medical emergency. The order of authority in most states is:

- ✓ *Spouse*
- ✓ *Parents*
- ✓ *Legal age children*
- ✓ *Siblings*

Your medical care advisors and practitioners also need to be informed of your wishes for cryopreservation. They may or may not believe in what you are doing, but they often respect patient choice and will help you on that basis. They are the ones that can order medications or procedures that will help with patient stabilization, such as placing an IV for intravenous fluid admin istration or giving the patient an anticoagulant to prevent blood clots prior to legal death. If you are in a hospital and your death occurs late at night, you may have to wait for the staff physician to visit. This doctor is not your primary health practitioner. It will save precious time when your wishes are clearly stated in your primary health practitioner's records.

Choose A Funeral Home

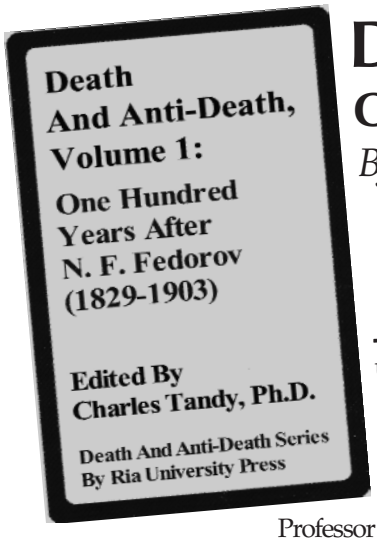
It is also important to consider the steps that occur after legal death. The choice of a funeral home is very important. When a member contacts a local funeral home, this opens the door for Alcor's transport team. This little step makes a big difference. The funeral director does not know us and might know little or nothing at all of cryonics, but he does know about helping grieving families in any way they need. When he or she learns that it is the member's wish, this can make all the difference. If Alcor knows of your relationship with the funeral director, we can contact him/her in an emergency.

All of this prevents catching the funeral director off guard and helps save us time finding a funeral home to assist in an emergency. It may also be in your best interests to contact your local medical examiner's office to notify them of your wishes. There are certain levels of examination that can be done, but it is up to the medical examiner to decide what is necessary. Coroners and medical examiners must uphold their legal responsibilities, and they have control of when, where, and how the exam will take place. This may ultimately impact a cryopreservation procedure, if the member dies under conditions that require an autopsy.

Secrecy, is there a place for it? Yes there is. News and media coverage can hinder a cryopreservation and slow things down. We are fighting for the best outcome, and time is one of the most significant enemies we have. In some extreme cases, secrecy has extended to include family members or friends that were expected to interfere with a cryopreservation. Nevertheless, it is very important to inform your next of kin so they are better prepared to speak for you when you do not have the ability to speak for yourself.

You may not feel that now is the right time to tell them about your decision. It is a hard subject to deal with because we do not always want to face the fact that it could happen to us. Yet, if you die suddenly or become incapacitated, you have lost your chance. The time is now or in the very near future. Make it a high priority because for the moment, it is the responsibility of each member to watch out for his or her own safety.

***Communication** is one of the greatest keys to success. We have seen it in business and our personal lives, but it also needs to be part of your strategy to protect your future with Alcor.* ▲



Death and Anti-Death, Volume 1:

One Hundred Years After N. F. Fedorov (1829-1903)

By Charles Tandy, Editor (Palo Alto, California: Ria University Press, 2003)

Book Review by R. Michael Perry, PhD

As he briefly notes in the back of his book, "Death and Anti Death, Volume 1: One Hundred Years after N. F. Fedorov (1829 1903)", Dr. Tandy holds a PhD in philosophy of education and (2003) was Associate Professor of Humanities and Director of the Center for Interdisciplinary Philosophic Studies at Fooyin University, Taiwan. Other sources indicate he also has a strong interest in life extension and cryonics going back many years and is himself a cryonicist (signed up with American Cryonics Society). For the past few years he has been editing volumes devoted to immortalist themes; these feature some of his own writings along with those of invited contributors.

The Death and Anti Death series reached volume two last year; a third volume is projected for later this year. Each contributed article forms a chapter in the volumes and concludes with notes and a bibliography. The series memorializes important figures in the history of thought, particularly as their ideas relate to the scientific conquest of death (immortalism). The first volume honors the pioneering Russian scientific immortalist Nikolai Fedorov who died a hundred years before. Contributors are invited to reference this patron figure in their articles, though it is not a requirement. In fact most of the articles in this volume do not mention Fedorov, whose radical proposal to raise the dead through science has garnered only marginal serious attention.

Dr. Tandy offers a generous endorsement of Federov in an introductory chapter, and an interesting comparison is made in the article by well known Fedorov biographer George M. Young, between Fedorov's idea of a universal resurrection and yoga. Both seek transcendence of this mortal world, but yoga is a process of mental discipline to be carried out without technological aids and focuses on "metaphysical knowledge." Fedorov's idea of resurrection, in contrast, would be strongly dependent on advanced technology and involve straightforward scientific principles and knowledge.

There are other important differences, too. Yoga is focused on liberation, while resurrection is aimed at a kind of self deification. While in yoga only a few are likely to make great progress and achieve final liberation, Fedorov's idea of resurrection is to be open to all and all must, in the end, join in the project so that each may optimally benefit. The main difficulty with Fedorov's idea is how the dead are to be raised when the important remains (the brain) have perished. Fedorov's own ideas of tracking and reassembling atoms that made up each individual seem naïve and unworkable in modern physics. Yet the case against Fedorov's basic idea is far from closed; the prospects depend significantly on just what one accepts as a "resurrection." In the book, however there is not much discussion of the implementation issue; the main consideration of Fedorov is as a moral philosopher.

A rather inspiring point of view is articulated in the book by Alcor member Dr. Robert Newport in his article titled "Fear of Death and the Quest for Immortality." Paradoxically, Newport maintains, it is fear of death that creates antipathy toward doing something about the problem, even at a time in history when there is actually something we can do about it (cryonics). Evidence favoring cryonics is cited: the successful resuscitation of small organisms from cryogenic freezing, the promise of nanotechnology to make fine scale repairs on cold damaged tissue, and so on. Needless to say, it will probably not convince those already unfavorable to cryonics, but it does at least establish a balance with the more pro death stance of "mainstream" contributors in the book. While many of these may have their minds made up, there is one interesting instance of a fence sitter, gerontologist Harry R. Moody. Moody tells us that when he began his article he intended to argue against anti aging technologies and "for a more 'ecological' vision of life where youth and age are both accepted as part of the natural life cycle." But the more he thought about it the harder it was to rationalize this position. He finally concluded he would rather just stay younger, "instead of celebrating the condition of age to which I had devoted the bulk of my professional life in gerontology."

The final chapters of the book are taken up with the issue of whether death is harmful to the individual. Epicurus, an ancient Greek philosopher noted for discounting the possibility of an afterlife and advocating living as well as possible in this life, is cited: death is not harmful because before it happens there is no harm, and after it happens there is no victim! Several counterarguments are offered, the strongest being the "deprivation" argument that, even though death is not painful, it is not pleasant either, and one is deprived of satisfactions that continued life might bring.

In all, one finds a rich harvest of ideas on different sides of the death question, something that should interest many people and perhaps weaken some of the entrenched opposition to the idea of human life extension. ▲

Member Notes

New Whole Body Procedure

Alcor has implemented a new whole body cryopreservation procedure. This procedure involves the use of a new cryoprotectant solution, M22, licensed from 21st Century Medicine. The new cryoprotectant is perfused throughout the entire body using the same procedures required for glycerol cryoprotection; but while it cryoprotects the torso, arms, and legs, we are confident that it is also vitrifying the brain. The main difference, beyond the composition of the solution, is that neurovitrification can be done without separating the brain from the rest of the body. See pg. 21 for full details.

Whole Body Engineering Improvement

We had a visibility problem with the vapor cooling environment for whole body patients using the new enclosure box. The nitrogen vapor was being circulated around the patient with such vigor that the surgeons' vision was obscured. Our controls have now been modified so that the three fans pushing the vapor through the enclosure can be turned on or off individually.

Regional Emergency Training

Our last regional training session for the year was held in southern California on September 25. Alcor would like to commend both Bill Voice and all the transport team members who participated in the more vigorous training program implemented this year for regional groups. Everyone has worked hard throughout the course of this year, and the improvements in competence and skill are obvious. We'll continue the training program next year, and we hope to attract more qualified individuals to the teams.

New Research Lab

A lab has been created for Dr. Sheleg, Alcor's new research scientist, that includes improved ventilation and air circulation, a surgical station and operating microscope. Dr. Sheleg has begun projects approved by the Research Committee. See pg. 14 for his candid interview.

ICE Your Cell Phone

It has been reported that paramedics will access an unconscious person's cell phone for clues to that person's identity and for help contacting family members. If they see an entry in your phone book called ICE (stands for "In Case of Emergency") they will often call the corresponding number.

Media Update

In August and September, Alcor participated in the following media events:

Wall Street Journal (US)
Sun Sentinel (US)
BBC (UK)
Sunday Express (UK)
Financial Times (UK)
FuJi TV (Japan)
Red Back Films (UK)

Alcor also signed an Exclusivity Agreement with Zig Zag Productions (UK) licensing them exclusive rights to footage of a yet to be filmed cryopreservation case.

Website Update

An estimated 25,514 distinct computers visited Alcor's website in September. There was a small access spike on Sept. 5 coincident with the *New York Times* article on the Ted Williams "death mask" art exhibit. There was a large access spike (triple normal traffic) on Sept. 15, the same day that an Israeli company announced success freezing sheep ovaries.

Announcing Alcor United

Alcor members have a new forum where they can meet and chat with other members. Please visit Alcor United (www.alcorunited.org), an Internet forum for Alcor members created and moderated by James Conaway, a nine year member of Alcor. This is an easy to reach meeting place for Alcor members. There is an anonymous forum for those who wish to remain anonymous.

Emergency Response Improvements

Our emergency phone number has not changed in many years, but some members may still carry outdated emergency alert tags (bracelets and necktags). It is important to keep the emergency numbers current. A quick phone call to Alcor Central may one day be crucial. We have made diligent efforts to ensure members receive updated tags when changes are made, but please verify that your tags have the following correct phone numbers: 800 367 2228 and 480 922 9013 (note area code). If the numbers on your tags do not match these, we apologize and you are encouraged to let us know immediately so we can send you replacement tags. Contact D'Bora Tarrant at Alcor: 877 462 5267 x 101 or eMail her at dbora@alcor.org.

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PERIASTRON

Publishing for immortalists since 1990. The newsletter *PERIASTRON* and the two books, *A Guide to Antiaging Drugs* and *Tales of Skastowe,* continue in publication.

And we announce here availability of *three new updates* to THE GUIDE. They are rewrites of Chapter 10 (on melatonin), Chapter 12 (on Ch picolinate) and Appendix 2 (drugs waiting in the wings). Chapter 10 now tells not only of melatonin, but of a closely related hormone, epithalamin. Chapter 12 tells much more about toxicity of Ch picolinate: As before, no significant human toxicity. Each Update is available for $5.00, including postage.

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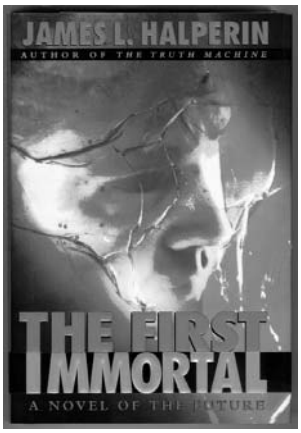

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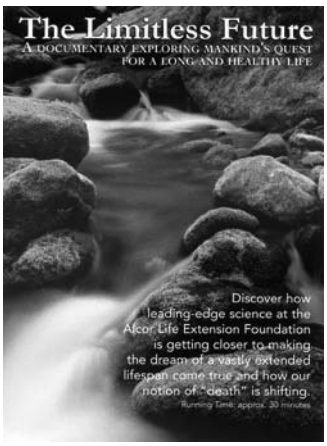


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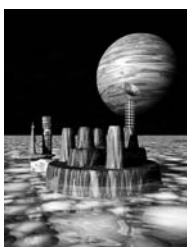
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Cover Art by Tim Hubley!

Over the last several years, Tim Hubley has provided this magazine with some of the most beautiful and creative CGI art we ve ever seen. Now Tim is selling matted 8.5 x 11 color inkjet prints of these images *(without all the messy text added in layout)*.

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About the Alcor Foundation

The Alcor Life Extension Foundation is a non profit tax exempt scientific and educational organization dedicated to advancing the science of cryopreservation and promoting it 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 cryotransport technicians on call around the United States. Alcor's Arizona facility includes a full time staff with employees present 24 hours a day.

MEETINGS

ARIZONA

Scottsdale:
Alcor Board of Directors Meetings
Alcor business meetings are generally held on the first Saturday of every month starting at 11:00 am MST. Guests are welcome. For more information, contact Alcor at (480) 905 1906.

Scottsdale:
Alcor Tours
Tours are held at Alcor at 10:00 am and 2:00 pm every Tuesday and Friday. They are hosted by our Executive Director (10:00 am) and Director of Technical Operations (2:00 pm). Call Alcor at (877) 462 5267, ext. 101 to schedule an appointment.

NEVADA

Las Vegas:
There are many Alcor Members in the Las Vegas area. If you wish to meet and socialize, contact Katie Kars at (702) 251 1975. This group wants to get to know you!

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.

CALIFORNIA

Los Angeles:
Alcor Southern California Meetings
For information on Southern California meetings, call Peter Voss at (310) 822 4533 or e mail him at peter@optimal.org. Although monthly meetings are not held regularly, there is no shortage of Los Angeles Alcor Members you can contact via Peter.

San Francisco Bay:
Alcor Northern California Meetings
For information on Northern California meetings, call Tim Freeman at (408) 774 1298 or e mail him at tim@fungible.com.

WASHINGTON

Seattle:
For information on Northwest meetings, call Richard Gillman at (425) 641 5136 or join the e mail group CryonicsNW at http://groups.yahoo.com/group/CryonicsNW.

DISTRICT OF COLUMBIA

Life Extension Society, Inc. is a cryonics and life extension group with members from Washington, DC, Virginia and Maryland. Meetings are held monthly. Contact Secretary Keith Lynch at kfl@keithlynch.net. For information on LES, see our website at www.keithlynch.net/les.

MASSACHUSETTS

Boston:
A cryonics discussion group meets the second Sunday of each month. For more information, contact Tony Reno by phone at (978) 433 5574 or e mail at tonyreno@concentric.net. Information can also be obtained from David Greenstein at (508) 879 3234 or e mail: davidsgreenstein@juno.com.

TEXAS

Dallas:
North Texas Cryonauts, please join 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.

UNITED KINGDOM

There is an Alcor chapter in England. Its members are working hard to build solid emergency response, transport, and cryopreservation capability. For information about meetings, contact Andrew Clifford at Andrew@banknotes.ws. See the website at www.alcor uk.org for additional details

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