

A Publication of the Immortalist Society

LONG LIFE

Longevity Through Technology

Volume 47 - Number 01



Analytics



map navigation



Statistics



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 - money transfer
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 - strategic planning
 - statistics
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Faculty



Account

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Why should You Join the Cryonics Institute?

The Cryonics Institute is the world's leading non-profit cryonics organization bringing state of the art cryonic suspensions to the public at the most affordable price. CI was founded by the "father of cryonics," Robert C.W. Ettinger in 1976 as a means to preserve life at liquid nitrogen temperatures. It is hoped that as the future unveils newer and more sophisticated medical nanotechnology, people preserved by CI may be restored to youth and health.

1) Cryonic Preservation

Membership qualifies you to arrange and fund a vitrification (anti-crystallization) perfusion and cooling upon legal death, followed by long-term storage in liquid nitrogen. Instead of certain death, you and your loved ones could have a chance at rejuvenated, healthy physical revival.

2) Affordable Cryopreservation

The Cryonics Institute (CI) offers full-body cryopreservation for as little as \$28,000.

3) Affordable Membership

Become a Lifetime Member for a one-time payment of only \$1,250, with no dues to pay. Or join as a Yearly Member with a \$75 initiation fee and dues of just \$120 per year, payable by check, credit card or PayPal.

4) Lower Prices for Spouses and Children

The cost of a Lifetime Membership for a spouse of a Lifetime Member is half-price and minor children of a Lifetime Member receive membership free of charge.

5) Quality of Treatment

CI employed a Ph.D level cryobiologist to develop CI-VM-1, CI's vitrification mixture which can help prevent crystalline formation at cryogenic temperatures.

6) Locally-Trained Funeral Directors

CI's use of Locally-Trained Funeral Directors means that our members can get knowledgeable, licensed care. Or members can arrange for professional cryonics standby and transport by subcontracting with Suspended Animation, Inc.

7) Funding Programs

Cryopreservation with CI can be funded through life insurance policies issued in the USA or other countries. Prepayment and other options for funding are also available to CI members.

8) Cutting-Edge Cryonics Information

Members currently receive free access to Long Life Magazine online or an optional paid print subscription, as well as access to our exclusive members-only email discussion forum.

9) Additional Preservation Services

CI offers a sampling kit, shipping and long-term liquid nitrogen storage of tissues and DNA from members, their families or pets for just \$98.

10) Support Education and Research

Membership fees help CI to fund important cryonics research and public outreach, education and information programs to advance the science of cryonics.

11) Member Ownership and Control

CI Members are the ultimate authority in the organization and own all CI assets. They elect the Board of Directors, from whom are chosen our officers. CI members also can change the Bylaws of the organization (except for corporate purposes).

The choice is clear: Irreversible physical death, dissolution and decay, or the possibility of a vibrant and joyful renewed life. Don't you want that chance for yourself, your spouse, parents and children?

To get started, contact us at:

(586) 791-5961 • email: cihq@aol.com

Visit us online at www.cryonics.org



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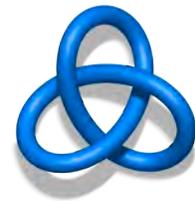


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A publication of the Immortalist Society



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Cover: © Sellingpix - 123rf.com
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You've signed up for Cryonics Now what should you do?

Welcome Aboard! You have taken the first critical step in preparing for the future and possibly ensuring your own survival. Now what should you do? People often ask "What can I do to make sure I have an optimal suspension?" Here's a checklist of important steps to consider.

- Become a fully funded member through life insurance or easy pre-payments

Some members use term life and invest or pay off the difference at regular intervals. Some use whole life or just prepay the costs outright. You have to decide what is best for you, but it is best to act sooner rather than later as insurance prices tend to rise as you get older and some people become uninsurable because of unforeseen health issues. You may even consider making CI the owner of your life insurance policy.

- Keep CI informed on a regular basis about your health status or address changes. Make sure your CI paperwork and funding are always up to date. CI cannot help you if we do not know you need help.
- Keep your family and friends up to date on your wishes to be cryopreserved. Being reclusive about cryonics can be costly and cause catastrophic results.
- Keep your doctor, lawyer, and funeral director up to date on your wishes to be cryopreserved. The right approach to the right professionals can be an asset.
- Prepare and execute a Living Will and Power of Attorney for Health Care that reflects your cryonics-related wishes. Make sure that CI is updated at regular intervals as well.
- Consider joining or forming a local standby group to support your cryonics wishes. This may be one of the most important decisions you can make after you are fully funded. As they say-"Failing to plan is planning to fail".
- Always wear your cryonics bracelet or necklace identifying your wishes should you become incapacitated. Keep a wallet card as well. If aren't around people who support your wishes and you can't speak for yourself a medical bracelet can help save you.
- Get involved! If you can, donate time and money. Cryonics is not a turnkey operation. Pay attention and look for further tips and advice to make both your personal arrangements and cryonics as a whole a success.



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Hello everyone and welcome to the new print-by-paid-subscription and read-it-free-online edition of *Long Life* magazine. I believe it will continue to serve the purpose of informing and educating our members while doing so in a way that is affordable for all its regular readers as well as those new to the concept of cryonics. I'm sure it will do so in a helpful and responsible way. Thanks to the Immortalist Society for continuing to work to provide accurate information while doing so in a way that is affordable for all.

CI continues with its steady growth and improvements. We are currently working on a tribute/conference room at CI and it is my hope that it will be ready for viewing at our next AGM **Saturday, Sept. 12 at 2pm** - remember to mark your calendars! We are also developing an early notification alarm app for android phones to help cryonicists access medical/cryonics help when they are alone or cannot speak for themselves. My hope is to unveil this prior to the next AGM as well. We have been very busy with media requests--approximately one a week. The majority of such requests seem to be positive and at least mostly accurate. Many people have been asking questions about local standby and planning. This is what I had hoped for and CI has developed a few basic and intermediate kits for members to either copy or purchase near cost. Call or write CI if you are interested.

As circumstances would have it, I was able to put our intermediate kit to the test and was afforded the opportunity to lend a hand to one of our less fortunate members who was suffering from Amyotrophic Lateral Sclerosis (ALS), which is also known as "Lou Gehrig's disease". What follows is the case report I wrote in conjunction with CI Operations Manager Andy Zawacki.

Cryonics Institute Case Report for Patient Number 132

CI patient #132 was a 47 year old male from Pennsylvania. The patient was a CI member at the time of his death.

On March 24th 2015 at 12:30 pm, patient 132 went into cardiac arrest and was pronounced in his home by hospice medical staff that were already on scene. Due to the circumstances of his illness, he had decided to voluntarily have his ventilator removed and had made his intention publicly known. This afforded volunteer standby via myself and local funeral directors with the ability to be available bedside to begin ice bath cool down and CPS (cardiopulmonary support) immediately.

Prior to his arrest he was administered Heparin, Mannitol, Maalox, Morphine, and Versed by his physician. At approximately 12:31pm manual CPS and cool down were begun. Another 160 units of Heparin were given IV and 1 mg Epinephrine 1:10,000 was administered every 5 minutes IV bolus for the first 40 minutes. His initial temperature of 36.2 C was obtained via nasopharynx at 12:32. He was ventilated using a Bag Valve Mask (BVM) with an ITD at about 12 ventilations per minute. His end tidal CO₂ was in the 5% range indicating good ventilation and gas exchange from the lungs. Approx 1 hour of high quality CPS was performed at a rate of 100 per min using the Lucas 1 automatic CPR unit while he was supine in the Ziegler Ice Bath. In addition, ice water circulation was continued with a battery pack driven marine bilge pump and hose with an emphasis on the patients head. Departure from Pennsylvania was at 3:14 pm and the temperature reading was 13.1 C. Ice water circulation continued enroute to CI with an arrival time of 11:52 pm where temperature was measured at 3.4 C.

Sara Walsh, CI's local cooperating funeral director, was present for the perfusion and she was assisted by Hillary, a licensed funeral director who works for her. The incisions for the perfusion began at 12:41am and the perfusion began at 1:01am. A full-body perfusion was performed. The temperature of the probe in the nasopharynx was 3.4c at the start of the perfusion.

The perfusion was finished at 2:15am. During the perfusion 6 liters of 10% EG (Ethylene Glycol) solution, 10 liters of 30% EG solution and 70 liters of 70% VM1 (Vitrification Mixture 1) solution were used. The final refractive index of the effluents exiting the right jugular vein from the head was 1.4226. The final refractive index of the effluents exiting from the right jugular vein in the body was 1.4206. The average flow rate during perfusion with 70%VM1 was 1.41 liters per minute. The temperature of the probe in the nasopharynx was -5.6c when the perfusion was complete.

Continues on Page 8



Cryonics Institute Membership Statistics:

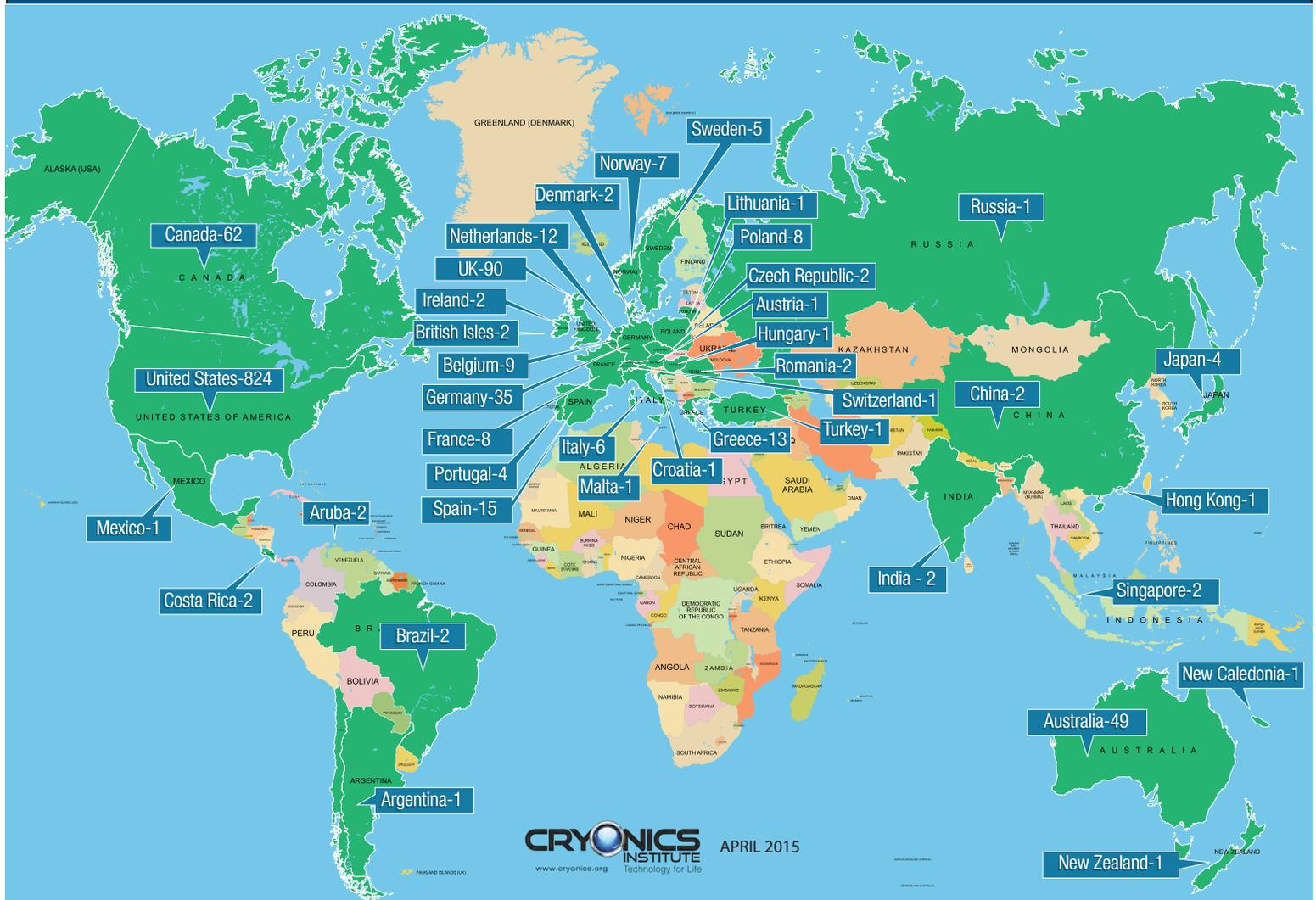


As of late April 2015, the Cryonics Institute has 1,188 members, up 23 from our last report. Of the 1,188 Members, 582 have funding and contracts in place for human cryopreservation. Of these 582, 177 have arrangements for Suspended Animation Standby and Transport.

There are 132 human patients and 110 pet patients in cryopreservation at CI's Michigan facility.

CI continues to be an industry leader in terms of both membership and practical affordability for all.

Cryonics Institute Membership by Country:



CRYONICS INSTITUTE APRIL 2015
www.cryonics.org Technology for Life



Worldwide Cryonics Groups

If you know of, or are considering starting a support, standby or other cryonics-related group in your area, please send details to immsoc@aol.com. We'll be using [Long Life](#) to list existing groups of interest as well as help spread the word and encourage new organizations. (New additions to the list are denoted with an asterisk).

AUSTRALIA: The Cryonics Association of Australasia offers support for Australians, or residents of other nearby countries seeking information about cryonics. caalist@prix.pricom.com.au. Their Public Relations Officer is Philip Rhoades. phil@pricom.com.au GPO Box 3411, Sydney, NSW 2001 Australia. Phone: +6128001 6204 (office) or +61 2 99226979 (home).

BELGIUM: Cryonics Belgium is an organisation that exists to inform interested parties and, if desired, can assist with handling the paperwork for a cryonic suspension. The website can be found at www.cryonicsbelgium.com. To get in touch, please send an email to info@cryonicsbelgium.com.

BHUTAN: Can help Cryonics Institute Members who need help for the transport & hospital explanation about the cryonics procedure to the Dr and authorities in Thimphu & Paro. Contacts : Jamyang Palden & Tenzin Rabgay / Emails : palde002@umn.edu or jamgarnett@hotmail.co Phones : Jamyang / 975-2-32-66-50 & Tenzin / 975-2-77-21-01-87

CANADA: This is a very active group that participated in Toronto's first cryopreservation. President, Christine Gaspar; Vice President, Gary Tripp. Visit them at: <http://www.cryocdn.org/>. There is a subgroup called the Toronto Local Group. Meeting dates and other conversations are held via the Yahoo group. This is a closed group. To join write: csc4@cryocdn.org

QUEBEC: Contact: Stephan Beauregard, C.I. Volunteer & Official Administrator of the Cryonics Institute Facebook Page.

For more information about Cryonics in French & English: stephanbeauregard@yahoo.ca

DENMARK: A Danish support group is online. Contact them at: david.stodolsky@socialinformatics.org

FINLAND: The Finnish Cryonics Society, (KRYOFIN) is a new organization that will be working closely with KrioRus. They would like to hear from fellow cryonicists. Contact them at: kryoniikka.fi Their President is Antti Peltonen.

FRANCE:

SOCIETE CRYONICS de FRANCE Roland Missionnier would like to hear from cryonicists in Switzerland, Luxembourg and Monte Carlo, CELL: (0033) 6 64

90 98 41, FAX: (0033) 477 46 9612 or rolandmissionnier@yahoo.fr

Can help Cryonics Institute Members who need help for the transport & hospital explanation about the cryonics procedure to the Dr and authority in Toulouse Area. Contact : Gregory Gossellin de Bénicourt / Email : cryonics@benicourt.com Phone : 09.52.05.40.15

GERMANY: There are a number of cryonicists in Germany. Their homepage is: www.bio-stase.de (English version in preparation.) if there are further questions, contact Prof. Klaus Sames: sames@uke.uni-hamburg.de.

GREECE: Greek Cryonics Support Group. Sotiris Dedeloudis is the Administrator. Find them at: <http://www.cryonics.gr/>

INDIA: Can help Cryonics Institute Members who need help for the transport & hospital explanation about the cryonics procedure to the Dr and authority in Bangalore & Vellore Area. Contacts : Br Sankeerth & Bioster Vignesh / Email : vicky23101994@gmail.com Phones : Bioster / 918148049058 & Br Sankeerth / 917795115939

ITALY: The Italian Cryonics Group (inside the Life Extension Research Group (LIFEXT Research Group)) www.lifext.org and relative forum: forum.lifext.org. The founder is Bruno Lenzi, contact him at brunolenzi88@gmail.com or Giovanni Ranzo at: giovanni1410@gmail.com

JAPAN: Hikaru Midorikawa is President Japan Cryonics Association. Formed in 1998, our goals are to disseminate cryonics information in Japan, to provide cryonics services in Japan, and eventually, to allow cryonics to take root in the Japanese society. Contact mid_hikaru@yahoo.co.jp or <http://www.cryonics.jp/index.html>

NEPAL: Can help Cryonics Institute Members who need help for the transport & hospital explanation about the cryonics procedure to the Dr and authorities in Kathmandu. Contact : Suresh K. Shrestha / Email : toursuresh@gmail.com Phone : 977-985-1071364 / PO Box 14480 Kathmandu.

NETHERLANDS: The Dutch Cryonics Organization (<http://www.cryonisme.nl>) is the local standby group and welcomes new enthusiasts. Contact Secretary Japie Hoekstra at +31(0)653213893 or email: jb@hoekstramedia.nl

* Can help Cryonics Institute Members who need help, funeral home, transport & hospital expla-

tion about the cryonics procedure to the Dr and authority at Amsterdam with branches in other cities. Contact : Koos Van Daalen / Phone (24 Hours) +31-20-646-0606 or +31-70-345-4810

NORWAY : Can help Cryonics Institute Members who need help for the transport & hospital explanation about the cryonics procedure to the Dr, funeral home and authority at Sandvika. Contacts : Gunnar Hammersmark Sandvika Begegravelsesbyraa / Phones : 011-47-2279-7736

PORTUGAL: Nuno & Diogo Martins with Rui Freitas have formed a group to aid Alcor members in Portugal. Contact: nmartins@nmartins.com or visit www.cryonics.com.pt/

RUSSIA: KrioRus is a Russian cryonics organization operating in Russia, CIS and Eastern Europe that exists to help arrange cryopreservation and longterm suspension locally, or with CI or Alcor. Please contact kriorus@mail.ru or daoila.medvedev@mail.ru for additional information or visit <http://www.kriorus.ru>. Phone: 79057680457

SPAIN: Giulio Prisco is Secretary of the Spanish Cryonics Society. Website is <http://www.cronica.org.sec>. He lives in Madrid and he's a life member of CI and is willing to serve as a contact point for Europeans. He can be contacted at: cell phone (34)610 536144 or giulio@gmail.com

* **SWITZERLAND (new entry):** www.CryonicsSwitzerland.com or www.ria.edu/cs

UNITED KINGDOM: Cryonics UK is a nonprofit UK based standby group. <http://www.cryonicsuk.org/> Cryonics UK can be contacted via the following people: **Tim Gibson:** phone: 07905 371495, email: tim.gibson@cryonics-uk.org. **Victoria Stevens:** phone: 01287 669201, email: vic-stevens@hotmail.co.uk. **Graham Hipkiss:** phone: 0115 8492179 / 07752 251 564, email: ghipkiss@hotmail.com. **Alan Sinclair:** phone: 01273 587 660 / 07719 820715, email: cryoservices@yahoo.co.uk

Can help Cryonics Institute Members who need help, funeral home, transport at London. Contact : F.A. Albin & Sons / Arthur Stanley House Phone : 020-7237-3637

INTERNATIONAL: The Cryonics Society is a global cryonics advocacy organization. Website is www.CryonicsSociety.org. They publish an e-newsletter [FutureNews](#). Phone: 1-585-643-1167.

Please note, this list is provided as an information resource only. Inclusion on the list does not constitute an endorsement by Long Life magazine or our affiliated organizations. We urge our readers to use this list as a starting point to research groups that may meet their own

individual needs. We further note that readers should always use their own informed judgment and a reasonable amount of caution in dealing with any organization and/or individual listed.



The patient was then placed in the computer controlled cooling chamber to cool to liquid nitrogen temperature. The human vitrification program was selected and the time needed to cool the patient to liquid nitrogen temperature was five and a half days. The patient was then placed in a cryostat for long-term cryonic storage.

Comments: The perfusion of the patient went very well because of advanced planning and on hand standby at the moment of cardiac arrest. This case was a result of donations made possible from the Venturist Society and the very generous cryonics community. Thanks to all who donated the time and money to make this happen.

This case helps to illustrate that a very high quality suspension can take place with a little planning and standby completed by a competent group of people. In this case the funeral directors, physician and family understood the standby process and despite not all necessarily being 100% in favor of cryonics, they all nevertheless acted professionally to honor the patient's wishes. Not only did they act with urgency and an understanding of the basic process, they were willing to render services that in this case resulted in an optimal suspension. The lesson to be learned is to plan and prepare so that when and if you ever find yourself in need of these services, they will be there for you and you will receive the best possible chance.

Molecule-making machine simplifies complex chemistry

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN PRESS RELEASE: PUBLIC RELEASE: 12-MAR-2015

Eureka Alert: http://www.eurekaalert.org/pub_releases/2015-03/uioa-mms030615.php

A new molecule-making machine could do for chemistry what 3-D printing did for engineering: Make it fast, flexible and accessible to anyone.

Chemists at the University of Illinois, led by chemistry professor and medical doctor Martin D. Burke, built the machine to assemble complex small molecules at the click of a mouse, like a 3-D printer at the molecular level. The automated process has the potential to greatly speed up and enable new drug development and other technologies that rely on small molecules.

"We wanted to take a very complex process, chemical synthesis, and make it simple," said Burke, a Howard Hughes Medical Institute Early Career Scientist. "Simplicity enables automation, which, in turn, can broadly enable discovery and bring the substantial power of making molecules to nonspecialists."

The researchers described the technology in a paper featured on the cover of the March 13 issue of Science.

"Small molecules" are a specific class of complex, compact chemical structures found throughout nature. They are very important in medicine - most medications available now are small molecules - as well as in biology as probes to uncover the inner workings of cells and tissues. Small molecules also are key elements in technologies like solar cells and LEDs.

However, small molecules are notoriously difficult to make in a lab. Traditionally, a

highly trained chemist spends years trying to figure out how to make each one before its function can even be explored, a slowdown that hinders development of small-molecule-based medications and technologies.

"Up to now, the bottleneck has been synthesis," Burke said. "There are many areas where progress is being slowed, and many molecules that pharmaceutical companies aren't even working on, because the barrier to synthesis is so high."

The main question that Burke's group seeks to answer: How do you take something very complex and make it as simple as possible?

The group's strategy has been to break down the complex molecules into smaller building blocks that can be easily assembled. The chemical building blocks all have the same connector piece and can be stitched together with one simple reaction, the way that a child's interconnecting plastic blocks can have different shapes but all snap together. Many of the building blocks Burke's lab has developed are available commercially.

To automate the building-block assembly, Burke's group devised a simple catch-and-release method that adds one building block at a time, rinsing the excess away before adding the next one. They demonstrated that their machine could build 14 different classes of small molecules, including ones with difficult-to-manufacture ring structures, all using the same automated building-block assembly.

"Dr. Burke's research has yielded a significant advance that helps make complex small molecule synthesis more efficient, flexible and accessible," said Miles Fabian of the National Institutes of Health's National Institute of General Medical Sciences, which partially funded the research. "It is exciting to think about the impact that continued advances in these directions will have on synthetic chemistry and life science research."

The automated synthesis technology has been licensed to REVOLUTION Medicines, Inc., a company that Burke co-founded that focuses on creating new medicines based on small molecules found in nature. The company initially is focusing on anti-fungal medications, an area where Burke's research has already made strides.

"It is expected that the technology will similarly create new opportunities in other therapeutic areas as well, as the industrialization of the technology will help refine and broaden its scope and scalability," Burke said.

"Perhaps most exciting, this work has opened up an actionable roadmap to a general and automated way to make most small molecules. If that goal can be realized, it will help shift the bottleneck from synthesis to function and bring the power of making small molecules to nonspecialists."





Keeping Atherosclerosis In Check With Novel Targeted Nanomedicines

Columbia University Medical Center Press Release: February 18, 2015

<http://newsroom.cumc.columbia.edu/blog/2015/02/18/keeping-atherosclerosis-check-novel-targeted-nanomedicines/>

Boston, MA, & New York, NY (Feb.18, 2015) – Nanometer-sized “drones” that deliver a special type of healing molecule to fat deposits in arteries could become a new way to prevent heart attacks caused by atherosclerosis, according to a study in preclinical models by scientists at Brigham and Women’s Hospital (BWH) and Columbia University Medical Center (CUMC). The findings are published in the February 18 online issue of *Science Translational Medicine*.

Although current treatments have reduced the number of deaths from atherosclerosis-related disease, atherosclerosis remains a dangerous health problem: Atherosclerosis of the coronary arteries is the #1 killer of women and men in the United States, resulting in one out of every four deaths. In the study, targeted biodegradable nano “drones” that delivered a special type of drug that promotes healing (“resolution”) successfully restructured atherosclerotic plaques in mice to make them more stable. This remodeling of the plaque environment would be pre-

dicted in humans to block plaque rupture and thrombosis, thereby preventing heart attacks and strokes.

“This is the first example of a targeted nanoparticle technology that reduces atherosclerosis in an animal model,” said co-senior author Omid Farokhzad, MD, associate professor and director of the Laboratory of Nanomedicine and Biomaterials at BWH and Harvard Medical School (HMS). “Years of research and collaboration have culminated in our ability to use nanotechnology to resolve inflammation, remodel and stabilize plaques in a model of advanced atherosclerosis.”

In the study, targeted nanomedicines made from polymeric building blocks that are utilized in numerous FDA-approved products to date were nanoengineered to carry an anti-inflammatory drug payload in the form of a biomimetic peptide. Furthermore, this peptide was derived from one of the body’s own natural inflammatory-resolving

proteins, called Annexin A1. The way the nanomedicines were designed enabled this biological therapeutic to be released at the target site, the atherosclerotic plaque, in a controlled manner.

In mouse models with advanced atherosclerosis, researchers administered nanomedicines and relevant controls. Following five weeks of treatment with the nanomedicines, damage to the arteries was significantly repaired and plaque was stabilized.

Specifically, researchers observed a reduction of reactive oxygen species; increase in collagen, which strengthens the fibrous cap; and reduction of the plaque necrotic core. These changes were not observed with the free peptide or empty nanoparticles.

“Many researchers are trying to develop drugs that prevent heart attacks by tamping down inflammation, but that approach has some downsides,” said co-senior author Ira Tabas, MD, Richard J. Stock Professor of Medicine (Immunology) and professor of



pathology & cell biology at CUMC. "One is that atherosclerosis is a chronic disease, so drugs are taken for years, even decades. An anti-inflammatory drug that is distributed throughout the entire body will also impair the immune system's ability to fight infection." That might be acceptable for conditions that severely affect quality of life, like rheumatoid arthritis, but "using this approach to prevent a heart attack that may never happen may not be worth the risk."

In addition, it's not enough to deliver an anti-inflammatory drug to the plaques, said Columbia associate research scientist Gabrielle Fredman, PhD, one of the study's lead co-authors. "Atherosclerosis is not only inflammation; there's also damage to the arterial wall. If the damage isn't repaired, you may not prevent heart attacks."

The targeted nanomedicines used in the current study were engineered by researchers at BWH. Following preliminary proof-of-principle studies at CUMC in models of inflammation, they were further tested in a clinically relevant disease model in mice and were shown to be capable of maneuvering through the blood circulation and traversing leaky regions through to the inside of the plaques, as was demonstrated by fluorescence microscopy imaging of the plaque lesions.

Researchers note that in addition to their specific "sticky" surfaces, their small sub-100-nanometer size is also a key property that facilitates the retention and accumulation of these nanoparticles within the plaques. These nanoparticles are 1000 times smaller than the tip of a single strand of human hair.

"These nanomedicines are developed using biodegradable polymers that can break up over time in the body using the body's natural mechanisms and can be nanoengineered using scaleable chemistries and nanotechnologies, which ultimately can facilitate their rapid translation to the clinic," said

co-lead author Nazila Kamaly, PhD, instructor in the Laboratory of Nanomedicine and Biomaterials at BWH and HMS.

Researchers caution that although plaques in mice look a lot like human plaques, mice do not have heart attacks, so the real test of the nanoparticles will not come until they are tested in humans. "In this study, we've shown, for the first time, that a drug that promotes resolution of inflammation and repair is a viable option when the drug is delivered directly to plaques via nanoparticles," said Dr. Tabas. To be ready for testing in humans, the team plans to fine-tune the nanoparticles to optimize drug delivery and to package them with more potent resolution-inducing drugs. "We think that we can obtain even better delivery to plaques and improve healing more than with the current peptides," he said.

Dr. Farokhzad and colleagues have considerable expertise with bench-to bedside translation of nanotechnologies for medical applications. Foundational work done in part by his team has led to the development and first-in-human testing of a targeted nanoparticle capable of controlling drug release for treatment of cancers, as well as the first in-human testing of a targeted nanoparticle vaccine capable of orchestrating an immune response to facilitate smoking cessation and relapse prevention.

"The inflammation-resolving targeted nanoparticles have shown exciting potential not only for the potential treatment of atherosclerosis as described here, but also for other therapeutic areas, including wound repair, for example, as described in the Feb. 9 online issue of *Journal of Clinical Investigation*, in addition to other applications currently under way with our collaborators," Dr. Farokhzad said. "I'm optimistic that with additional animal validation we will also consider the human testing of the inflammation-resolving targeted nanoparticles for a myriad of unmet medical needs—these are

exciting times in medicine and the future of nanomedicine is incredibly bright."

About:

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Medical nanoparticles: local treatment of lung cancer

Helmholtz Zentrum Muenchen - German Research Centre for Environmental Health. (2015, March 5). Medical nanoparticles: local treatment of lung cancer. ScienceDaily. www.sciencedaily.com/releases/2015/03/150305081130.htm

Nanoparticles can function as carriers for medicines to combat lung cancer: Working in a joint project at the NIM (Nanosystems Initiative Munich) Excellence Cluster, scientists from the Helmholtz Zentrum München (HMGU) and the Ludwig-Maximilians-Universität (LMU) in Munich have developed nanocarriers that site-selectively release medicines/drugs at the tumor site in human and mouse lungs. In the journal, 'ACS Nano', the scientists reported that this approach led to a significant increase in the effectiveness of current cancer medicines in lung tumour tissue.

Nanoparticles are extremely small particles that can be modified for a variety of uses in the medical field. For example, nanoparticles can be engineered to be able to transport medicines specifically to the disease site while not interfering with healthy body parts.



proteases, which are enzymes that break down and cut specific proteins. The scientists took advantage of this by modifying the nanocarriers with a protective layer that only these proteases can break down, a process that then releases the drug. Protease concentrations in the healthy lung tissue are too low to cleave this protective layer and so the medicines stay protected in the nanocarrier.

“Using these nanocarriers we can very selectively release a drug such as a chemotherapeutic agent specifically at the lung tumour,” reports research group leader Meiners. “We observed that the drug’s effectiveness in the tumour tissue was 10 to 25 times greater compared to when the drugs were used on their own. At the same time, this approach also makes it possible to decrease the total dose

of medicines and consequently to reduce undesirable effects.”

Selective drug transport verified in human tissue for the first time

The Munich scientists have developed nanocarriers that only release the carried drugs in lung tumour areas. The team headed by Silke Meiners, Oliver Eickelberg and Sabine van Rijt from the Comprehensive Pneumology Center (HMGU), working with colleagues from the Chemistry Department (LMU) headed by Thomas Bein, were able to show nanoparticles’ selective drug release to human lung tumour tissue for the first time.

Tumour specific proteins were used to release drugs from the nanocarriers

Tumour tissue in the lung contains high concentrations of certain

Further studies will now be directed to examine the safety of the nanocarriers in vivo and verify the clinical efficacy in an advanced lung tumour mouse model.

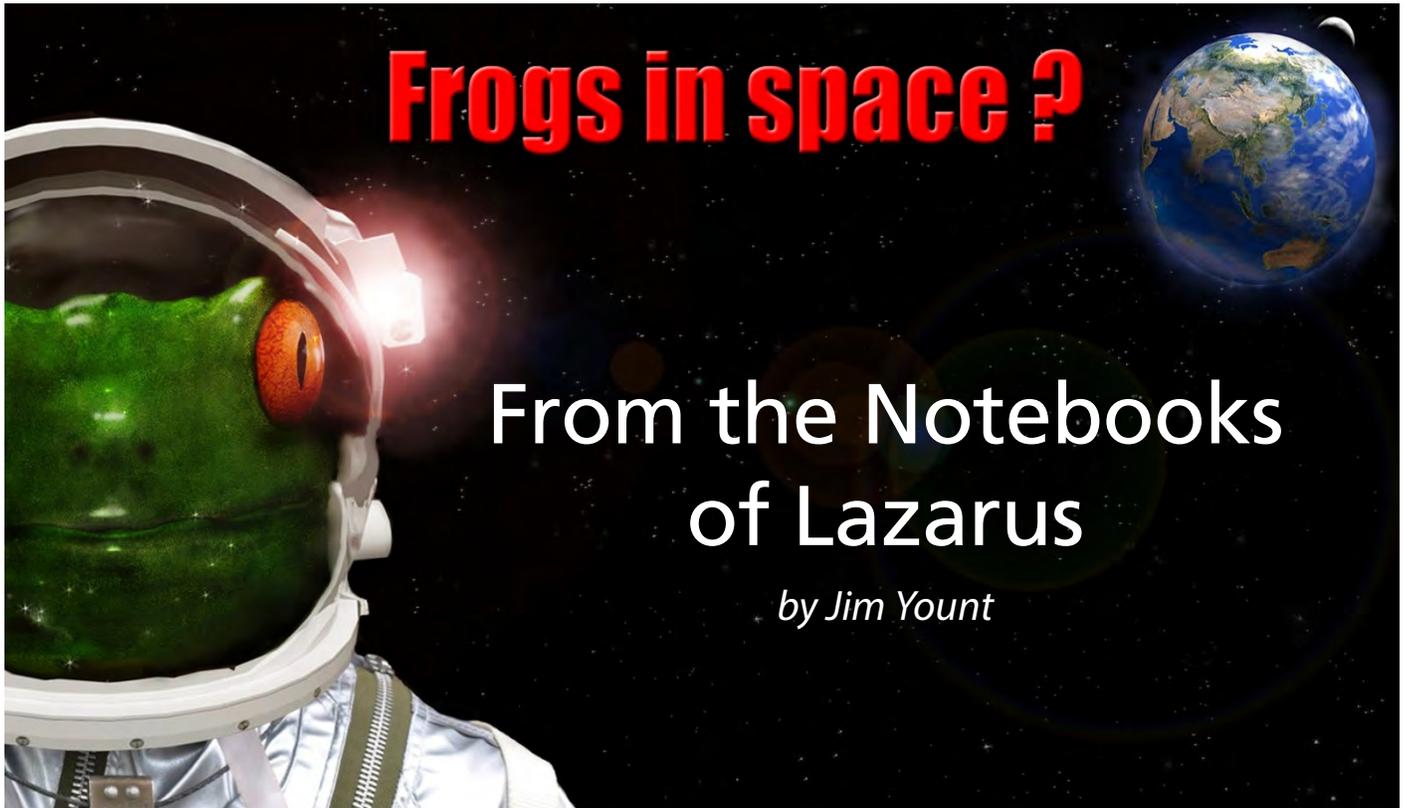
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The above story is based on materials provided by Helmholtz Zentrum Muenchen - German Research Centre for Environmental Health. Note: Materials may be edited for content and length.

Journal Reference:

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Frogs in space?

From the Notebooks of Lazarus

by Jim Yount

"Never try to teach a pig to sing - it wastes your time and annoys the pig."

On the surface that seems like good advice. On the other hand, if a person actually could teach a pig to sing, it might prove interesting and perhaps even profitable. There would be all those appearances with the pig on the late night talk shows, to say nothing of recording contracts!

The quote above is an example of the witticisms (or, if you prefer "aphorisms") credited to Robert Heinlein's character, Lazarus Long, in the science fiction novel *Time Enough for Love*. Lazarus Long -- born Woodrow Wilson Smith -- first appeared in Heinlein's novel *Methuselah's Children* as a youthful looking 213 years old space-ship captain. When the sequel *Time Enough for Love* ends, Lazarus Long is aged over two-thousand.

Personally I would like to be around until the heat death of the universe and now that it appears the universe is not contracting but rather expanding that might mean forever! Should that plan not prove

practical, I would at least like to beat the threescore years and ten allotted to us by the Bible (Psalms 90:10). I will take your two-thousand, Lazarus, and raise you thousands years of my own!

I like the idea of our elders giving us advice. And who is more of an elder than someone who is two-thousand years old? However, it isn't really a bimillennial man giving the advice, it is the author. Here is another Heinlein witticism from *Job: A Comedy of Justice*:

"The supreme irony of life is that hardly anyone gets out of it alive."

The "supreme irony" got the best of Mr. Heinlein. He did not. And (barring time-travel) he has no chance of "getting out of it alive" either. Although he knew of cryonics and featured it in at least one of his novels *Door Into Summer*, he didn't choose the cold path. After his death at age 81, Heinlein was cremated and his ashes were scattered in the Pacific. Perhaps to honor his service in

the US Navy, it was done from the deck of a warship.

Heinlein's character, Lazarus Long, had the idea of keeping a notebook and jotting down various ideas, personal advice, clever sayings, remembrances, observations, as they occur. An idea that has obvious appeal to cryonicists, for we all know that there is apt to be some or a lot of memory lost between the time you read these words and the time you are reanimated. This notebook (if preserved) could help the you of the future reconnect with the you of the present.

So ... without suggesting that my own notebook is comparable in wisdom or wit to either Lazarus or Heinlein, I would like to share with you what I might write in my own notebook. It would be a bit more loquacious than that of Lazarus Long, but much less so that that of my longstanding friend York Porter, the Immortalist Society President, who is well known among his friends (and foes) for his "longer than the New York Telephone Directory" e-mail mes-



sages! For example, unlike Lazarus, I would use topic titles to help organize it. I will also clearly label the advice, to make it easier for you to remember the source when passing it onto friends and relatives!

Now I am a fellow with lots of advice, so I, like Heinlein, have much to give! This quarter's advice will focus on preserving memories, however I may hop away from that topic a bit as the following story illustrates!

The Frog in the Concrete

According to urban legend there are, or have been, occasions when a frog, perhaps in stasis, was mixed into concrete during the pouring of a suburban driveway. Years later, when some new owner had the driveway removed with jackhammers, the frog, having quite had enough of its decades long hibernation, indignantly hopped away.

The only reference I could find on-line for this particular story was from a magazine called the Tacoma Ledger in 1908 quoted in an issue

of Cement World. It may be that sources of gravel and sand, in times past, were a bit more primitive than now, which led to more amphibians in the mix. "Just drive yer' wagon down to the creek, Jethro, and load up some of that-there sand and gravel, ner-ya'-mind if ya' get a frog or two."

The Aesop being: "If you are a frog, stay away from wet cement!"

The urban legend features the frog hero who survived the concrete dunking. Think about all the frogs entombed in all the driveways across this great land of ours where the owners of the driveways are per-

fectly happy with slightly cracked cement; or those frogs who are pulverized by the jackhammer when the old driveway is removed!

This advice to the frogs could be extended to humankind. It might be: "Never volunteer for anything;" or "Avoid situations where there might be a happy ending, but more likely will lead to a bad outcome."

So, what do frogs in concrete have to do with cryonic suspension? To answer that question a fellow has to think a bit outside the box, or the concrete driveway for that. If we can determine, and imitate in ourselves,



Q: Why did the frog read Long Life Magazine? A: Because he didn't want to croak.

the mechanism by which the pretty green caecilians achieve their form of suspended animation then we could dispense with cryostats and liquid nitrogen entirely. Such a stasis state would be very handy for, say, interstellar travel, and we could be well on our way to colonizing the galaxy. On the other hand, we might work to make a smarter frog, one with intelligence comparable to that of our own. Since these croakers already have the long-term hibernation down-pat, we would have an Earth-spawned intelligent species already well-fitted for space travel and colonization of other worlds! Could mankind be so unself-

ish? Should that scenario come about, it would be a good idea to be on good terms with frogs. It might give the expression "kiss a frog" a whole new meaning!

On Time Capsules and Time Vaults

First, as I am using the words here, a time capsule is the container for a collections of items one intends to send into the future, but where one also wants to target a particular date (time) in the future. A time vault, on the other hand, is a container for a collection of items that are intended to

be preserved indefinitely, where no particular date or event is intended for when the time vault is to be opened.

Advice: "Never put anything valuable in a Time Capsule or Time Vault."

I will follow this with a corollary:

Advice: "Never put anything valuable (except ourselves) into a cryonics stor-

age facility."

We don't want to make the mistake the ancient Egyptians made where the mummy of the pharaoh was soon desecrated by tomb robbers who were intent on getting at the treasure interred in the tomb. We also don't want our yards dug up, or for our unburied post-deanimation Time Vault opened, possibly by greedy relatives to get at the gold coins or the upside-down airplane stamp that they think you might have squirreled away.

The question is: What to put in a time vault? My advice would be: non-valuable personal



Frogs in Stone?

By Benjamin Medlen Illustrations by Sharon Poisson

While the scientific evidence of so-called “entombed” animals is inconclusive, frogs and other ectothermic vertebrates have several fascinating evolutionary mechanisms that cryonicists can appreciate.

For example, the natural freeze tolerance found in only four known frog species that allow them to withstand the freezing of the water in their cells. Experiments have demonstrated that they can even survive brief exposure to temperatures as low as -12 C. As long as freezing occurs extracellularly (outside of the cells themselves), they may tolerate freezing temperature for up to two weeks. If intracellular freezing occurs, death for the frog results, as blood flow halts, breathing is restricted.

Their hibernation ability is also not something to sneer at. In the fall season, as temperatures drop the frog becomes more lethargic.

At least one species can withstand two-thirds of its body freezing. Natural cryoprotectants are produced in frog’s liver and then are delivered throughout the amphibian’s tissues that prevent ice from forming in the interior of their cells -- working by minimizing the reduction of cell volume due to dehydration caused by the extracellular ice drawing water from the cells. In conjunction, heart rate, metabolism, breathing -- all these functions slow down or cease in the frog, and only begin again when temperatures rise. Many frog species undergo multiple freezing and thawing cycles.

Desert toads may hibernate underground in muddy holes for up to two years. With the gradual drying out, the animal produces a cocoon-like second skin that reduces water loss -- a process called aestivation. They emerge only when temperatures lessen and moisture increases (also doing so when they hear the sounds of rain too).



“Honestly, George, you never do anything I ask. Three simple tasks: pick up bug burgers, feed our pet humans, and jackhammer Grandpa out of the concrete of the driveway. You didn’t do any of it.”

“But Dear, they were out of bug sandwiches, the human pets were eating each other, and Grandpa didn’t want to be jackhammered out of the concrete.”



memorabilia such as personal writings, letters from friends or relatives, your first-grade coloring book, etc.

How to Make a Time Vault

1. Buy a short length of good quality PVC (plastic) pipe at any hardware store, along with two PVC caps. The PVC should be over a foot in diameter.
2. Cut it into a manageable length, such as 18 inches.
3. Cap one end with the PVC pipe and apply PVC glue to seal the cap to the pipe.
4. Insert into the capped pipe the items you want to squirrel away.
5. Cap the other end of the 18 inch pipe with the other PVC cap.
6. Label the pipe with indelible ink or use a soldering iron or the hot-iron from a wood-burning kit to burn-in lettering.
7. Place your Time Vault in a secure place (see below).

This recipe can be improved on a bit by using an inert gas to displace air in the pipe. An inert gas is a gas that does not contain oxygen. Oxygen is best avoided since newsprint and many other items you might wish in your Time Vault will react to the oxygen in the air and, over time, deteriorate. A pressurized can of argon or nitrogen gas may be purchased at a wine making shop. The pressurized gas can be directed into the PVC pipe just after you have put in your memorabilia and before the sealing (second) cap is applied. The inert gas will drive out most of the oxygen-laden air.

Where to put your Time Vault?

One place is under or in the concrete of a new driveway or patio. True, a jackhammer would need to be used to extract the Time Vault, but there can be advantages in making it not-so-accessible. You may have to displace a frog or two to make room for your PVC Time Vault, but those frogs have

no business hanging out in the concrete of a driveway anyway!

Advice: Do Book Reports

I recall that in grade school one of the least popular tasks was doing book reports. First off, the students had to actually read the book or at least the Cliff Notes. Second, the students needed to write about the book's plot and to do it in such a way that it is more-or-less grammatically correct, and pleases the teacher. Bah-humbug!

Many cryonicists that I know are avid readers, possessing many shelves full of books that they have read, and may re-read someday or lend to friends and family. Of course, book-filled shelves are being fast replaced or supplemented by ebook readers or other electronic devices, which is not apt to impress your friends as much as a shelf full of well-worn books!

Professor Richard Marsh, now a patient at the CI facility, frequently advised me and other cryonicists to "write your autobiography." That is, record in type the experiences of your life. That is good advice, but life experiences are often mistaken to mean things you have done and things you have seen. Yet any avid reader spends many hours of his or her life absorbed in books. Such reading can be every bit as much a part of your experience as a trip to Niagara Falls would be.

Advice: "Do a book report on any book you read and record the report in a way that it can be accessed by your future self."

Because you are not writing to impress the critics, or as a critic, cribbing from other reports should be avoided. The report should be your personal reaction to the book and your evaluation of the book based upon your other life experiences. The happenings in the book may evoke memories of your life experiences or of other books you have read. Write them down!

If you happen to be not much of a reader, but instead watch movies, shows or play video games, then do reports on those instead!

Advice: Make Lists

Say you don't want to write book reports? That's okay. Instead you can take the next line of advice, which is:

"Make lists of the books you have read, the movies you have seen, do lists of favorites, of don't likes; add details of where you were and who you might have accompanied you." You can also do lists of favorite music, foods, flavors of ice cream, etc.

Don't want to make lists?

Advice: "Take a photo of your book-shelves where the titles of the books can be read in the photo."

Advice: Photograph the Neighborhood

Even the recording of mundane things about a person's life can help jog memories. One of my cryonics friends told me that he brings his camera along when he takes walks around his neighborhood. He does this so he can take candid shots.

Conclusion

That's all the entries in my notebook for now. Thanks to Heinlein for the inspiration and advice. I feel keen regret when I learn about the deaths of people whose writings I enjoy. It is too bad that Mr. Heinlein ended up as ashes in the Pacific rather than, say, as his protagonist Dan did in *Door Into Summer*, in a cryonics facility with Pete, his cat. Whatever his after-death fate, it was what Robert Heinlein wished. Heinlein strongly believed in self-determination, and in that we can agree.





Robert Ettinger: *The Legacy Continues*

Robert Ettinger's Views On The Affordability of Cryonics

Introduction by York W. Porter, President of the Immortalist Society

One of the strengths, at least from my point of view, of the Cryonics Institute is that, so far, it has managed to "hold the line" on prices. This means that, in real terms, the costs of CI's services have fallen since other costs in society, at least in terms of general inflation, have gone up. There is no guarantee, of course, that this will always be the case but, again, to this point in time, CI has kept things on a steady course.

The article below is one in which Robert Ettinger discusses the cost of cryonics in terms of some realities at the time of the article and also from the standpoint of possible future developments in better allocating existing societal resources. This article is from the February 1982 issue of The Immortalist, which was the former name of Long Life Magazine. (Note: The article referred to in the column authored by Steve Bridge and Mike Darwin can be found at the following location: <http://www.alcor.org/cryonics/cryonics8201.txt>).

Affordability of Cryonics: The Intermediate Future

By: Robert Ettinger

Stephen Bridge and Michael Darwin have written a thoughtful two-part piece on The High Cost of Cryonics (Cryonics, newsletter of the Institute for Advanced Biological Studies, 4030 N. Palm, #304, Fullerton, CA 92635). One of their conclusions is that, as cryonics tends to join the medical mainstream, its costs are likely to advance sharply. This is certainly possible, but not inevitable.

1. In the Cryonics Institute, we have suggested various steps, and implemented some, to hold the line on prices and even roll them back. One set of measures involves

donating services and a drive toward full self-sufficiency. Another involves fall-back positions for cheaper options when those technically most desirable are out of reach. Total effectiveness, of course, will only be known for sure as time unfolds.

We should also remember that rising costs--insofar as they affect perfusion rather than storage--are not necessarily daunting; for example, if costs rise less rapidly than disposable income, then we are gaining ground rather than losing it.

It is also possible for costs in the medical mainstream to come down, through a variety of measures: reduction of fraud, encouragement of competition, requiring direct payment for health insurance, greater use of computer diagnosis, greater use of paramedics, and many others.

2. For the relatively distant future, when we have full-fledged suspended animation and revival after freezing can be guaranteed, there is essentially no problem. There will be massive shifts in psychology and in personal and national priorities, and many options for financing one's freezing. If necessary, someone advanced in age and declining in health and short of funds could choose early freezing and allocate to it any retirement funds due him from public or private sources for the actuarial remainder of his life, as well as a percentage of the projected cost (if he were not frozen) to his health insurance company, private or public. In other words, he can sell his future income and benefits for their present value, but of course keeping a portion



invested as a growth fund for use after reanimation.

Many painful problems for individuals and for society would be relieved by the availability of suspended animation. Those who consider life a burden because of cruel afflictions (paralysis, blindness, etc.) could choose suspension instead, with enormous savings both economically and emotionally. (They would be awakened, of course, when cures or prostheses were ready). Possibly criminals serving long sentences could, with their consent, be put on ice until society is either better protected from them or better able to rehabilitate them. Conceivably even unwanted embryos, after a non-damaging abortion, could be stored until some family or agency is ready to have gestation completed in vitro and follow up with adoption.

At some unknown time in advance of this happier future (not soon, I'm afraid) people will begin to pay attention to the social and economic benefits to be had from suspended animation and from increased longevity. Albert Rosenfeld (Prolongevity, Knopf, 1976) has made excellent points concerning the staggering amounts of money we can save by extending life. I have at various times suggested some of the economic benefits of suspended animation. Some day the significance of these opportunities will be appreciated.

3. Some of the notions above were suggested by recent experience, and might be applicable in the intermediate future. In particular, a relative recently had two hospitalizations costing together about \$30,000, and is now in a nursing home at about \$1,200/month. She is aged and very debilitated, with no perceptible chance of anything close to a normal or enjoyable life. If she had chosen (and been allowed to choose) early freezing rather than slow and dreary expiration, there would have been striking savings in money, as well as in emotional wear and tear on all parties concerned.

From a strictly economic point of view, her health insurers could easily have paid for her perfusion, and pocketed a tidy saving besides. However, present health insurance contracts do not provide for such options, and regulations would doubtless prevent individual negotiation, even if demand were sizable enough to interest the companies. But in the middle future all this could change.

First would have to come a court decision, preferably in the form of a declaratory judgement (i.e., before the fact), allowing cryonic suspension before legal death in well-defined circumstances--es-

entially, when illness is terminal and the patient wants to be frozen before death.

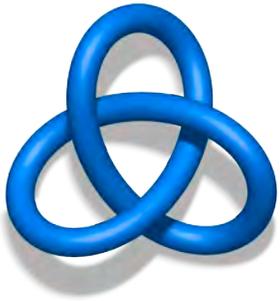
Justification for such a decision has been discussed before, but we can briefly recapitulate. One can liken the suspension of a terminal patient to one of Dr. Christiaan Barnard's pioneer heart transplants. In the transplant operation, the patient is actually killed in some medical sense when the old heart is excised, and the operation could--and often did--result in permanent death when the new heart failed. But despite the possibility of shortening the patient's life, and the technical killing by cutting his heart out, the physician and patient agreed that over-all chances were best with the transplant. The same thing is true of cryonic suspension: if patient and physician agree that long-term chances are improved by freezing, and especially by freezing under controlled conditions before the patient has deteriorated too much, then the fact that current freezing methods are fatal by present criteria, and that the outcome is not assured, should not be insuperable obstacles.

The court decision, or declaratory judgement, need not be very far in the future. Barring an emergency, it should not be this year, because the expense and related strain would be substantial, and other conditions ought to be improved to make our best case. We don't want to lose our first case, and set even a tentative adverse precedent. But if I were to become terminally ill, I would want such a case brought on my behalf. (There is also the possibility, if things are handled right, of direct and indirect financial benefit to the patient and the movement. If people are dumb enough to pay for books and movies about Watergate, there is a bare possibility they might be smart enough to pay for books and movies about the first live freezing.)

When the terminally ill can be frozen without legal obstacles, there should be a huge boost for cryonics. If the patient can be make a choice while still vigorous and clear of mind, rather than in a helpless and hopeless torpor at the end of a losing battle, and before his life savings have been squandered on protracting the misery, and can be frozen under controlled conditions, then surely our numbers will be multiplied. A larger number of potential customers, along with legal clearance, will give the health insurers motivation for negotiating the changes we have mentioned, allowing them to save money by paying for a perfusion instead of a long terminal illness.

All of these developments, in my opinion, are nearly inevitable. The time scale, as usual, is another question. But we can make it happen.





Final Thoughts

York W. Porter - Executive Editor

“Mendeleev..”

When I was in my early teens, one of my reveries was to think about becoming a great scientist one day. Even though I would later attain certification as a Medical Laboratory Scientist, my dreams of scientific greatness proved, like the vast majority of teenage daydreams, to have only been a pleasant pastime. Reality has a way of straightening one out. So, instead of attaining accolades, I've contented myself with reading about persons who attained the heights that I, in my youthful naiveté, aspired to lo those many decades ago.



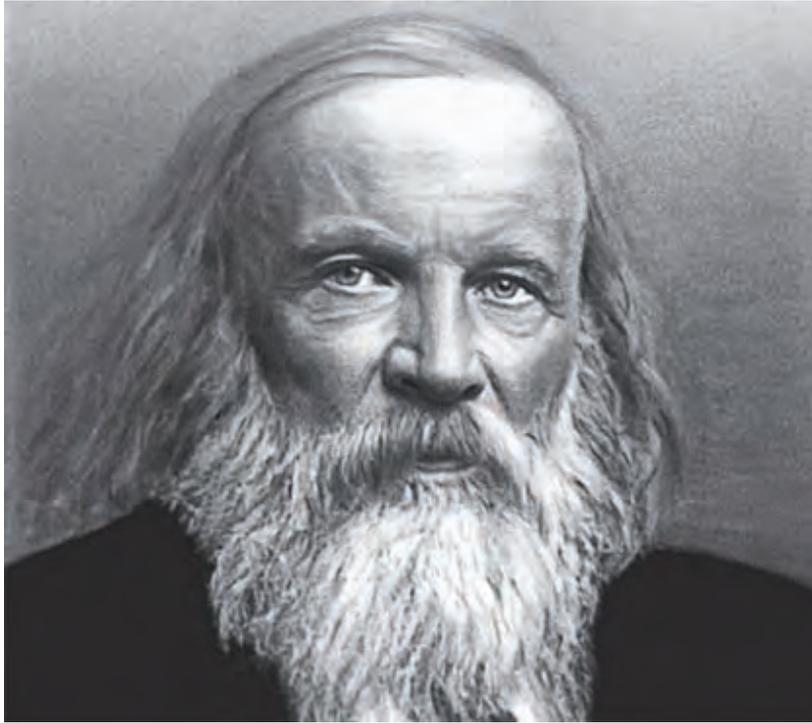
*One such man was Dimitri Mendeleev. Mendeleev was born in Siberia in 1834. He was destined, through his development of the periodic table, to be a giant in the field of chemistry. Although not the first to come up with the idea of “patterns” in the known elements of chemistry, his greatly improved version was formally presented in March of 1869 to the Russian Chemical Society. Mendeleev used both atomic weight and the ability of atoms to combine (their so-called “valence”) to not only provide an orderly view of the known elements but to predict the existence of then undiscovered elements. His textbook, *Principles of Chemistry*, was considered one of the outstanding textbooks of his time.*

Mendeleev was also a lesson that, unlike the sometimes popular mass media view that scientists are impersonal and cold-hearted beings, they are, in reality, very human creatures indeed. Mendeleev was first married in April of 1862 but, 14 years later, he fell in love with Anna Popova and threatened suicide if she would not marry him. Mendeleev technically became a bigamist when he married his second wife one month before his divorce from his first wife was finalized. Affairs of the heart apparently can outweigh any scientific reasoning capacity any human being may possess, no matter how “great” those scientific talents may ultimately be recognized to be.

In his scientific life, of course, he was frequently “ahead of his time”. In just one of his many concepts, he recognized, and wrote about, the usefulness of petroleum, not just as a heating fuel, which he considered a wasteful use of a natural resource, but instead as a source of raw materials. Mendeleev saw, instead, the usefulness of petroleum as a stock material for the myriad of petrochemical compounds which now pervade our modern world. Numerous other ideas came forth as well from the mind of this excellent scientist..

But not all of them were excellent ideas. Mendeleev was, as all human beings, a part of the times he lived in and influenced by the thinking that was pervasive in those times. One of his hypotheses, for instance, involved the Aether, a substance then believed to exist that supposedly allowed light waves to be propagated through otherwise “empty space”. Mendeleev thought the Aether might be chemically composed of two inert elements that were lighter than hydrogen. It turns out that the concept of the Aether ultimately came





Dimitri Mendeleev In The Latter Part Of His Life

crashing down and now is looked on as never having existed at all, other than in the minds of the scientists of the time.

In another interesting fact, Mendeleev never accepted that electrons could be part of the atom after J.J. Thompson discovered electrons near the end of Mendeleev's life. Like John Dalton, the "father of modern atomic theory", who died when Mendeleev was around ten years old, Mendeleev believed that the atom was, at bottom, the indivisible and fundamental particle itself. It, therefore, could not have further subdivisions. We now know that all phenomena necessary to study biological systems, including aging, disease, and death, can be ultimately viewed as interactions between the electrons, neutrons, and protons that form atoms themselves. Even those with greatness and scientific talent can have trouble recognizing new and useful ideas that come along, even if at a later date those ideas prove to be quite correct and useful.

Such was, to some degree, the case when Robert Ettinger, another scientifically trained individual, developed the concept of cryonics in the mid-20th Century. Ettinger's idea was initially met with skepticism in some, though not all, quarters. Down through the years, however, especially with the development of the field of nanotechnology, the evidence in favor of cryonics has gotten better and better and better and, somewhat like the case of the electron that Mendeleev rejected, is gaining more and more interest as the years go by. A recent example of this was an episode of the pretty heavily viewed television show "Dr. Oz", where cryonics was mentioned in a fairly objective, although very brief way.

Cryonics is a real and ongoing effort by numerous individuals who represent a broad spectrum of life. We have doctors, lawyers, scientists, housewives, truck drivers and just about any other category you can think of. The days of raw skepticism are gradually coming to a close. Cryonics has now been around for fifty years and continues to gain strength and recognition with each passing day. If Mendeleev had lived long enough, he would have recognized the reality of electrons, neutrons, and protons. If he were with us today, I'm sure he would recognize the reality of the promise of cryonics as well.



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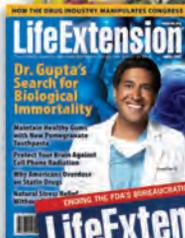
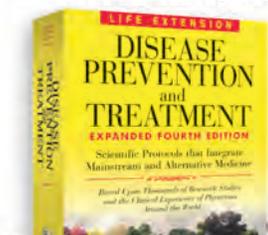
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