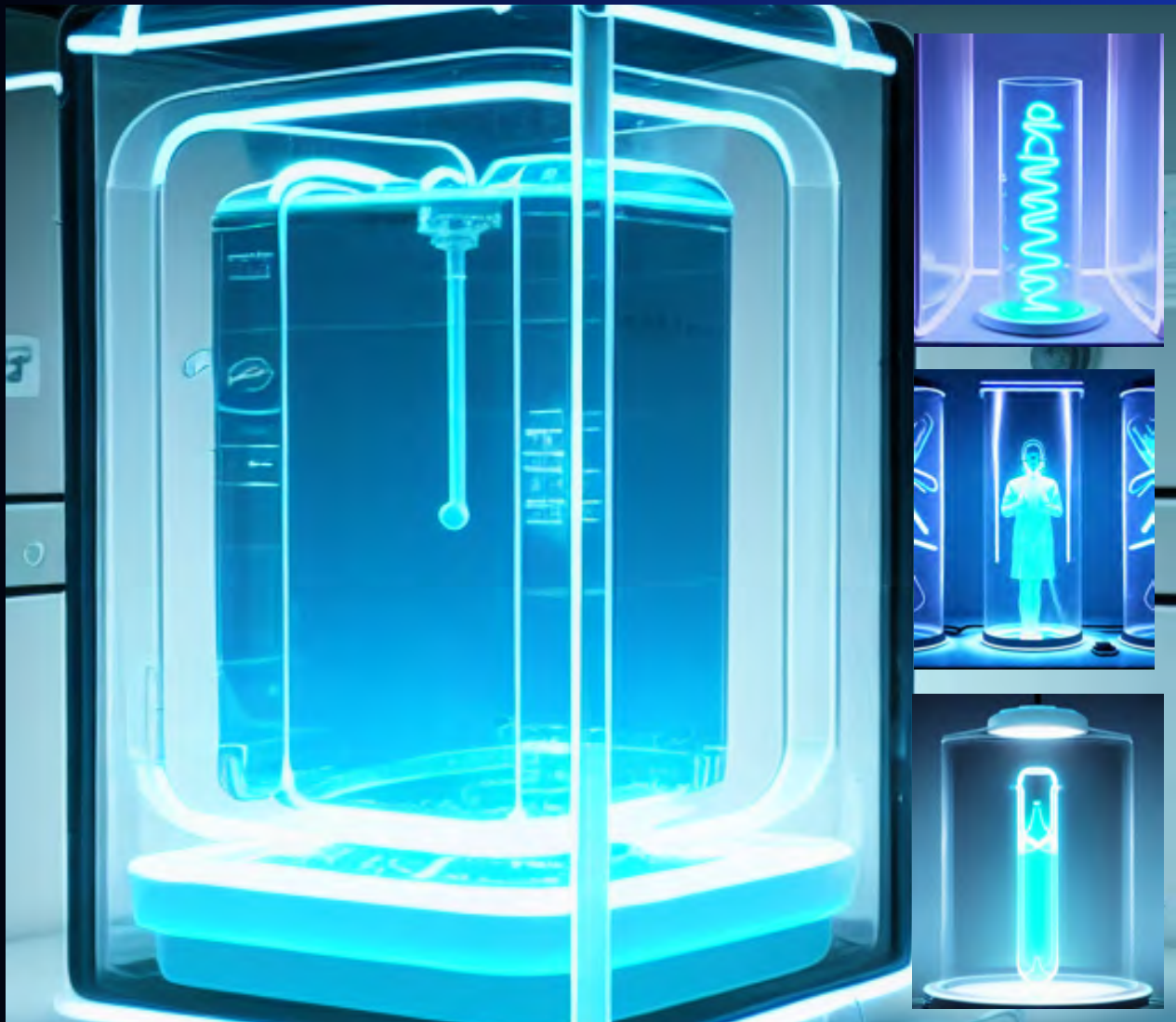
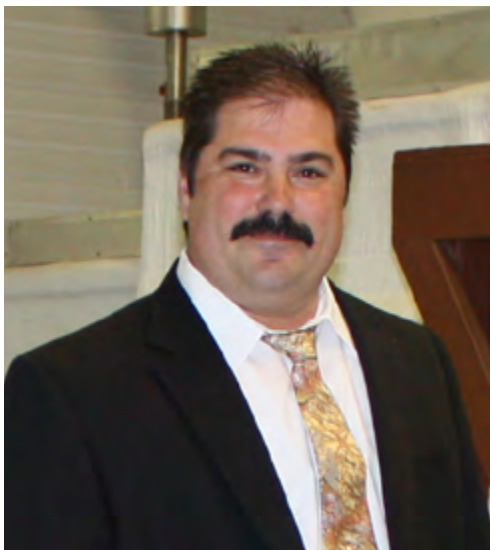


# CRYONICS INSTITUTE

## NEWSLETTER

Cryonics insights and  
information for members  
and friends of the  
Cryonics Institute





Hello Everyone

I am pleased to report that the Cryonics Institute continues to grow and improve in our mission to offer the best possible cryonics services to our members. As the President of the Cryonics Institute, it is my honor to provide an update on the progress we have made in recent months and to highlight some of the many reasons why the Cryonics Institute remains the best choice for those who seek to extend their lives into the future through the process of cryopreservation.

Firstly, I am proud to announce that we are the largest cryonics provider in the world in terms of suspended patients, pets, and future signed-up members. This is a testament to our commitment to providing high-quality cryonics services at an affordable price. Our team of highly trained professionals is dedicated to ensuring that every aspect of the cryopreservation process is handled with the utmost care and attention to detail. We take great pride in knowing that we have helped so many individuals and families to achieve their dreams of extending their lives into the future.

In addition to our size, we are also proud to offer the lowest suspension fees and ongoing membership fees in the industry. We understand that cost is an important factor for many of our members, which is why we have always focused on providing affordable cryonics services without compromis-

ing on quality. We also offer the same standby options as more expensive providers at a lower price, demonstrating that we are good stewards of your money and good at what we do.

At the Cryonics Institute, we are committed to providing our members with the highest quality cryonics services possible. This includes offering a range of options for standby and associated fees that are tailored to each individual member's needs. We believe that cryopreservation is not a one-size-fits-all solution and that our members should have the flexibility to choose the standby options that work best for them. We offer a variety of options for standby, from our own trained local personnel to partnerships with third-party providers and even the option to set up your own local standby. Our goal is to ensure that every member has access to the best possible standby options to maximize the chance of a successful cryopreservation.

Finally, we continue to invest in our infrastructure to improve the quality of our services. We are retrofitting and expanding our new facility to ensure that we have the capacity to store our members in suspension for many years to come. We are also investing in cutting-edge research and development to improve the science of cryonics and make it more accessible to the wider public.

In conclusion, I am proud to say that the Cryonics Institute is the best choice for anyone looking to extend their lives through cryopreservation. With our commitment to affordability, quality, and flexibility, we are confident that we can help our members achieve their dreams of a longer, healthier, and happier life. Thank you for your continued support, and we look forward to serving you for many years to come.

Sincerely,

Dennis Kowalski President, Cryonics Institute



## CRYONICS INSTITUTE MAGAZINE

The digital newsletter of the Cryonics Institute  
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Clinton Township, MI 48035-3239

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FAX: 1 (586) 792-7062  
Email: [info@cryonics.org](mailto:info@cryonics.org)

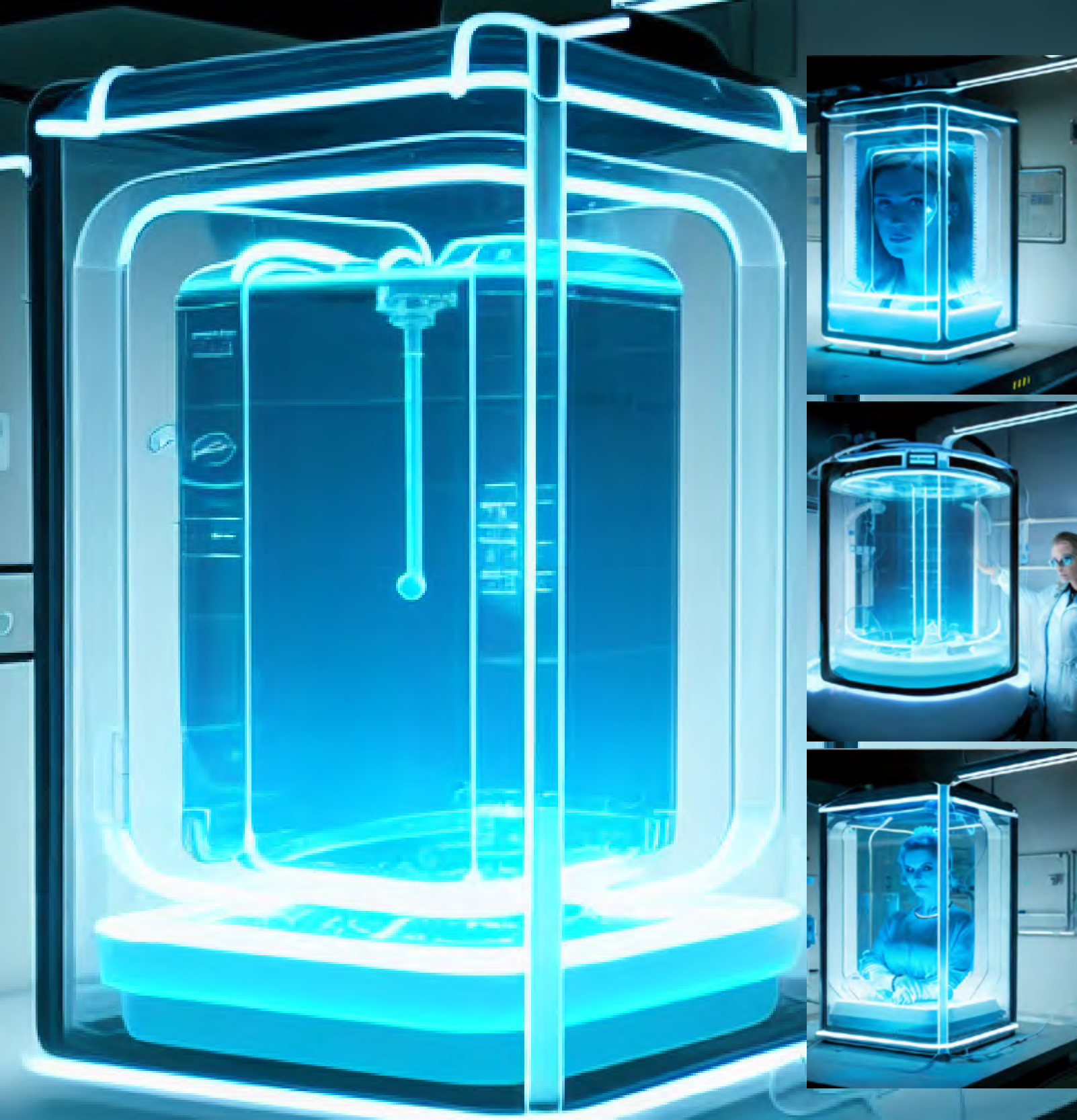
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## ARTICLE SUBMISSIONS

Cryonics Institute or cryonics-related articles are welcome. Submissions: [dg@cryonics.org](mailto:dg@cryonics.org)

## E-SUBSCRIPTIONS

As a CI member, you are automatically added to our email reminder list. To unsubscribe, please use the "unsubscribe" link at the bottom of your email.



## Cover Art

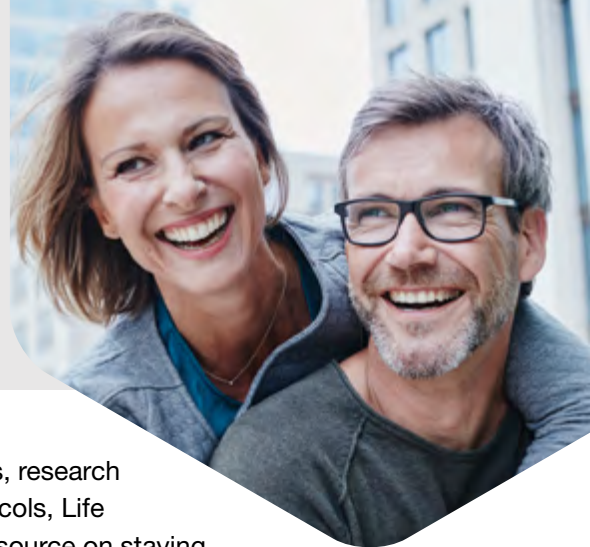
This issue's cover art was created using the StarryAI image generator: <https://starryai.com/>

To submit your own cover art concepts for a future issue, please contact [dg@cryonics.org](mailto:dg@cryonics.org).

*(Please keep total file sizes under 5mb for email. Special arrangements can be made to transfer larger files if needed.)*



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# Membership Benefits

## Why join the Cryonics Institute?

*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?*

### 1) **A Second Chance at Life**

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 through cryopreservation.

### 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) **Standby Options and Assistance**

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](#) or [International Cryomedicine Experts](#) (I.C.E.) CI also offers Standby

Training Materials and Kits for members who choose to perform Local Standby.

### 7) **Affordable Funding Options**

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 receive a free e-subscription to the Cryonics Institute Newsletter, as well as access to our Facebook page, Twitter feed, YouTube channel and an official members-only forum.

### 9) **Helpful, Professional Support**

CI's professional staff is available to answer any questions and address any concerns you may have about CI, your membership or Cryopreservation.

### 10) **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.

### 11) **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.

### 12) **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).



To get started, contact us at:

**(586) 791-5961 • email: [info@cryonics.org](mailto:info@cryonics.org)**

Visit us online at [www.cryonics.org](http://www.cryonics.org)





## CI Acquires New Generator and Cargo Van

CI purchased and installed a Kohler20RCA 60 Hz generator with an Aluminum Enclosure to serve as an emergency backup generator for the Cryonics Institute's main facility. It features a reliable Kohler CH1000 4-Cycle, 30.9 HP, V-2 engine with maximum 3600 RPM. The Kohler Command PRO OHV engine is designed for tough commercial applications. It has hydraulic valve lifters that eliminate the need for lengthy break-in periods and expensive valve adjustments. This dual fuel generator runs on LPG and natural gas.

In only 10 seconds, this Kohler generator can restore power to a 5-ton (60,000 BTU) air conditioner, major appliances, and electronics automatically. More specifically for the Cryonics Institute, this secures our computer controlled cooling chamber and ensures that the essential cool-down process cannot be interrupted by a power outage.





A 2023 GMC Cargo Van has also been added to the assets of the Cryonics Institute. The addition of a van eliminates our dependence on third party livery transportation – allowing Cryonics Institute staff to take custody of patients directly, ensuring the highest levels of patient care, while reducing costs.



Special thanks for the generous donations that made these purchases possible. If you would care to make a donation to support the Cryonics Institute, please visit: <https://cryonics.org/donate/>

## Pet Preservation Story Features Cryonics Institute Member

Australian News organization SBS News recently ran a story about pet cryopreservations. The story prominently features one of our members who discusses the reasoning behind his decision and nicely expresses the guarded optimism we all have about the potential for cryonics.

Thanks to SBS for covering the story and to Dave for agreeing to the interview.

Check it out here:

[SBS News Australia](#)

*Please note, CI's policy is to keep all our member information private, so you will never be contacted by any media outlet without your prior consent. However, if you are open to being interviewed for stories like this, please let us know and we will add your name to our list of approved interview subjects. When we get a request for member interviews, we will contact you with the details first to see if you're still interested.*



From the SBS website:

*Ever wish your pet could live forever? Dale professionally froze his dog so he can bring her back to life one day. This could soon be an option for other pet lovers - with Australia's first cryonics facility about to open. Cryonics is preserving bodies at extremely low temperatures, in the hope future technology will allow them to be revived. The promise of immortality can be very tempting - but some scientists have doubts about whether it will work.*





## Scholarships Announced for the Fourteenth Annual Young Cryonicists Gathering



### Fourteenth Annual Young Cryonicists Gathering

Teens & Twenties 14 2023 & RAADfest 5 2023:

**Thurs-Sun; Sept 7-10, '23 Hyatt Regency Orange County; Garden Grove CA**

*Host: Biomedical Research & Longevity Society - Director: Bill Faloon*

Young cryonicists aged 13-30 are eligible for full or partial scholarships to the 2023 Teens & Twenties / RAADfest event Sept. 7-10, 2023 in Garden Grove, CA. Applicants must be financially covered & contracted cryonicists. Additionally, T2 Alums, DAs and RITs may also apply to attend.

The scholarship covers admittance to RAADfest from Thursday (6-10 pm) -Sunday. The T2 14 2023 program runs Friday & Saturday, 9 am -noon, beginning with breakfast & all day Sunday 'till 10 pm. Breakfast, lunch & dinner will be provided on Sunday. Flight & lodging also covered.

**Application deadline: July 30, 2023. 40 Scholarships available on a first applied first granted basis to all qualified applicants - so best apply early.**

Application form available [HERE](#)

# Member Readiness Checklist

*You've signed up for cryonics -  
what are the next steps?*

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.
- ☐ Review the [CI Standby Manual](#) and other materials designed to help you with you Standby Planning. Also, 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 you 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. The stronger our organization is, the stronger your chances of success.
- ☐ Keep your records, contact information and contracts up to date. It is recommended you review your relevant information annually at a minimum. One way is to schedule time to review all your materials at the same time you submit your required Annual Proof of Funding to CI. Also, Be especially aware of easy to forget things like a new email, phone number or address. Remember, you can also contact us at any time to ask if you have any outstanding paperwork or other info that needs to be updated.

The online [CI Members' Information Form](#) is a great resource for updating your current information on file.





### **Pet Cryosuspension Services Available**

Did you know CI Members can take advantage of our cryonic suspension services for their pets? Instead of burial or cremation, you can give a loyal and beloved pet the same second chance at life that we have through cryopreservation.

Many members who have preserved their pets say it's a comforting thought that their longtime animal companions now have the same chance to live again in a better future. CI currently has nearly 200 pets in cryosuspension.

Cryopreservation of pets is only available to Lifetime and Yearly Members of the Cryonics Institute. Excluding the cost of Membership, the typical cost of cryopreserving a cat or dog is \$5,800 up to 15 pounds in weight plus \$150 per pound for every pound above 15 for dogs. This does not include shipping and veterinarian expenses. CI will also preserve other types of pets and pricing is similarly by the size and weight scale for dogs. Please contact us to inquire about specific pricing and procedures for pet patients, or visit [cryonics.org](https://cryonics.org) for more complete details.







### Visiting Hours For Family Members of CI Patients

Monday:	2:00pm - 4:00pm
Tuesday	2:00om - 4:00pm
Wednesday	2:00pm - 4:00pm
Thursday	2:00pm - 4:00pm

We ask that visitors kindly give us at least **one month advance notice** to ensure there are no scheduling conflicts. We cannot guarantee that the facility will be accessible to visitors who have not scheduled their visit in advance.

**\*\* These visiting hours ar subject to change without notice due to patient or pet emergencies. \*\***

These requirements have been established for multiple reasons, but most importantly for protecting our patients, members and facility.

Questions regarding visitation can be directed to Andy Zawacki, Facility Manager at [info@cryonics.org](mailto:info@cryonics.org) or 1-586-791-5961.

Thank you!







# Worldwide Cryonics Groups

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

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**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](http://www.cryonicsbelgium.com). To get in touch, please send an email to [info@cryonicsbelgium.com](mailto:info@cryonicsbelgium.com).

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**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](mailto:palde002@umn.edu) or [jamgarnett@hotmail.co](mailto:jamgarnett@hotmail.co) Phones : Jamyang / 975-2-32-66-50 & Tenzin / 975-2-77-21-01-87

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**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: [csc5@cryocdn.org](mailto:csc5@cryocdn.org)

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**BRITISH COLUMBIA:** The Lifespan Society advocates for radical life extension. They also organize conferences and educational outreach events on life extension issues. Lifespan welcomes all Canadians as members, although voting in the society is open to BC residents. Contact Carrie Radomski, President at [carrie@lifespanbc.ca](mailto:carrie@lifespanbc.ca) Web site [www.lifespansociety.com](http://www.lifespansociety.com)

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**QUEBEC:** Contact: Stephan Beauregard, C.I. Director & Official Administrator of the Cryonics Institute Facebook Page. Information about Cryonics & perfusion services in Montreal for all cryonicists. Services available in French & English: [stephan@cryonics.org](mailto:stephan@cryonics.org)

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**CHILE:** Community oriented to provide reliable information on human cryopreservation, as far as technical scientific as well as other practical aspects. Dissemination, awareness and education on issues related to the extension of life in general and cryonics in particular. Contact José Luis Galdames via [galdamesh.jl@gmail.com](mailto:galdamesh.jl@gmail.com).

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**FINLAND:** The Finnish Cryonics Society, (KRYOFIN) was established in 2008 and is an organization collaborating with all nearby groups and organizations. Contact them at: [kryoniikka.fi](mailto:kryoniikka.fi) Their President is Ville Salmensuu [ville@salmensuu.fi](mailto:ville@salmensuu.fi)

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**FRANCE:** SOCIETE CRYONICS DE FRANCE is a non profit French organization working closely with European cryonics groups. For more information: J.Roland Missionnier: phone: 33 (0) 6 64 90 98 41 or email: [cryonicsnews.inpi@gmail.com](mailto:cryonicsnews.inpi@gmail.com) • **Facebook group**

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**Francecryonics-Webnode** Vivien Gruss, member of Cryonics Institute, has opened a web site for the information of persons interested in cryonic suspension.

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**GERMANY: DGAB** There are a number of Cryonicists in Germany. Their Organization is called "Deutsche Gesellschaft für Angewandte Biostase e.V.", or short "DGAB". More information on their homepage at [www.biostase.de](http://www.biostase.de). If there are further questions, contact their Board at [vorstand@biostase.de](mailto:vorstand@biostase.de)

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**GERMANY: CRYONICS-GERMANY** is an active group providing cryonics support, including a special 8-member Standby Response Team. Members from Germany or Internationally are welcome to join. at <http://cryonics-germany.org>. Direct inquiries to [contact@cryonics-germany.org](mailto:contact@cryonics-germany.org).

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

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**ITALY:** The Italian Cryonics Group (inside the Life Extension Research Group (LIFEXT Research Group)) [www.lifext.org](http://www.lifext.org) and relative forum: [forum.lifext.org](http://forum.lifext.org). Contact Giovanni Ranzo at: [giovanni1410@gmail.com](mailto:giovanni1410@gmail.com)

**Kriorus Italy:** Representative Filippo Polistena, email: [filippopolistena45@gmail.com](mailto:filippopolistena45@gmail.com). phone: +39 334 298 9378

**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](mailto:mid_hikaru@yahoo.co.jp) or <http://www.cryonics.jp/>

**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](mailto:toursuresh@gmail.com) Phone : 977-985-1071364 / PO Box 14480 Kathmandu.

**THE NETHERLANDS:** Dutch Cryonics Organization is the local support group since 2002 and able to provide advice, standby, perfusion and shipment 24/7, in case of need. We are an active group utilizing the latest equipment. New members from The Netherlands welcome.

E-mail: [info@cryonisme.nl](mailto:info@cryonisme.nl)  
website: <http://www.cryonisme.nl>

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

**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@gmail.com](mailto:kriorus@gmail.com) for additional information or visit <http://www.kriorus.ru>. Phone: +7 962 947-50-79

**SWEDEN:** [www.kryonik.se](http://www.kryonik.se) or Facebook: Svenska Kryonikföreningen. Initially, the society will focus on providing information and assistance to those who wish to sign up for cryonics. Eventually,

we also hope to provide practical assistance in cases, possibly in collaboration with other European groups.

**SWITZERLAND:** [www.cryosuisse.ch](http://www.cryosuisse.ch)

CRYOSUISSE The Swiss Society for Cryonics is an active group with over 30 members. To join, [email info@cryosuisse.ch](mailto:info@cryosuisse.ch)

## UNITED STATES:

**Minnesota:** Minnesota Cryonics Rapid Response (MCRR) is a nonprofit standby, stabilization and transport group based in Minneapolis, Minnesota. We have a strong, longstanding working relationship with local funeral directors, and have successfully participated in significantly more-timely suspension efforts in Minnesota in cooperation with both Alcor and the Cryonics Institute. Contact: President, Chuck Bartl, [chuckbartl@yahoo.com](mailto:chuckbartl@yahoo.com).

**Washington DC Metro Region:** Life Extension Society (LES) is a nonprofit organization of area cryonicists dedicated to enhancing local capabilities for standby, stabilization and transport. Members from both Alcor and Cryonics Institute are welcome. Contact: Mark Mugler, [mugsim2@gmail.com](mailto:mugsim2@gmail.com).

**UNITED KINGDOM:** Cryonics UK is a nonprofit UK based standby group. [www.cryonics-uk.org](http://www.cryonics-uk.org) Cryonics UK can be contacted via the following people: Tim Gibson: phone: 07905 371495, email: [tim.gibson@cryonics-uk.org](mailto:tim.gibson@cryonics-uk.org). Victoria Stevens: phone: 01287 669201, email: [vicstevens@hotmail.co.uk](mailto:vicstevens@hotmail.co.uk). Graham Hipkiss: phone: 0115 8492179 / 07752 251 564, email: [ghipkiss@hotmail.com](mailto:ghipkiss@hotmail.com). Alan Sinclair: phone: 01273 587 660 / 07719 820715, email: [cryoservices@yahoo.co.uk](mailto: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. [www.CryonicsSociety.org](http://www.CryonicsSociety.org). They publish an e-newsletter *FutureNews*. Phone: 1-585-643-1167.

## HELP US STAY UP-TO-DATE!

Please send any corrections or changes to the address below. If you know of, or are considering starting a support, standby or other cryonics-related group in your area, please send details to

[dg@cryonics.org](mailto:dg@cryonics.org).



*Please note, this list is provided as an information resource only. Inclusion on the list does not constitute an endorsement by the Cryonics Institute 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.*



# CI MEMBERSHIP

APRIL 2023

Members ..... 1,940  
Patients.....240

Pets ..... 239  
DNA/Tissue ..... 341  
SA ..... 317

TOTAL  
**2,180**



# Who will be there for YOU?



## Don't wait to make your plans. Your life may depend on it.



Suspended Animation fields teams of specially trained cardio-thoracic surgeons, cardiac perfusionists and other medical professionals with state-of-the-art equipment to provide stabilization care for Cryonics Institute members in the continental U.S.

Cryonics Institute members can contract with Suspended Animation for comprehensive standby, stabilization and transport services using life insurance or other payment options.



Speak to a medical representative for more information.

..... **Call 1-949-482-2109** .....

or email [info@suspendedanimationinc.com](mailto:info@suspendedanimationinc.com)

# Appointing a Funeral Agent or Designated Funeral Representative

*by Branson Peacock - Cryonics Institute*

What is a Funeral Agent and the process of appointing a funeral agent, who will have the authority to make final funeral arrangements on your behalf to ensure your Cryonic Suspension

By naming a funeral agent or designated representative, you are able to appoint the person who you believe will best carry out your wishes to be Cryonically Suspended. Designating a funeral agent is an important step in order to ensure that your final wishes are handled as you wish them to be. When you appoint someone, they will be legally responsible for arranging your funeral (specifically your transportation, perfusion, long-term storage at the Cryonics Institute.) It is important to think carefully when choosing a person for this position because it is a huge responsibility. You should pick someone that you trust and that will faithfully abide by your personal beliefs in Cryonics regarding the disposition of your remains. The appointed agent will have the legal authority to carry out the arrangements on your behalf, so it is important that you choose someone who understands what your wishes to be Cryonically Suspended and can handle that responsibility.

It is important to communicate your belief in Cryonics clearly with the appointed agent, so that they are aware of what you want and can carry out your wishes after you have legally been declared deceased. The funeral representative is the person responsible for making decisions, and is the sole authority to dispose of your remains. To appoint a funeral agent, you must fill out a form sometimes called a 'Declaration of Appointment of Funeral Agent' (This form does vary depending on which State the individual resides) which allows you to name the person who will be in charge of making decisions about your legal death. It is important that you choose someone who you trust and are comfortable with to fill this position.

In order to appoint a funeral agent, you should also consider your estate planning documents. If you have named a specific person in your will to make the arrangements for your funeral, that person has the highest priority. However, if there is no such appointment in your will, then you may appoint

any other person to make decisions about the arrangements for your Cryonic Suspension.

To appoint a funeral agent, you should also consult with your lawyer or estate planner to determine if you have included specific appointment wording in your will or trust. In most cases, the executor of the estate is appointed as the designated funeral agent. However, if there is no executor or if you would like to designate someone else as your agent, you will need to complete an appointment form. This charged funeral agent is responsible for carrying out the individual's final wishes in regards to the decedent's Cryonic Suspension.

The family hierarchy should also be taken into consideration when appointing an individual as your funeral agent. If the decedent has no living spouse, the next person in line to be appointed would typically be his or her children. If the individual has no living children, then the relatives are responsible for appointing someone to be their funeral representative. When appointing someone to be your funeral representative, it is important to ensure that they are familiar with your personal preferences for Cryonics and that they have enough authority to make decisions concerning your arrangements.

When deciding who to appoint as your funeral agent, you may wish to give this position to a family member, friend, or even a fellow Cryonist. It is important that the person you select has the ability to make decisions and control the disposition of your remains. The appointed person will be responsible for executing your wishes and making sure that all of the planning is done correctly. However, they are not able to override decisions made by family members or other decision makers unless you have authorized them in writing prior to death.

For additional information regarding your specific State please contact the Cryonics Institute at 586-791-5961 or [info@cryonics.org](mailto:info@cryonics.org).



# Generating Art with Artificial Intelligence

by Nicholas Van Der Muellen - Cryonics Institute



Maybe you have heard of AI image generators like Stable Diffusion. Very easy to download and free to use. Just write a short prompt and an image of what you wrote is created. When I first tried it out, I was pretty surprised. As more updates were released, I was stunned. So, I'm writing this short article to briefly explain how that works in a way that's easy to understand. Or at least how I think it works... Also, how it will affect our future as cryonicists.

Originally, I thought the program was connected to the internet and that it scanned the web for images on various sites based off the prompts each time a new image was generated. Now I know that's not how it works. It doesn't need to be connected to the internet at all! Basically, pictures of certain objects are used to train different models. One model might know what an apple looks like and another may not. The way a model is trained to know what an apple is for example, is by simply showing it pictures of apples. The pictures are not even saved as image files in the model, but rather as lines of code the model can understand that are categorized by short text descriptions of the apples. The shape of what an apple looks like is recorded, the texture, material, essentially the way light interacts with it. Through repeated attempts at properly recreating similar images of the apples, the model then creates a few small files only kilobytes in size called embeddings. These embeddings can then be added to the different models. No internet needed and no images saved.

I trained Stable Diffusion to recognize my wife, Nicole by embedding primarily her face into the model. The following images were created using only Stable Diffusion and absolutely no other programs were used. Not even for post processing. Although I do admit that these represent a few of the best images out of hundreds of other nonsensical images. These were dialed in by repeatedly and gradually changing settings.

Again, the AI is only currently capable of learning what things look like. In the near future, these programs will be able to create complex 3D models. They will be used to make movies, develop games, and create virtual realities. They will be used to manufacture objects in the real world. Simply tell it. Hey AI... What is the best design and building process to make the most efficient and effective -insert anything here- in the world? And the AI will tell you and make it for you. Potentially it will even be used to bring us back to life in the future. What is the best possible way to reanimate the cryonics patients? Nanotech? Brain scanning? We like everything else are simply nothing but a 3D model. Just the exact configuration of atoms and molecules which are universally identical units of our world. If I could utilize the AI of the future right now, I would train it to recognize every single aspect of human cellular and molecular biology so that it could create new proteins for example and alter every cell in my body so that I can live indefinitely.



## Finding the fountain

Another thing machine learning might help us do is identify potential drug candidates that intervene in one or more of the aging pathways. Previous work with machine learning developed a way to identify senescent cells and identify chemicals that might mitigate the process.

A new study does something similar for potentially lifespan-prolonging compounds in *Caenorhabditis elegans* — a tiny roundworm that is a favorite model organism of many biologists and aging researchers. (This also means — caveat emptor — that the findings of this study are not (yet?) translatable to humans.)

The researchers used the DrugAge database that collects drugs, compounds, and supplements that have anti-aging effects in a variety of model organisms. Using the molecular features and descriptors of the database entries, the scientists developed a random forest machine learning model. This:

...is a supervised machine learning technique, consisted of an ensemble of decision trees, where each tree is trained independently using a random subset of the data.

Basically, in each data subset, a decision tree goes from observations about a molecule (the proverbial branches) to conclusions about its potential (the leaves). The random forest is the collection of these trees and when several of these trees look the same, we have a hit for further exploration.

The researchers set the threshold for hits at a >80% probability of extending the life of *C. elegans*. They ended up with fifteen promising candidates, roughly categorizable into three groups.

**Flavonoids:** polyphenolic metabolites found in, among others, tea, soy, fruits, vegetables, wine, and nuts. Top hits here were diosmin (citrus fruits), rutin (buckwheat) — especially in combination with quercetin (onions), hesperidin (also citrus fruits), and several soy isoflavones.

**Fatty acids and conjugates:** top hitters here were gamolenic acid (evening primrose oil, hemp seeds, and hemp seed oil) and sodium aurothiomalate (a type of gold salt).

**Organooxygen compounds:** top three were lactose (dairy), sucrose (fruits), and lactulose (combination of lactose and galactose).

**Others:** A few compounds didn't belong in any of the above groups, such as alloin (aloe vera), and the antibiotics fidaxomicin, rifapentine, and chlortetracycline.

## The authors conclude that:

Future work would involve in vivo testing of promising compounds ...would also explore how the predicted probability of lifespan increase is affected when testing two structurally similar compounds that promote longevity at different concentrations.

And this, I think, is an important message: machine learning can be wrong. These compounds are suggestions that still need to be tested. Also, the road from *C. elegans* to humans is long and often crumbles a long way from human trials.

But it might be a starting point.





## New release of Blue Brain Project Atlas sheds light on neuron types

*by Evelyne Schmid Osborne, Ecole Polytechnique Federale de Lausanne*

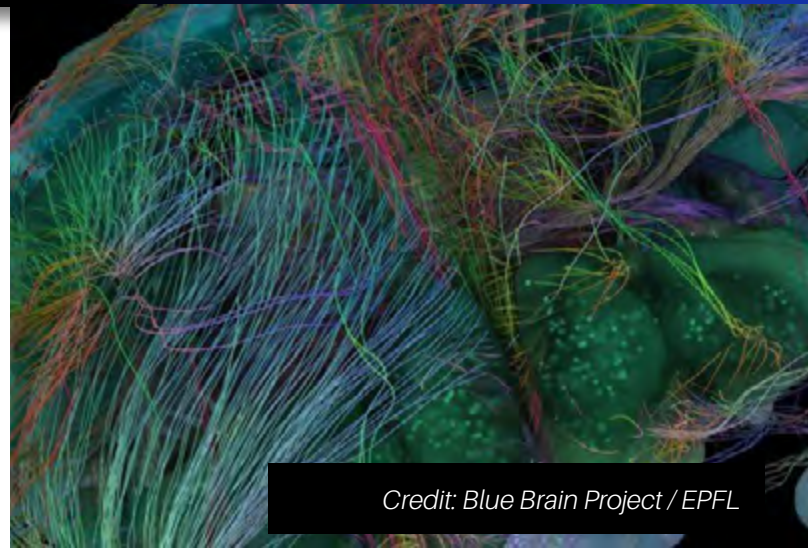
After four years of research, EPFL's Blue Brain Project shares an enriched version of their 3D digital cell atlas of the mouse brain which includes more neuron types. The new approach can be extended to any other cell type, and provides a resource to build tissue-level models of the mouse brain.

Knowledge of the cell-type specific make-up of the brain is useful to understand the role of each cell type as part of the network, is necessary to tackle any large scale neural circuit simulation, and is key to Blue Brain's long term goal of accurately building a digital model of the whole mouse brain. Nonetheless, obtaining a global understanding of the cellular composition of the brain is an excessively complex task, not only because of the great variability inherent in the literature but also because of the numerous brain regions and cell types that make up the brain.

In 2018, EPFL's Blue Brain Project presented the first model of a cell atlas which provided an estimate of the composition of the mouse brain. The release of Blue Brain's Cell Atlas (BBCAv1) marked the first time a 3D digital atlas provided information on major cell types, numbers and positions in all the more than 700 regions of the mouse brain.

It provides the densities of neurons, the associated connective tissue cells (glia) and their subtypes for each region, all of this presented in a navigable and dynamic format, allowing researchers to contribute new data. "At the time, it filled the huge gap in our knowledge of 96% of the mouse's brain regions," says Blue Brain Founder and Director, Professor Henry Markram.

In recent years, new datasets and tools have emerged, providing cell-type composition based on the specific proteins expressed within the cells. While comparatively quick, these



*Credit: Blue Brain Project / EPFL*

molecular marker techniques alone do not always yield directly usable information on the morphologies (shape) and electrophysiological properties of neurons. However, characterizing morpho-electrical properties of cells is extremely time-consuming and not suited to whole brain scans. It is therefore desirable to bring together and combine all the various available datasets in order to create one coherent framework with as much detailed information as possible.

### Revealing inhibitory neuron density

One notable class of neurons for which very little data was available, and for which the method used to establish the BBCAv1 needed to be refined, is inhibitory neurons. Inhibitory neurons dampen the firing of other neurons and play a crucial role in packaging and transmitting information in the brain. They act like neuronal punctuation marks, and allow the brain to make sense of the influx of information.

Estimates of inhibitory neuron counts were collected from the literature and a framework was built in order to combine them consistently into the cell atlas. Using brain slice images, inhibitory neuron densities were also estimated in regions where no literature data was available. In total, the authors reveal that in the mouse brain 20% of all neurons are inhibitory.

"This sets the stage for subdividing inhibitory neurons into more fine-grained classes," according to lead author, Blue



from MEDIUM.COM



## **Machine Learning Finds Potential Longevity Drugs**

*A new machine learning model identifies chemical compounds that might prolong the lifespan of model organisms*

Gunnar De Winter

### **It's complicated**

Aging is complicated.

Our immune system sputters, the risk for cancer rises, muscle wasting becomes a potential problem, joints get stiffer, and memory is spottier than it used to be. Even our microbiome, skin, and body shape change. Down to the DNA, things start to go wrong.

To understand all that happens in an aging body, we can study metabolism, physiology, cognitive function...

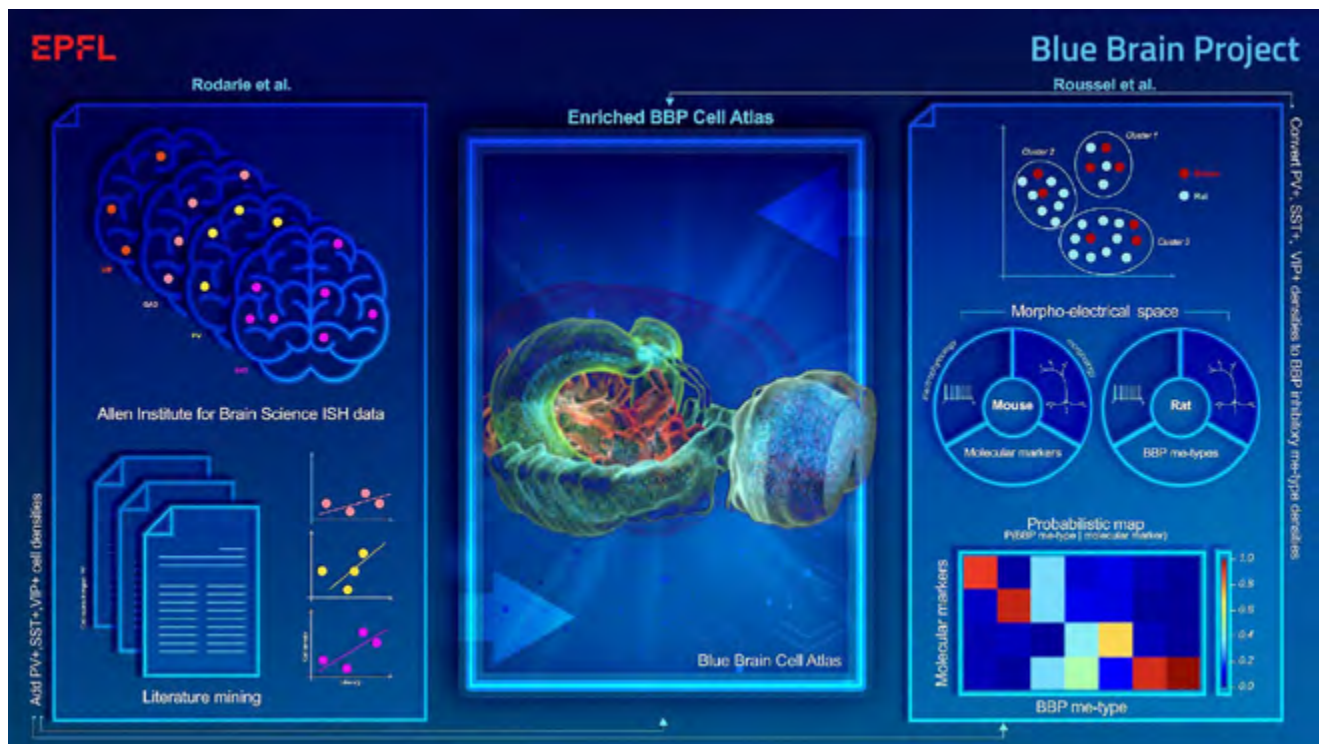
We can also try to untangle the genetic roots of aging (environment and lifestyle matter too, of course). But there are thousands — if not more — of genes involved. Not to

mention the importance of gene expression.

It's not only about having certain genes, it's (partially) about how you express them. For example, epigenetic tags that change gene expression can make genetically identical worms live for different durations. Epigenetic alterations are also a suspect in how hibernation in some animals seems to slow down aging, or in how queens in eusocial species outlive workers.

Aging remains a tricky problem because it is a systemic process that leaves no bodily function unaffected. It is a multi-factorial problem and in a previous post, we looked at how machine learning can be beneficial in aging research, for example, by developing lifespan 'clocks'.





The new tools and methods used to refine the Cell Atlas and produce the BBCAv2 are published in two companion papers in PLOS Computational Biology. Credit: Blue Brain Project / EPFL

Brain’s Dimitri Rodarie “and allows the neuroscience community to identify areas where current knowledge can be enhanced by additional constraints.”

### Cross-species help for neuron models

The information mined from the Allen Institute for Brain Science provides essential data, allowing the creation of a catalog of neurons in the mouse brain according to their molecular, morphological and electrophysiological properties. However, in order to model brain regions, and more so a whole brain, not only is a global understanding of the cellular composition of the brain required, but detailed biophysical models of neurons must also be created.

In a previous publication, Blue Brain built models based on morpho-electric data from neurons of the juvenile rat somatosensory cortex. As the data is from different species—mouse vs. rat—and from a different developmental stage, the authors included normalization steps in order to map the models to the cell data from the Allen Institute. This step not only allowed them to assign a molecular identity to the neuron models, but also to populate the whole mouse cortex with detailed neuronal models.

“Our algorithm helps to draw parallels across species but also extends our understanding of less studied brain areas,” explains lead author, Blue Brain’s Yann Roussel, adding “This model will allow experimentalists to understand regional composition and allow computational neuroscientists to place defined cell types in their simulations.”

The new tools and methods used to refine the Cell Atlas and produce the BBCAv2, published in two companion papers in PLOS Computational Biology, were extended to map well identified types to inhibitory neuron subclasses, paving the way for more accurate in silico reconstructions of brain tissues.

The data, algorithms, software, and results of the pipeline used to upgrade the Blue Brain Cell Atlas are all publicly available.

For Daniel Keller, leader of Blue Brain’s Molecular Systems team, “This version encompasses four years of studies and includes additional constraints from biological data to make the results more amenable to simulation. Using it for simulation allows us to identify areas for further refinement, thereby permitting improvement with every successive generation.”

“This project aims to involve the scientific community to contribute with open access to data, software and tools. We expect the BBCAv2 to be used for many purposes,” conclude the authors.

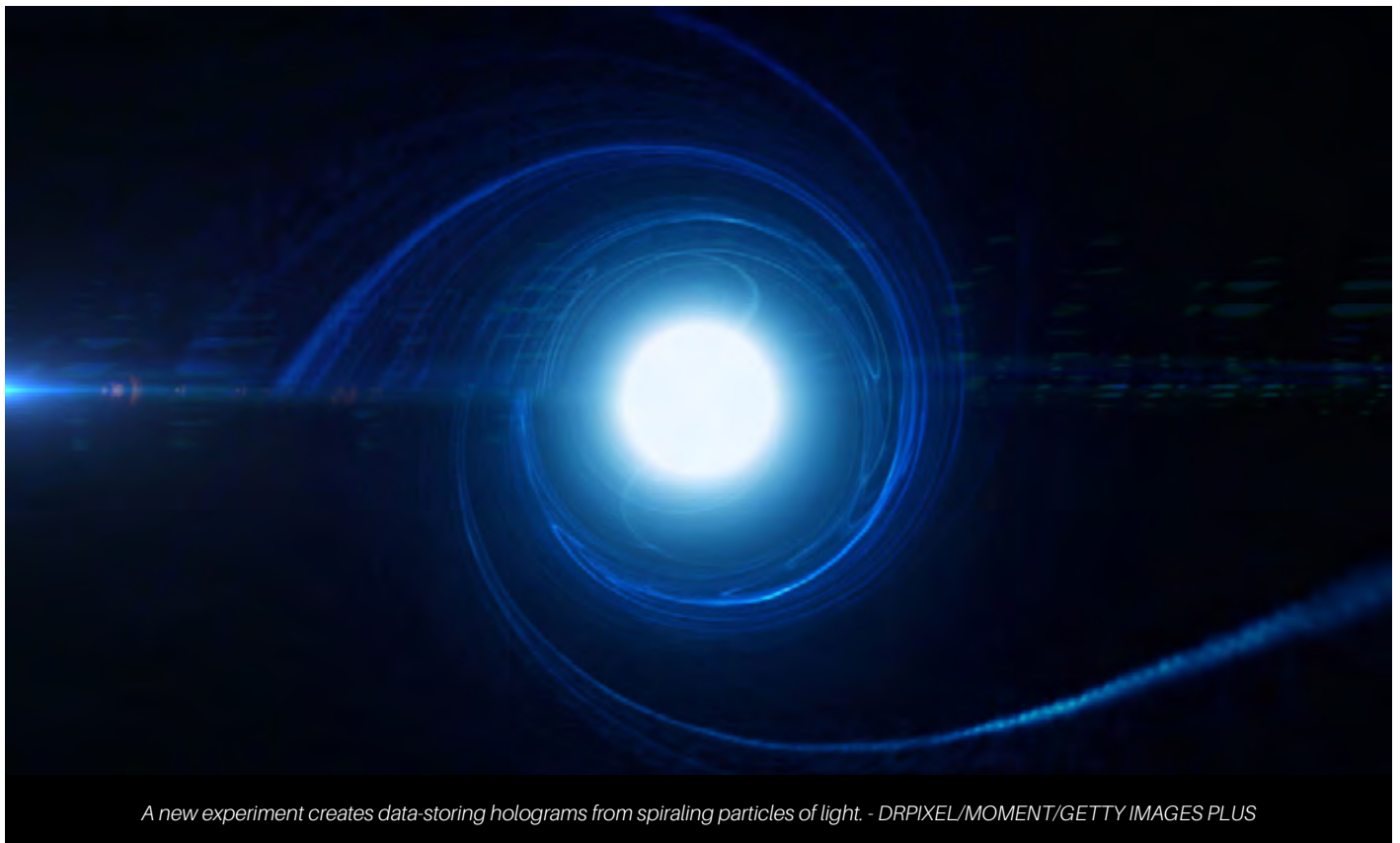
More information: Yann Roussel et al, Mapping of morpho-electric features to molecular identity of cortical inhibitory neurons, PLOS Computational Biology (2023). DOI: [10.1371/journal.pcbi.1010058](https://doi.org/10.1371/journal.pcbi.1010058) Dimitri

Rodarie et al, A method to estimate the cellular composition of the mouse brain from heterogeneous datasets, PLOS Computational Biology (2022). DOI: [10.1371/journal.pcbi.1010739](https://doi.org/10.1371/journal.pcbi.1010739)

Journal information: PLoS Computational Biology

## Physicists stored data in quantum holograms made of twisted light

By James R. Riordon



*A new experiment creates data-storing holograms from spiraling particles of light. - DRPIXEL/MOMENT/GETTY IMAGES PLUS*

Particles of twisted light that have been entangled using quantum mechanics offer a new approach to dense and secure data storage.

Holograms that produce 3-D images and serve as security features on credit cards are usually made with patterns laid down with beams of laser light. In recent years, physicists have found ways to create holograms with entangled photons instead. Now there is, literally, a new twist to the technology.

Entangled photons that travel in corkscrew paths have resulted in holograms that offer the possibility of dense and

ultrasecure data encryption, researchers report in a study to appear in *Physical Review Letters*.

Light can move in a variety of ways, including the up-and-down and side-to-side patterns of polarized light. But when it carries a type of rotation known as orbital angular momentum, it can also propagate in spirals that resemble twisted rotini pasta.

Like any other photons, the twisted versions can be entangled so that they essentially act as one entity. Something that affects one of an entangled photon pair instantly affects the other, even if they are very far apart.

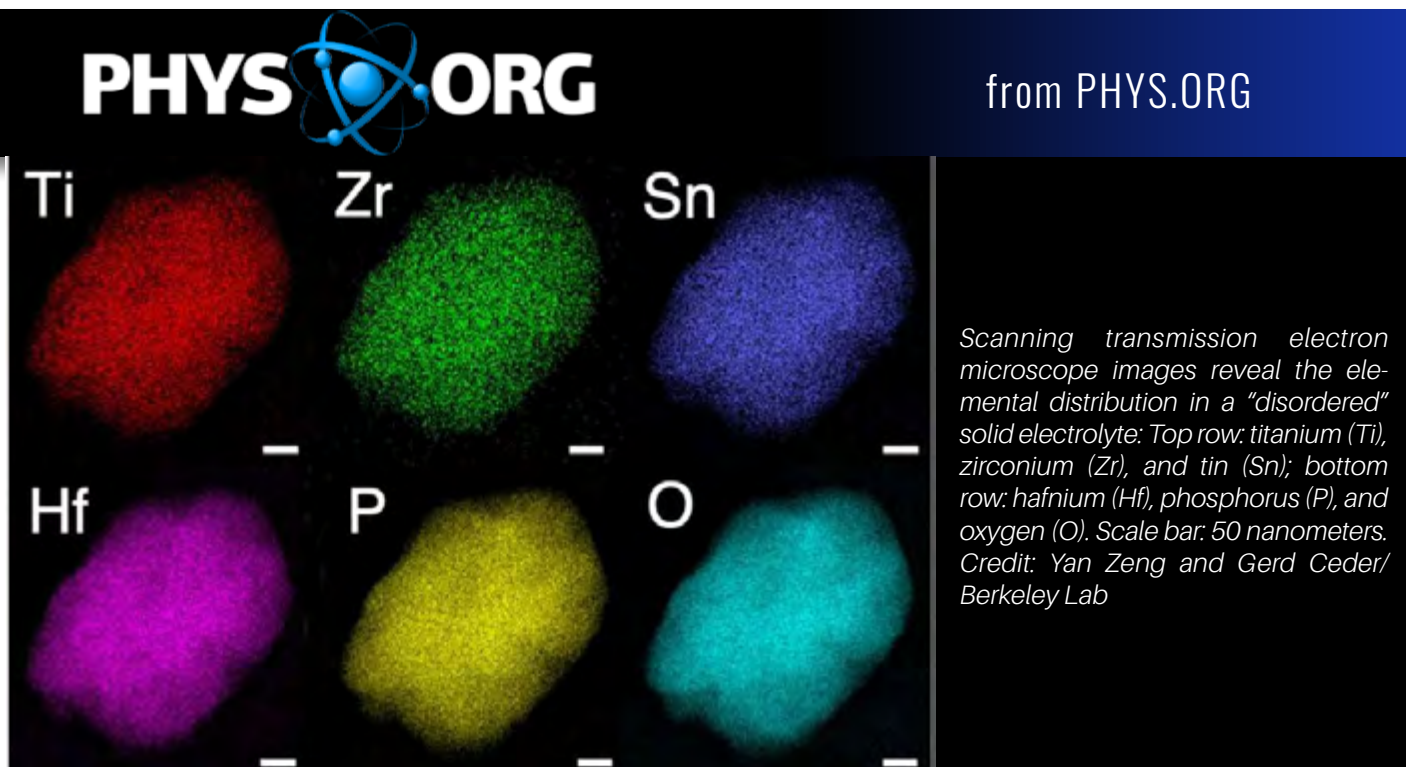


In previous experiments, researchers have sent data through the air in entangled pairs of twisted photons (SN: 8/5/15). The approach should allow high-speed data transmission because light can come with different amounts of twist, with each twist serving as a different channel of communication.

Now the same approach has been applied to record data in holograms. Instead of transmitting information on multiple, twisted light channels, photon pairs with different amounts of twist create distinct sets of data in a single hologram. The more orbital angular momentum states involved, each with different amounts of twist, the more data researchers can pack into a hologram.

In addition to cramming more data into holograms, increasing the variety of twists used to record the data boosts security. Anyone who wants to read the information out needs to know, or guess, how the light that recorded it was twisted.

For a hologram relying on two types of twist, says physicist Xiangdong Zhang of the Beijing Institute of Technology, you would have to pick the right combination of the twists from about 80 possibilities to decode the data. Bumping that up to combinations of seven distinct twists leads to millions of possibilities. That, Zhang says, "should be enough to ensure our quantum holographic encryption system has enough security level."



## Powering up: Research team develops strategy for better solid-state batteries

by Kathleen Haughney, Florida State University

A team from Florida State University and Lawrence Berkeley National Laboratory has developed a new strategy to build solid-state batteries that are less dependent on specific chemical elements, particularly pricey metals with supply chain issues.

Their work was published in the journal *Science*.

Bin Ouyang, an associate professor in the Department of Chemistry and Biochemistry, first developed the idea for this

work while finishing his postdoctoral research at the University of California, Berkeley, along with his co-first author Yan Zeng, and their postdoctoral adviser Gerbrand Ceder. In their study, they demonstrated that a mix of various solid-state molecules could result in a more conductive battery that was less dependent on a large quantity of an individual element.

"There's no hero element here," Ouyang said. "It's a collective of diverse elements that make things work. What we

found is that we can get this highly conductive material as long as different elements can assemble in a way that atoms can move around quickly. And there are many situations that can lead to these so-called atom diffusion highways, regardless of which elements it may contain.”

Solid-state batteries operate almost the same way as other batteries—they store energy and then release it to power devices. But rather than liquid or polymer gel electrolytes found in lithium-ion batteries, they use solid electrodes and a solid electrolyte. This means that a higher energy density can occur in the battery because lithium metal can be used as the anode. Additionally, they have lower fire risk and potentially increase the mileage of electric vehicles.

However, many of the batteries constructed thus far are based on critical metals that are not available in large quantities. Some aren’t found at all in the United States. Given that the U.S. and many other countries plan to replace all vehicles with electric vehicles by 2050, there is an enormous strain being put on the supply chain for critical metals.

The research team considered the straightforward path of using one element to replace commonly used ones, but that approach raised its own supply chain issues. Instead, the team approached the problem by designing materials

that weren’t beholden to one specific element. For example, instead of creating a battery made with germanium, which rarely appears naturally in high concentrations, the team created a mixture of titanium, zirconium, tin, and hafnium.

“With such a feature, we need to assemble those elements in a way so that we have many ‘good’ local configurations which can form a network for the fast transport of atoms or energy,” Ouyang said. “Think of it as a highway. As long as there is a connected highway for atom diffusion, the atoms can move quickly.”

This study opened a new area of research for Ouyang and his colleagues as they work to build more efficient solid-state batteries.

Government, research and academia have heavily invested in the development of solid-state batteries because batteries that contain liquids are more prone to overheating, fire and loss of charge. Smaller solid-state batteries already power devices like smartwatches and pacemakers. Still, many manufacturers believe that breakthroughs in this area could mean solid-state batteries could one day be helping electric vehicles or aircraft.



from LIFESPAN.IO

## Exercise and Supplements Against Age-Related Inflammation

*A synergistic effect was shown in several studies.*

*By Larisa Sheloukhova*

### A double-edged sword

Chronic low-level inflammation accompanies many hereditary and age-associated diseases. Inflammation also plays an important role in ‘healthy’ aging, so it was recently acknowledged as another hallmark of aging by that paper’s original authors.

Inflammaging (inflammation + aging) is associated with fatigue – one of the most commonly reported symptoms among older people. While fatigue was shown to lead to physical inactivity in this population [2], exercising might actually be beneficial for reducing inflammation and, subsequently, fatigue.

At the same time, vigorous long-duration exercise sessions might promote inflammation [3]. Ultimately, the effect of

exercise on an individual’s inflammatory profile seems to depend on several factors, including exercise intensity, duration, and type of exercise as well as characteristics such as sex, age, health status, and, possibly, nutrition.

In this study, the researchers sought to explore if a combination of dietary supplementation and physical activity can reduce inflammation in people over the age of 60. The team analyzed the results of 11 studies that satisfied pre-defined criteria for eligibility.

### Exercise-supplementation synergy

The 11 randomized controlled studies differed in design, but most included healthy men and women, and all compared exercise + supplementation groups to control groups.



Six studies evaluated protein or amino acid supplements (mostly leucine). Two studies included omega-3 supplements, one study focused on vitamin C supplements, and vitamin D was used either as a sole supplement or in conjunction with amino acids and whey protein.

The studies also differed by the implemented exercise regimes. Most studies incorporated resistance training, two studies focused on combined exercise (e.g. aerobic + stabilization), and one included only Nordic walking. In general, participants exercised 2-3 times a week. Study durations varied from 4 weeks to 24 weeks.

The analysis showed that in 6 of the 11 studies, there was a reduction in inflammatory markers such as IL-6, TNF- $\alpha$ , and C-reactive protein after exercise combined with dietary supplementation. The researchers conclude that in addition to the beneficial effect of exercise, the anti-inflammatory properties of plant-derived proteins and such micronutrients as vitamins C and D might be responsible for the suppression of inflammation in these studies.

Nonetheless, the results obtained in this systematic review are rather ambiguous. Most often than not, not all inflammation markers were suppressed by the interventions in the analyzed studies. In addition, it is still unclear what the ideal combination of exercise and dietary supplementation is.

### Abstract excerpt

After applying eligibility criteria and risk-of-bias assessment, 11 studies were included in the systematic review. In total, 638 participants were analyzed and the main supplements evaluated were amino acid or protein supplementation from different sources. In the counterpart, the exercise applied in the evaluations included strengthening exercises or aerobic

training. The interventions had a range of duration between 4 and 24 weeks, and the effects on inflammation markers in most of the studies showed a decrease in pro-inflammatory cytokines and non- or slightly significant change in anti-inflammatory cytokines. However, these results suggest that exercise and supplement interventions can contribute to diminishing the inflammation process in the elderly. We can also conclude that further well-designed randomized controlled trials are needed to confirm the possible synergistic effects of exercise and food supplementation against inflammation in the elderly due to the limited studies that currently exist.

### Conclusion

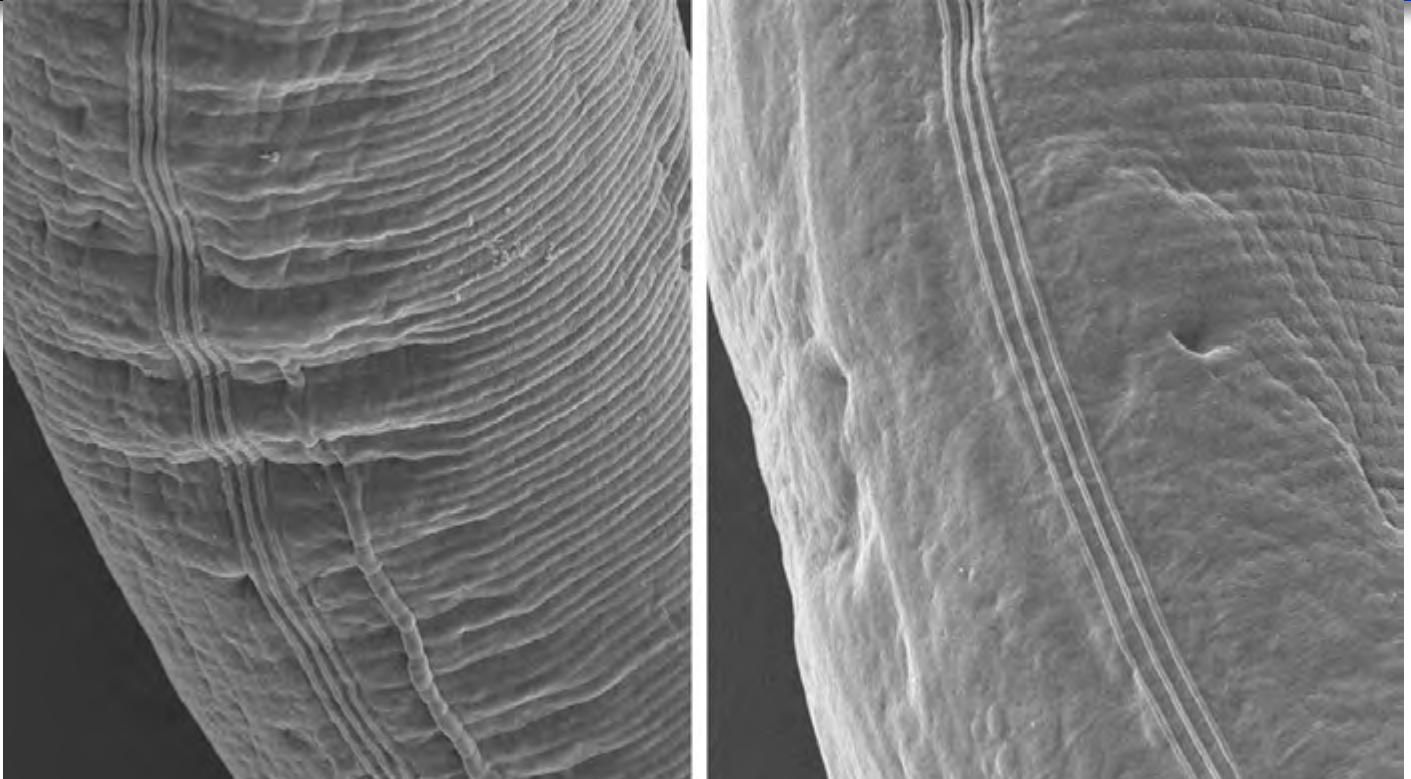
This study revealed some evidence of the synergistic anti-inflammatory effect of exercise combined with dietary supplementation, including protein, in older people. The significance of this result is not clear, though, and the optimal exercise and nutrition regime likely depends on the person and should be developed with individual parameters in mind.

We would like to ask you a small favor. We are a non-profit foundation, and unlike some other organizations, we have no shareholders and no products to sell you. We are committed to responsible journalism, free from commercial or political influence, that allows you to make informed decisions about your future health.

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*In a new systematic review, researchers have shown that combining some dietary supplements and exercise might be beneficial for people over the age of 60 [1].*





Scanning electron microscopy images of the cuticle (skin) of *C. elegans* kept at 25 degrees Celsius show wrinkles on an old (9-day old) adult wild-type worm (left) but smooth skin on an *npr-8* mutant worm of the same age (right). Credit: Yiyong (Ben) Liu, Washington State University

## New discovery could hold the key to healthy aging during global warming

by Judith Van Dongen,, Washington State University

Researchers have long known that many animals live longer in colder climates than in warmer climates. New research in *C. elegans* nematode worms suggests that this phenomenon is tied to a protein found in the nervous system that controls the expression of collagens, the primary building block of skin, bone and connective tissue in many animals.

Since the *C. elegans*' protein is similar to nervous system receptor proteins found in other species including humans,

the discovery potentially brings scientists closer to finding ways to harness collagen expression to slow down human aging and increase lifespan in the midst of global warming. Led by scientists at Washington State University, the study was published in *Aging Cell*.

"Based on animal studies, scientists anticipate that human lifespan will go down in the future as climate change drives up the ambient temperature," said senior author Yiyong



(Ben) Liu, an assistant professor in the WSU Elson S. Floyd College of Medicine and director of the university's Genomics Service Center.

"We have found that warm temperatures leading to short lifespan is not a passive, thermodynamic process as previously thought, but a regulated process controlled by the nervous system. Our findings mean that down the road, it may be possible to intervene in that process to extend human lifespan as temperatures rise."

The researchers looked at a nervous system protein known as NPR-8 in the tiny soil-dwelling worm *Caenorhabditis elegans* (*C. elegans*), a commonly used model organism in aging research. During their study, they observed that worms lacking NPR-8 had fewer skin wrinkles as they aged.

They also made the unexpected discovery that mutant worms kept at a warm temperature of 25 C (77 F) had increased collagen expression and lived longer than wild-type worms, which did not happen when the worms were kept at 20 C or 15 C (68 F and 59 F, respectively). To determine whether the neural regulation of collagens may play a role in aging and longevity, they conducted a series of additional experiments and analyses.

"What we saw was that the absence of NPR-8 caused an increase in collagen expression, which increased the worms' stress resistance and lifespan and made them look younger than wild-type worms that were the same biological age," said co-first author Durai Sellegounder, a former postdoctoral research associate in the WSU Elson S. Floyd College of Medicine who is now a scientist at the Buck Institute for Research on Aging.

In one experiment, the researchers reintroduced NPR-8 in mutant worms kept at 25 C and saw that this reverted the worms' skin from smooth to wrinkled and significantly reduced the animals' extended lifespan. Next, they showed that the extended lifespan of npr-8 mutant worms also held up under heat stress conditions, with mutant worms surviv-

ing significantly longer than wild-type worms when moved into a 35 C (95 F) environment.

Additional experiments identified specific neurons responsible for regulating lifespan in response to warm temperatures and pointed to increased expression of collagens as a driver of the improved lifespan at warm temperatures.

The phenomenon of heat shortening lifespan has traditionally been explained by the rate of living theory, which suggests that heat speeds up an organism's metabolism, causing it to use up its finite store of metabolic energy more quickly. While the researchers still found limited evidence supporting this idea, their study findings indicate that the nervous system also plays an active role in this process.

Given earlier findings that showed that worms lacking NPR-8 were more resistant to infection and oxidative stress, the researchers believe that the NPR-8-controlled increase in collagen expression boosts the animals' resistance to stressful conditions such as excessive heat. Their next step is to delve deeper into the underlying mechanisms of how increased collagen production enhances stress resistance.

More information: Sankara Naynar Palani et al, The longevity response to warm temperature is neurally controlled via the regulation of collagen genes, *Aging Cell* (2023). [DOI: 10.1111/acer.13815](https://doi.org/10.1111/acer.13815)

Journal information: [Aging Cell](#)

Provided by Washington State University



# CI Reading Room

*Serializing essential works on cryonics*

**R.C.W. Ettinger**

# YOUNIVERSE

**Toward a Self-Centered Philosophy  
of Immortalism and Cryonics**

## **CHAPTER SEVEN**

*"A classic for anyone trying to understand what this universe is all about...and it has many little things that add to the fun of reading it."*

—Professor Peter Gouras, M.D., Ph.D., Columbia University, about the first edition.



## Chapter 7

### Ethics 2: Law

**The law is an ass**, according to Dickens's Mr. Bumble in *Oliver Twist*. Time for a little ass kicking, or at least chewing out. **Legislatures have been compared to sausage factories.** The procedure is gruesome and smelly, and the product often unwholesome.

**The Scandalous Judiciary:** The American judiciary is in a parlous state—not necessarily relative to other places and times, but certainly relative to what it could be and ought to be. To appreciate this, we don't even need to look at particular cases, just at the cruelly revealing structure. The courts have a hierarchy, most of them are geographically restricted, and some are restricted by type of case handled. But there is always an appeal structure, so if you don't like the result at one level, you can appeal higher, until you die or run out of money or lose or win at the U.S. Supreme Court level. Now think what that means.

It means not only that we acknowledge, in advance, that some courts or judges may be incompetent or dishonest in judging the facts, but it also means we acknowledge that any courts or judges may disagree on the law. This in turn implies one or both of two things—that no judges are both completely honest and completely competent, or the law is often unclear!

Once more: If all laws were clearly written, and if judges were reasonably honest and minimally competent, then there should hardly ever be a disagreement among judges about the law. Or among lawyers, for that matter, which would mean very light dockets. But

there is incessant and notorious disagreement, and even reversals of previous opinion at the Supreme Court level. This is intolerable, or ought to be thought so.

If the point needed emphasis, we could just note the fact that higher courts generally consist of a panel of judges—nine, the case of the U.S. Supreme Court. Rulings are by majority, and split decisions are common. This proves that the law is so unclear—or/and bias so pervasive—that even the brightest and the best often cannot agree. Imagine driving over a bridge designed by a committee of engineers, if 4/9 of the engineers deemed the bridge unsafe!

A column by syndicated commentator George Will on June 30, 2003, rails against the recent Supreme Court ruling that struck down a state law that criminalized sodomy in all circumstances. Homosexuals and their sympathizers rejoiced at the victory for "privacy" and "choice", while those on the religious right (among others) fumed at the undermining of morality. and "decency" If the court allows some sex acts as constitutional rights, by what principle are others denied the same standing? For example, why should laws against lap dancing be allowed?

Mr. Will missed the mark, I think. The more basic question is simply by what authority the court writes its rulings. The Constitution says nothing about privacy, and it was written in an era of laws against adultery and no women's suffrage and all kinds of other infringements on "rights" we now assume. It also says that

any powers not explicitly granted to the federal government are reserved to the states or the people. The exact wording is in Amendment X:

The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States, respectively, or to the people.

The defense of arbitrary judging, explicit or implicit, is that it is commonplace and expedient. Most of us sometimes fudge or cheat or hedge or cut corners a little, because its just too much trouble to go strictly by the book. Such a view includes the "evolving" Constitution notion, that the meaning of the words depends not only on what the framers thought they meant, but also, and maybe more importantly, on what contemporaries think they ought to mean. This is frighteningly close to the Orwellian vision of history trimmed to policy.

**More on Judicial Activism:** Judge-made law has been a problem in every society, since everyone in a position of power—whether a judge or a policeman or a mere clerk—is tempted to put his own preferences or biases into the mix.

One of the notorious examples in Constitutional law concerns freedom of religion and such things as prayer in public schools and use of public funds to subsidize parochial schools, displays of religious symbols on public property, etc. All the First Amendment says is that:

*Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.*

The Constitution also says that authority not given to the federal government is reserved to the States or the people. Yet many courts have ruled that nothing can be done with public funds or on public property that tends to promote a particular religion or denomination, or even any affirmation of faith.

**Abuse of Power, continued:** The American Founding Fathers—and western societies more generally—have been amazingly successful in reducing the corruption and abuses that have dominated history for most of the species in most places on earth and in most historical eras. Go almost anywhere in Asia or Latin America or Africa and count your blessings. But much remains to be done.

My acquaintances among lawyers and police officers assure me—if I needed such assurance—that personal prejudice or proclivity is a large factor in their behavior. Almost every judge or policeman will give favored treatment to someone he likes—and that isn't always a bad thing.

I once knew a young man who carried a concealed pistol in Detroit while delivering pizzas. One day three armed hoodlums tried to rob him. There was a shootout, and he wounded and captured all of them, while suffering minor gunshot wounds himself. He had no permit for the pistol, but the police were so delighted that they issued him one on the spot, suitably backdated. Still, we would like our people in power to observe the rules.

Making police observe the rules should be relatively easy, without Miranda and its collaterals. It is ridiculous to think that police abuse can be prevented only by coddling criminals at the expense of victims and society. What is needed is straightforward trial (or administra-



tive punishment) of offending police officers instead. Such a policy may not be easy to initiate or enforce, but it is surely worth trying.

The jaundiced judge problem is harder. An elected judge will feel enormous pressure to please his constituents, and an appointed judge will feel free to do as he pleases. There is already a voluminous and damning literature on the quirky sentencing habits of judges, resulting in more and more strict legislative guidelines on sentencing. Maybe we also need stricter legislative guidelines on other aspects of judicial behavior.

**More on Miranda, etc.:** Chief Justice Earl Warren explained the Miranda decision (1966) by saying that the Fifth Amendment guarantee against self-incrimination is so important that even an unfriendly atmosphere can inexcusably intimidate an isolated suspect, even though the celebrated jurist agreed that the rubber-hose days were long gone, even back then.

The Miranda warning rule is somewhat misunderstood, and some police departments bend over backward in applying it. It really just concerns the use of testimonial evidence in criminal proceedings that is the product of custodial police interrogation. Six factors must be present: (1) evidence must have been gathered (2) the evidence must be testimonial (3) the evidence must have been obtained while the suspect was in custody (4) the evidence must have been the product of interrogation (5) the interrogation must have been conducted by state-agents and (6) the evidence must be offered by the state during a criminal prosecution.

Perhaps in part because of the bend-over-backwards tendency, some studies seemed to

show that crime skyrocketed and clearances plummeted in the years following the Miranda decision, which was therefore not only unnecessary but an actual incitement to crime.

"Liberals" continue to think that only Miranda-type policies can restrain the police from brutality and intimidation, but this is far from clear. Again, an alternative would be a policy or public/private policies of prosecuting police or other agents who used excessive or unreasonable force.

Another argument against Miranda-type policies is that sometimes they almost compel police to perjure themselves or to plant evidence, as the only alternative to allowing dangerous miscreants to go free.

**Justice Needs Measurement:** Any justice system has so much potential for error or abuse that even the limited success of current Western practice represents a large advance over historical precedents. But not-quite-so-bad isn't good enough, and extensive reform is long overdue, both in analysis and administration. One key to advancement is measurement, sophisticated use of statistics.

**Trial by jury** is not generally used, as far as I know, outside of the U.S. and Britain, and despite the good intentions of its originators, it is an astonishingly bad idea. Compared to judges—which is not a terribly high standard—juries tend to be ignorant, stupid and readily swayed by irrelevancies and by histrionics. They rarely have much comprehension of statistical analysis or logical argument.

Bench trials or trials by judges or panels of judges are preferable to jury trials (if justice is the criterion), but this still runs afoul of fundamental flaws in law.

**Admissibility of evidence** is another grotesquerie of contemporary law. Certainly some kinds of evidence are less credible than others, but it is always a matter of degree, and present practice leads to absurdities.

For example, jurors are not only allowed but encouraged to use the appearance and demeanor of a witness as a guide to credibility. At the same time, most jurisdictions disallow the use of polygraph (lie detector) evidence on the grounds that it is somewhat unreliable. How goofy can you get?

Instead of the current mess, all evidence should be admissible in principle, with statistical guidelines as to degree of credibility.

**Preponderance of Evidence and Probability or Degree of Guilt or Liability:** In civil trials, a verdict (liable or not liable) is typically reached based on preponderance of evidence and a majority vote if there is a jury. In criminal cases, the verdict (guilty or not guilty) depends on whether or not there was a reasonable doubt, and the jury verdict must be unanimous.

Clearly, the civil procedure has more sense, but even that leaves room for improvement. There should be quantitative decisions—how likely the guilt or liability, and how culpable the party at fault. Once more, the problem is one of education. Most jurors, and many judges, know very little about statistical assessments or weighing of evidence. There would be heavy political resistance to any effort to demand appropriate education, but it needs to be done.

**Trial by Combat of Champions—The Adversarial System:** All lawyers are frightening, and specialty litigators are terrifying. Some firms are said to keep their lead litiga-

tors chained in a tower room and fed raw meat until needed.

In any case, the USA is notoriously the most litigious country, although there is some evidence that legal fees are higher in the UK. In any event, it is clear that the adversarial system has high costs both in money and miscarriage of justice.

It seems to be taken for granted nowadays that a lawyer has the right, and even the duty, to use every trick, including deceit, to gain a favorable verdict or reduced charge for his client. To contrast this with a once-upon-a-time presumption of honor, notice the following excerpts from oaths taken on admission to the bar:

The Colorado oath says in part: "I will employ only such means as are consistent with truth and honor; I will treat all persons whom I encounter through my practice of law with fairness, courtesy, respect and honesty; I will use my knowledge of the law for the betterment of society and the improvement of the legal system."

Maine, in part: "You solemnly swear that you will do no falsehood nor consent to the doing of any in court, and that if you know of an intention to commit any, you will give knowledge thereof to the justices of the court or some of them that it may be prevented; you will not willingly or willingly promote or sue any false, groundless or unlawful suit nor give aid or consent to the same."

Connecticut, in part: "You solemnly swear or solemnly and sincerely affirm, as the case maybe, that you will do nothing dishonest, and will not knowingly allow anything dishonest to be done in court, and that you will inform the court of any dishonesty of which



you have knowledge; that you will not knowingly maintain or assist in maintaining any cause of action that is false or unlawful.

Indiana, in part: "I will not counsel or maintain any action, proceeding, or defense which shall appear to me to be unjust, but this obligation shall not prevent me from defending a person charged with crime in any case; I will employ for the purpose of maintaining the causes confided to me, such means only as are consistent with truth, and never seek to mislead the court or jury by any artifice or false statement of fact or "law."

One might ask whether there is any legal recourse when a lawyer violates his oath. The answer is, apparently not. There seems to be no direct provision for enforcing the oath. The only statutes pertaining to attorney misconduct seem to relate to enforcement of the professional standards enactments of the various states, plus the lawyer discipline mechanisms of the state courts. The bottom line is that it is next to impossible to nail a lawyer who lies for his client or encourages the client to lie.

**Affirmative Action** is another current arena pitting the doctrine of equality before the law against elimination of racial bias or preferences. (And any preference for one group is necessarily a bias against another group.)

The defenders of judicial activism tell us that the Constitution was written in a different era, the Founders could not foresee the future, and we must rely on the spirit of the law rather than its letter, even squinting to perceive a penumbra enlarging what is written. Recent arguments before the Supreme Court, and many preceding it, have had their focus on the social impact of various policies or interpretations of law, not on what the law says.

We must allow that no document can foresee every contingency or spell out every detail of application. We don't want the Second Amendment to mean that individuals can own artillery or nuclear weapons. But no stretch can justify usurpation of the legislative function by the judiciary.

It doesn't matter whether "diversity is good for the University of Michigan, or the students, or some of them, or the society as a whole—unless you are willing in effect to scrap the Constitution and ad lib the whole thing under the political pressures of the moment. In effect, that is indeed the thrust of many "liberals"—just holler louder, and beat your breast, and the law be damned.

**Inequality as Instrument:** The Founders of the USA thought (or at least proclaimed) that all men are equal (except for blacks, and excluding women, and with preferences in custom for Christians). But they meant equal before the law, or perhaps entitled to equal opportunity, not equal in natural endowment, since any fool can see that people differ in their capacities. (Even one amoeba differs from another in teaming ability, and even without any central nervous system.) But equality was a sometime thing, and it isn't really dear that equality among individuals is always a good thing for a society.

As one of the most obvious examples, we currently advocate and practice a watered-down capitalism, which is supposedly free competition in a peaceful market. This given a built-in advantage to those who compete most effectively, namely the smartest and the most energetic and the most ambitious and sometimes the most ruthless or deceptive. Many would claim that this benefits society as a whole, and ultimately even those lagging in

the competition or on the sidelines. Others, of course, deride this as "trickle-down" theory.

There is plenty of evidence that trickle-down works, at least sometimes. Look at the barbershop. A barber today is scarcely more productive than he was a century ago; he takes just about as long to cut your hair; and yet his wage has kept up with the increased output of society. He is getting more not because he or any barber has contributed to progress, but because he shares the fruits of that progress with the scientists and engineers and business people who created it. If the creative and productive people had not been given incentives (a larger share of what they produce), perhaps progress would have been slower and everyone worse off. Perhaps we would not now have the fancy barber or "hair stylist" niche, with significant numbers of people willing and able to pay artiste prices for imaginative cuts.

True enough, sometimes the owners or managers cop more than they deserve, even much more. Read Dilbert. Or look at the almost daily scandals of corporate management and stock manipulation and so on. Checks and balances are needed, eternal vigilance is the price of freedom, due diligence is highly recommended, and watch out for strange hands on your wallet. Even with all this, we retain our tendency to honor and reward excellence, and with apparently good reason—it's even built in on an evolutionary basis.

Honor is not a concept restricted to knights, nor to humans. When the alpha male baboon sees a leopard stalking or attacking his troop, he and his buddies will gallantly fight—not always, but often enough. From an evolutionary point of view, his kind developed that way because the trait had survival value for his genes. From his own point of view, who

can doubt that he feels much the same as any human paladin?

Surely the alpha male is more important to the baboon troop than one of those lower in the pecking order. Hence is it not "right" that he be entitled to peck, as it were, or skim the cream? We implicitly acknowledge that it is right when we give medals to our heroes, and bonus.. We also often cheat a little, or mild be seen as taking advantage of the hero's gullibility, since the medal doesn't cost much.

Remember too that those discriminated against, or exploited, or kept down, don't always see it that way. One can visit towns in Latin America where the homes of ordinary citizens are little better than hovels, but the church is majestic and well kept. Do the peons resent the richness of the church? On the contrary—most of them are proud to maintain this symbol of the dignity of their heritage, and they don't begrudge the priest his authority. The things of the "spirit" are often prized above the comforts of the flesh. Those who make such choices may be dead wrong, and soon even dead, but the realities of psychology and tradition cannot be ignored.

### **Do Ends Justify Means?**

Of course they do—except when they don't. It's always a matter of degree, of probabilities. Religious fanatics have revealed the extremes of bad means supposedly justified by good ends, e.g., in the Spanish inquisition. It's all right to torture people if your ultimate aim is to save their souls, or if the souls of the infidels can't be saved, at least you protect the regime of the faithful. Nothing illogical about this, except the premise, the divine origin of their rules.

In modern secular life, we also—as individu-



als and as a society —make judgments about the acceptability of creating evil as a byproduct of doing good. In the workaday world, we erect enormous buildings, and in the course of construction, frequently some workers are killed or maimed. Can't be helped, and the workers know the risk, and the pain is alleviated by Workmen's Compensation laws and the like. Traffic accidents kill scores of thousands in the U.S. yearly, but we are willing to pay the price for our convenience. Everything has its risks and its costs.

All those buildings, and the rest of civilization's hardware, have additional costs that are less obvious, although there is a rising crescendo of complaints about some of them. To construct buildings and highways and "stuff" of all kinds, we need energy and raw materials, so we cut down forests and dig big holes in the ground and thereby change the former habitats of wildlife and the former scenery, and generally "despoil nature". We may also "exploit" the poor laborers in foreign countries from whom we buy cheap goods, or our own native laborers who don't get a "fair share" of the fruits of labor.

These are complex questions with few simple answers. How much should the taxpayers pay to save a particular kind of owl or fish from extinction? As just one side of a multifaceted puzzle, saving owls means dooming mice. If an owl kills a mouse every day, does the suffering of the mice offset the pleasure of the owl and our pleasure in observing the owl? If the owls didn't kill the mice, would mouse overpopulation have a net result of more mouse suffering? Must of us assign such questions a priority to low as to bent of sight. Then there is the Little White Lie. Lying is bad, but tact is good- to it's all right to lie a little in a good

cause—provided you aren't really lying to yourself about what you are doing when the lie isn't really so little or so snowy.

The "easy" way out—for some dispositions—is just to observe the letter of the law meticulously, both the statutory law and the generally accepted or traditional moral law. Cover your butt in an inward sense. You can't reasonably be expected to make a probability very you? For that matter, if individuals were allowed to make case-by-case assessments, wouldn't Hart lead to anarchy or at least impose an intolerable burden of responsibility? There are indeed some people with this disposition, but they are unlikely to be reading this.

**Eugenics:** In recent times it has been close to political/social suicide to advocate any kind of practical eugenics program. It's probably pissing in the wind to raise this topic again, but for the sake of completeness, someone needs to do it, even if the question will be moot fairly soon.

No one can (reasonably) deny that some people are born so deprived or deformed that their lives constitute a burden to others, including their parents, and to themselves. Would it not have been a mercy all around to have persuaded their parents to use contraceptives or to have themselves sterilized?

Such notions nowadays may brand you a Nazi—but no one is taking about forcible sterilization. A little innocuous bribery would get the job done, in most cases. Considering—for example—the cost to the public of maintaining a welfare family of the permanently unemployed, the bribe could be rather substantial and still cost effective. The prospective mother could be offered to lump sum of (say) \$25,000 to agree to be sterilized, and could still be

allowed to remain on welfare herself.

The saving in both public money and in pain and sorrow would be significant I won't bother anticipating the indignant rebuttal.

**Abortion:** In the Monty Python movie, *The Meaning of Life*, there is a little ditty about Contraception:

*Every sperm is scared,*

*Every sperm is great;*

*When a sperm is wasted,*

*God gets quite irate.*

At any rate, according to some, human life

ought legally to begin at conception, and abortion should be considered murder. Is this a reasonable view? Taken literally, it would mean that use of the "morning-after" pill would be murder if it succeeded in killing an embryo.

As I have said repeatedly, a system cannot properly claim personhood without the capacity for subjective experience and for humans, this requires a brain. Early embryos don't have brains, hence—to the best of our knowledge—they don't have feelings. If I remember correctly, the brain doesn't begin to form until about three weeks.

## Next Issue:

### *Chapter Eight: The Art of Living*

# 10 Worst Mistakes in Cryonics

Don't ruin your chance for a successful suspension

## 1) Not signing up ahead of time

Becoming a member, having contracts in place, and having paperwork in order should not be a last minute decision. Waiting until the last minute or after death results in an unnecessary delay of care or worse- No suspension at all! Don't wait. Sign up here and be prepared.

<https://www.cryonics.org/membership/>

## 2) Not providing proof of funding

Some people believe that they can worry about funding later or if they have funding, they have put off providing proof of funding to CI. This should be done annually. Failing to provide this can result in a delay of care while the funding clears, which can take weeks. Send your proof of funding to CI now to be prepared.

## 3) Not telling anyone your plans

Being reclusive or not telling family or friends your wishes is not recommended. You should not be afraid to tell those around you what your wishes are, especially your next of kin. Wearing a bracelet, necklace or having identification or other items in view can speak to your wishes. This is all you have when you can't speak for yourself. Disasters have resulted in the past from not sharing. Talk with your family, close friends and your estate attorney, so you can be prepared.

## 4) Not planning

Many think cryonics is a turnkey service where you can just sign up and let fate take over. No matter how much you pay for cryonics, you are the only one who can make sure that you will have the best chance by planning. CI has provided a lot of information on our website and in our standby manuals. Those who plan succeed those who don't fail.

For more information visit: <https://cryonics.org/category/members/standby/>

## 5) Not notifying CI of Emergencies

There is no way that your cryonics provider can help you if they do not know of your emergency. Your family, friends, standby group or next of kin must immediately contact CI when you are having health issues or worse. It is also important for CI to know if you have up and coming surgeries or procedures, including terminal illness. Patients with a diagnosed terminal illness could enter hospice care, which might help your cryonics situation vastly. Any delay in notifying us directly could result in a poor suspension. Those helping you must have simple and clear instructions.

## 6) Committing suicide

Anyone who commits suicide who is not terminally ill or breaks a local law in doing so is potentially putting both themselves and our organization at great risk. CI will not risk itself for people who engage in behavior that goes against our mission to preserve life. Such activity will likely lead to an autopsy and long delays, rendering the suspension process substandard or impossible to carry out.

Do not consider cryonics as a way out of your problems. You are likely to not get suspended under those circumstances. If you do not have a terminal illness and are considering suicide, you should seek mental health advice and treatment as soon as possible. <https://www.mentalhelp.net/articles/depression-hotline/>

## 7) Engaging in Risky or illegal activities

Risky behaviors or associations that lead to the patient dying around suspicious circumstances will also likely lead to mandated autopsies that will also stand in the way of your cryonics wishes. It is best to use common sense and not put yourself in harm's way. Not only could your life be ended, so too could your chances of cryonics suspension or future reanimation. Use common sense and stay safe.



# 10 Worst Mistakes in Cryonics

## 8) Providing financial or legal incentives that encourage your **not** being suspended.

Leaving all of your insurance or cryonics money to family if you are not suspended is certainly an option at CI, but ironically it does provide financial incentive for hostile family members to block your suspension. As often is the case, people will make sure you are not suspended to get a hold of your money.

One suggestion is to leave family and next of kin some separate money from cryonics funding while suggesting that Cryonics funding go to cryonics as a donation no matter if you are buried or suspended. In addition, family or next of kin can be further compelled to cooperate if they will actually lose the money that is allocated to them for not cooperating. It is also suggested that your family be made fully aware of your wishes and stipulations, so they know what the results of their actions will be. You want to make sure you put incentives and disincentives in the correct place, so that your wishes are honored. It is suggested that your will and cryonics documentation reflect this and get reviewed by an attorney. See <https://cryonics.org/members/protect-yourself-from-legal-threats/>

## 9) Not removing a hostile next of kin from rights to your remains and finances

In many states and areas you can legally remove a hostile family member or next of kin from your estate. You can reassign someone who is sympathetic to cryonics and who has the legal authority to disposition of your remains, as well as your assets. In some states and locations there are disposition of remains reassignment documents, as well as powers of attorney, both in regards to financial as well as medical decisions. The executor of your will or anyone involved with making decisions should

be sympathetic to your cryonics wishes. It is your responsibility to make your wishes very clear and to remove any doubt or potential legal resistance from family or next of kin.

We suggest seeking legal advice to help you in this regard. Some members have even made a video statement of their wishes and given it to both their cryonics organization as well as their attorneys. Not being careful could mean that you don't get suspended, despite your wishes. Many are surprised to learn that they lose their rights upon legal death. See an attorney and prepare.

## 10) Dying under less than favorable conditions

This seems harder to control than the other situations, but there are some things you can do to make your situation more favorable. You can diet, exercise and follow the latest official medical advice to stay healthy longer. The longer you are alive, the better the technology will probably be for suspending you and the closer we will be to a future that may be able to reverse your condition.

You can also avoid travel to remote or hostile places where such travel is risky. Some overseas travel can result in long delays both logistically and bureaucratically. In general, dying near your cryonics provider or cryonics standby group helps your chances. Living a healthy lifestyle and staying sociable, while surrounding yourself with people who will act on your behalf is paramount. Building solid, positive relationships with good people is probably one of the most important things you can do to have your wishes honored. Take care of yourself and maintain social connectivity.



## Bulletin Board



### Writers Wanted

*Got something to say?*

The CI Newsletter is looking for submissions from our readers!

If you've got a great idea for a story, please forward it to:

**dg@cryonics.org**

### CRYONICS QUESTIONS?

*Need some help with your membership?*

*Want to understand your suspension options?*

*Need to fill out important cryonics paperwork?*

### CONTACT US!

*Our team is here to help.*

**1-(586) 791-5961**

### FREE Memberships?!!

*Did you know the Cryonics Institute offers FREE LIFETIME Memberships for minor children of paid Lifetime Members? Any minor children (under the age of 18) of fully-paid Lifetime Members are eligible for a permanent Lifetime Membership of their own. If you'd like to give your children the priceless gift of a second chance of life with you in the future, please contact us at 1 (586) 791-5961 and ask about Lifetime Membership Benefits.*



Show the world you support cryonics with CI gear from our **Cafe Press store**.

