CRYONICS INSTITUTE MAGAZINE

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

PUBLISHED BY THE CRYONICS INSTITUTE | ISSUE 04 | 2024

cryonics.org • info@cryonics.org • 1 (866) 288-2796

CI PRESIDENT'S REPORT

Hello everyone,

Happy holidays to all of our members and readers around the world as we approach the close of another year here at the Cryonics Institute. Sincere thanks to everyone for your support for and interest in the exciting world of cryonics.

2024 has been another year of continued growth and improvement. As of December 1, we have 2,255 members, 264 human patients and 269 pet patients. I'm confident those numbers will keep growing in 2025, further strengthening our organization. Additional cryostats were installed at our new facility this year to accommodate new and future patients, and I will say it is rewarding to think back just a few short years when "CI West" was just an empty building. I'm very proud of what we have accomplished and to be leading our exceptional and hard-working team who converted an empty building into a state-of-the-art cryonics facility.

I'm also proud to have been re-elected as Cryonics Institute President and I thank everyone for their support and confidence in the direction I have been taking CI. This year we also had a change in our Leadership Team, with the election of Lauren Fosco to the Board.

Lauren has been quite active in the cryonics space over the past few years, working with Biostasis Technologies, speaking at several events and spearheading the new iOS version of the CI app with Nikki Olson among other achievements. She was also working closely with Jim Broughton during his too-brief tenure with CI, so I'm excited to see her continue Jim's work as well as forge a legacy of her own.

Lauren replaces Paul Hagen, who has served with distinction for many years, so I want to take this opportunty to publicly thank and recognize him for his service. I'm also happy to report that by vote of the Board of Directors and due to his experience and contributions, Paul will continue to serve on the Finance Advisory Committee.

Congratulations to incumbents Connie Ettinger, Pat Heller and Joe Kowalsky, who were re-elected to the Board and a special thanks to candidate Nicolas Lacombe, who ran but was not elected this cycle. Thanks also to Nicolas for volunteering to help out with the Immortalist Society meeting at this year's AGM.

It's vitally important our Board continues to evolve for the future with a mix of experienced and new members, so I am very happy we have members with the motivation and the dedication to lead our organization. Thanks to everyone, both incumbents and newer members, for their service and contributions to CI's continuing success.

In other news, we have partnered with International Cryomedicine Experts (ICE) to formally provide professional standby services for Cryonics Institute members worldwide .

Continuing on the topic of standby, Suspended Animation Inc. (SA) has announced that they will be offering Field Cryoprotectant Services (FCP) to CI members contracted with their company.

More details about both ICE Standby and SA's new FCP service can be found later in this issue.

I'm very happy we have been able to expand the professional standby options and services available to our members. Since the standby process is so critical to achieving an optimal suspension, the more options we can offer the better.

CI has a number of other projects in the works for 2025 so it promises to be an eventful year. I'm glad you're with us on this journey to the future!

Sincerely
Dennis Kowalski
President - Cryonics Institute

CRYONICS INSTITUTE MAGAZINE

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ARTICLE SUBMISSIONS

Cryonics Institute or cryonics-related articles are welcome. Submissions: **dg@cryonics.org**

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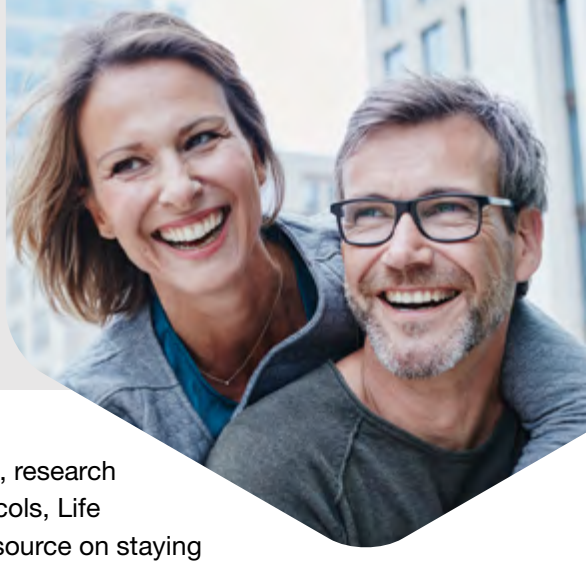

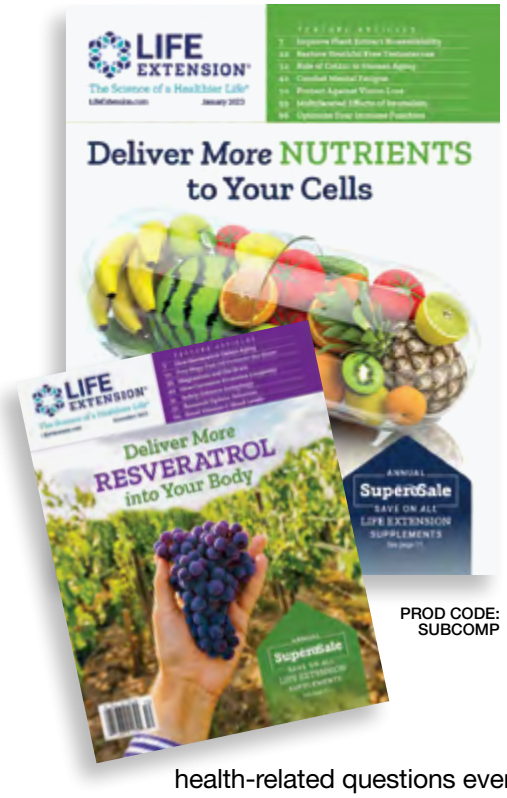

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Membership Benefits

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 inititation 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).

CRYONICS INSTITUTE
Technology for Life

To get started, contact us at:

(586) 791-5961 • email: info@cryonics.org

Visit us online at www.cryonics.org

CI NEWS

What's happening at the Cryonics Institute

2024 Annual General Meeting

CI's 2024 AGM was held Sunday, September 9. The weekend event included a night before dinner on Saturday that was very well-attended, tours of both facilities prior to the meeting and the meeting itself on Sunday.

Special thanks to visiting documentary filmmaker David Ehrenreich for these photos.


EXIT


LN2 Vapor
Cooldown System
TIME
18:04
TEMP
-103°


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Since 1977
200 patients
2,000
members

CI NEWS

What's happening at the Cryonics Institute

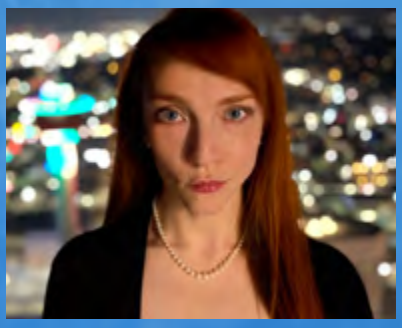
2024 Board of Directors Election

Board Members serve three-year terms, with four positions up for election each year on a rotating basis. Board positions are open to Voting Members only. To qualify as a Voting Member of the Cryonics Institute a CI Member must be age 18 or over and either be a Lifetime Member or have been a Yearly Member for at least three years. Additionally, only CI Members with an executed Cryonic Suspension Agreement and having full funding for the Cryonic Suspension Agreement may be Voting Members.

Connie Ettinger
112 votes

Joseph Kowalsky
112 votes

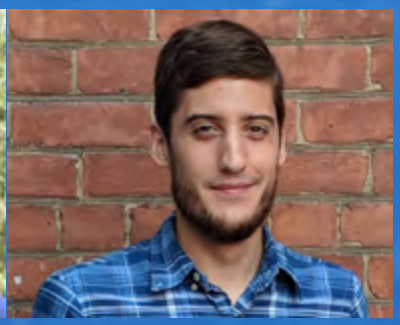
Elected Directors



Lauren Fosco
110 votes

Pat Heller
81 votes

Paul Hagen
62 votes



Nicolas Lacombe
47 votes

Runners-Up

CI NEWS

What's happening at the Cryonics Institute

SA to offer SST services to CI Members

First announced at the 2024 AGM, CI members who have SST arrangements with Suspended Animation will soon be able to avail themselves of Field Cryoprotectant Perfusion (FCP) services. Recent advances in SST capabilities mean that cryoprotectant perfusion (traditionally performed at CI) can now be performed at the location of the patient's death, reducing the amount of cellular damage incurred while en route to CI. Check back for more detailed information about FCP in the first 2025 issue of CI Magazine.

CryoRegistry.org launches resource for local standby

CryoRegistry.org helps connect you with others in your local area who are committed to improving cryonics outcomes through Standby, Stabilization, and Transport (SST) efforts. Local groups are crucial for faster response times, and even if you don't have medical experience, you can play a vital role in logistics, coordination, and support during an emergency. If you're willing to help ensure better cryopreservation outcomes, visit cryoregistry.org to join or form a local SST group today.

New perfusion table at CI

CI recenly acquired a new patient table for the Perfusion Room. The new table features an ergonomic design making transfers easier and safer for our staff and patients.

CI NEWS

What's happening at the Cryonics Institute

ICE now offering standby services to CI Members

International Cryomedicine Experts (ICE) now formally provides services for Cryonics Institute clients, who live both in the US and around the world.

The old standard of Standby, Stabilization & Transport (SST) has now expanded to include Surgery & Perfusion (+SP) prior to transport to address the growing complexities of having a patient arrive at their Cryonics Service Provider within the very small window of opportunity for perfusion. Over the years, the time requirement for a patient to arrive at their CSO has been reduced from 72 hours to now as little as 24 hours, following clinical death. This becomes very difficult to achieve depending on the location of the patient, the circumstances surrounding their clinical death, and maintaining compliance with local regulations that govern issuing death certificates and transport permits, all before interstate or international transport can commence.

To overcome these logistical challenges, ICE can now provide the surgery and perfusion services with cryoprotectant solutions, at the patient's location, rather than waiting for regulatory approval and lengthy transport that wastes precious time before the CSO can even attempt these same procedures. This new intervention can significantly improve the entire cryoprotective process by protecting the cells at a much earlier stage. The old phrase often used by doctors, "Time Is Tissue," means the longer you wait for treatment, the more damage that will occur and the less likely are the chances for recovery. This phrase could not be more relevant than in the science of cryopreservation.

What should you expect during SST+PC? ICE will work with their network of specialists to plan every component of your cryopreservation. A medical team will perform a standby including reviewing medical charts and speaking with physicians to help determine how long the patient may have before clinical death. Stabilization will commence after legal pronouncement and is followed by surgery and perfusion using cryoprotective fluids to protect the cells of the body during transportation to your Cryonics Service Organization.

It should come as no surprise that with all of these actions, the costs of SST+SP can be more expensive than the long-term storage component provided by the CSO. When you factor in the costs of sending an experienced medical/surgical team to a remote location, along with all of the equipment and perfusate needed to successfully cryoprotect a body, before cooling with dry ice and constructing specialized, air-transportable, dry ice shippers that optimize the profound hypothermic environment needed during transport. However, to accommodate a wide variety of budgets, ICE oJers services that range from as little as $15,000 for consulting services, to more than $100,000 for complex whole-body field cryoprotection with international, dry ice shipping requirements needed.

Collectively, ICE team members have participated in more than 150 cryopreservations for CI, Alcor and Yinfeng. Ice is based in Phoenix Arizona with Aaron Drake and Eric Vogt, however they also have team paramedics located in California, Texas, Florida, North Carolina, Alaska and Hawaii. You can find more information about ICE's services and prices on CI's website, or at

www.cryomedics.org.

CI NEWS

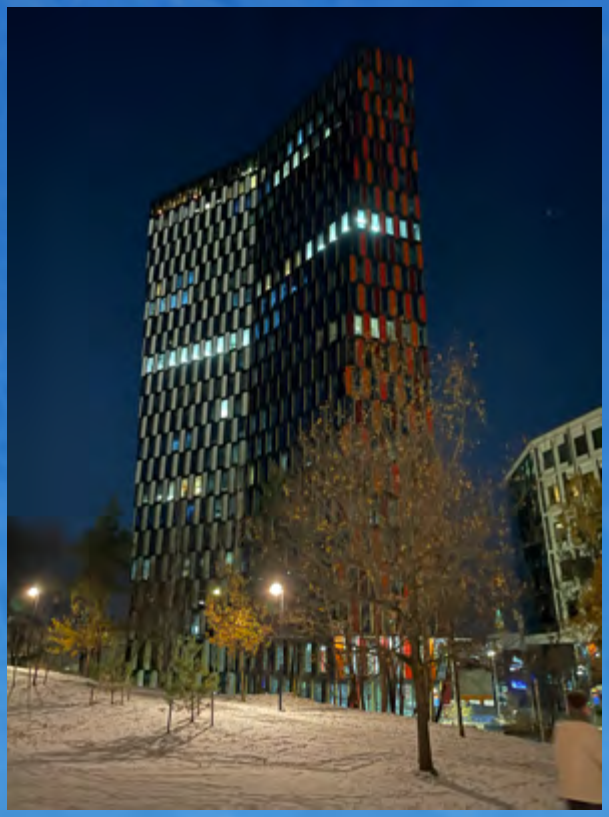
What's happening at the Cryonics Institute

Nordic Cryonics Convention

The Nordic Cryonics Conference took place on November 23rd in Stockholm, Sweden for attendees from the Nordic region or beyond interested in learning more about, or advancing, cryonics and biostasis.

Highlights included an Introduction to cryonics and biostasis for beginners and presentations on the latest developments in cryonics technology. Leading cryonics organizations and Nordic associations were involved, offering networking opportunities and collaboration discussions for steps towards the formation of a Nordic cryonics first-response team.

Attendees heard presentations by Aschwin de Wolf of Advanced Neural Biosciences and Biostasis Technologies, Daniel Walters of Alcor, CI Director Lauren Fosco of Biostasis Technologies, and Emil Kendziorra of Tomorrow Biostasis.



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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 then 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.

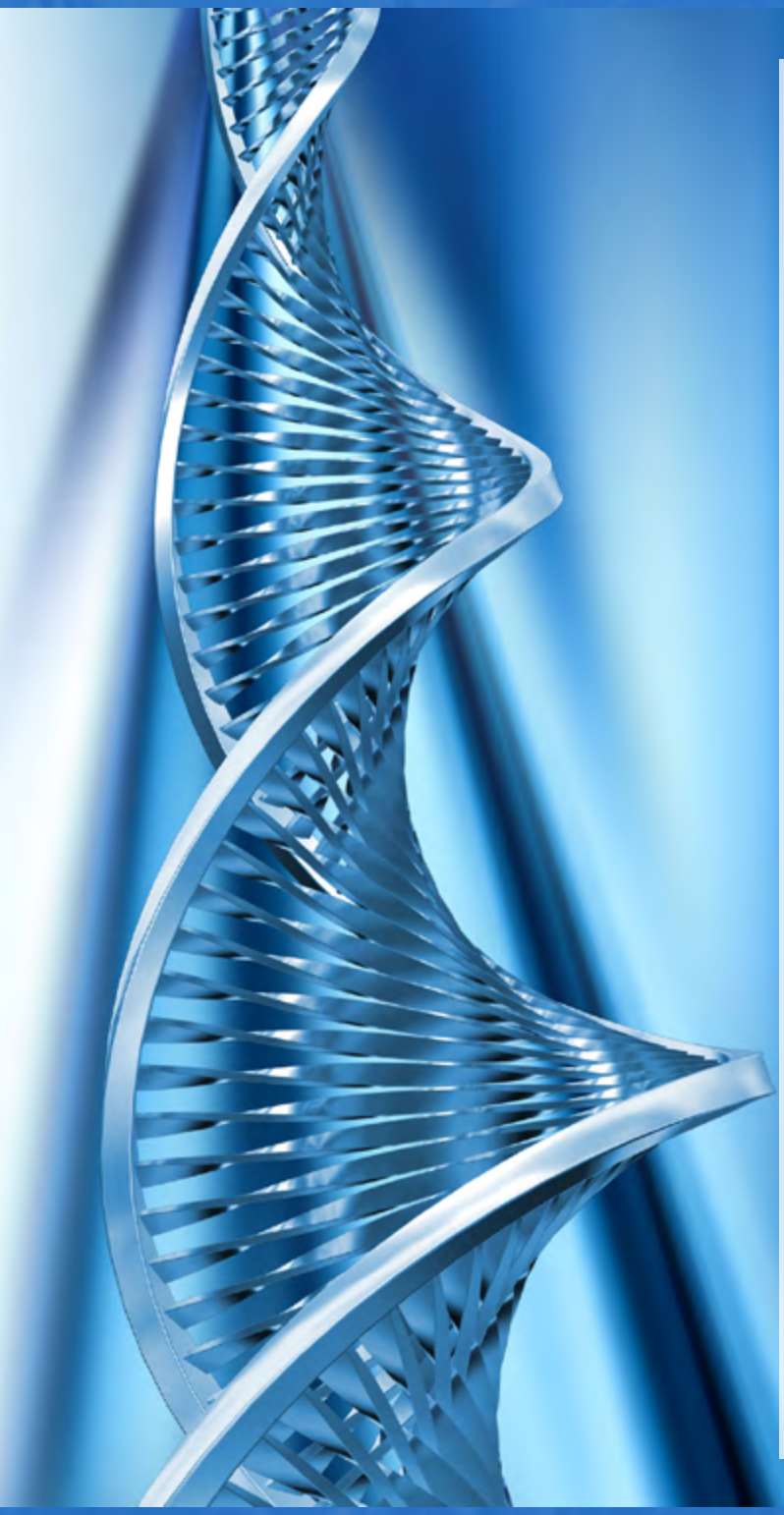
- ☐ Get involved! If you can, donate time and money. Cryonics is not a turnkey operation. Pay attention and look for further tips and advice to make both your personal arrangements and cryonics as a whole a success. The stronger our organization is, the stronger your chances of success.

- ☐ 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.

CI NEWS

What's happening at the Cryonics Institute



DNA and Tissue Sample Preservation Services

Lifetime and Annual Members of the Cryonics Institute can have DNA / Tissue Samples cryopreserved by CI. Annual Members must have fully paid for no less than one year, i.e. have paid $120 yearly dues (plus the initial $75 initiation fee if it is their first year) for a full year's Membership.

CI provides a DNA sampling kit for hair, skin, and/or inner cheek samples from living persons or pets. Tissue samples may be extracted from a deceased person or pet by a funeral director or veterinarian, respectively. A CI Member may store DNA/tissue for $98 for four samples that will each fit into a 1.8ml sample vial. Some members choose to store larger samples, which cost more and that cost is calculated based on the sze of the sample. The cost includes a DNA sampling kit which consists of four 1.8-milliliter nalgene vials, swabs, instructions, tissue storage contracts and labels that can be placed on the vials, along with a mailing envelope. Each nalgene vial can be individually labeled for content. Each full kit is labeled, identified by a tissue storage contract and stored in liquid nitrogen at the Cryonics Institute.

Tissue samples need not be sent to CI in the DNA sampling kit. Any small vial or container can be used, and CI will transfer samples to nalgene vials for storage in liquid nitrogen.

For more information on DNA and Tissue Storage Cryopreservation, please contact us at info@cryonics.org or visit cryonics.org:

CI NEWS

What's happening at the Cryonics Institute

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 requiirements 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 or 1-586-791-5961.

Thank you!

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.

SA Suspended Animation

Speak to a medical representative for more information.

Call 1-949-482-2109

or email info@suspendedanimationinc.com

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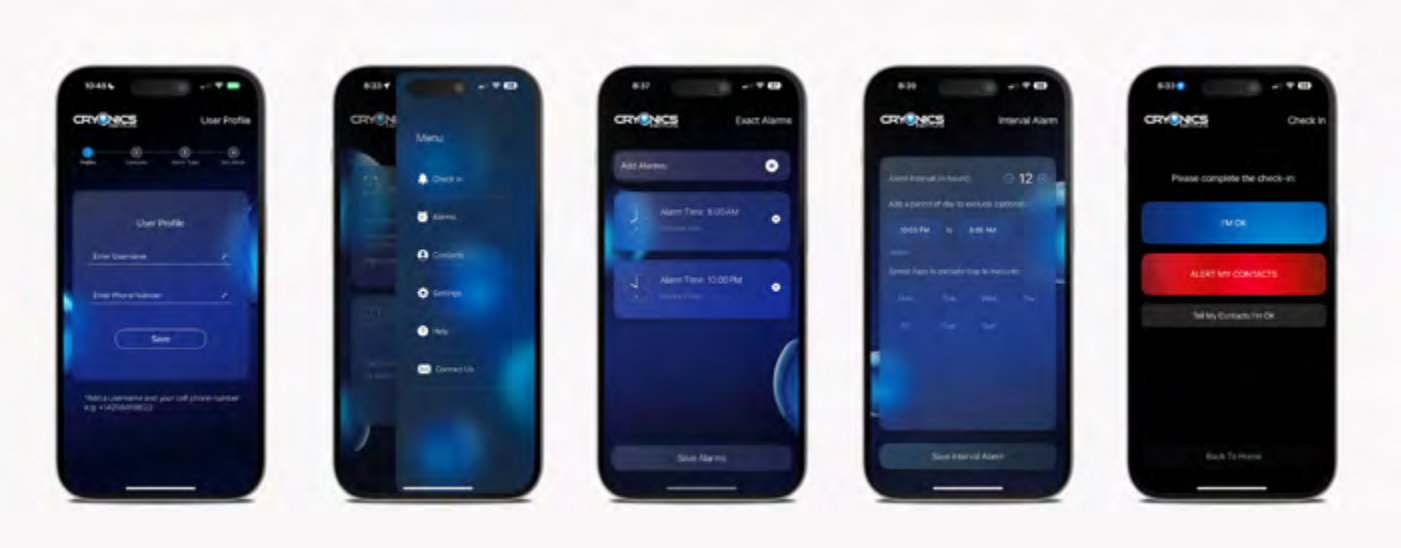
Cryonics Insitute Check-In App now available on iOS

Ever since CI launched our legacy Android Check-In app, Apple users have been asking for an iOS version and we are pleased to announce it is now available to download **here**. The new app has been built from the ground up, improving on the functionality of the legacy Android version and improving it with a modern interface and new features that make the most of the iOS architecture.

The original Android version has also received a much-needed overhaul to improve its stabiliy and usability. Both projects come to us courtesy of the hard work and dediction of CI Members Lauren Fosco and Nikki Olson who graciously volunteered their time and professional expertise to deliver a superior user experience for both Android and iOS users.

The app allows members to stay connected and secure with ease—right from their iPhone or Apple Watch. This first iOS release features a refreshed user interface along with new features designed for improved usability, making it much easier and more intuitive than the legacy app for scheduling and managing check-in alerts.



Getting Started

1. **Create Your Profile:**
   Enter your name and mobile phone number, then tap "Send Verification Text" to confirm your number.
2. **Add Your Contacts:**
   Next you can add trusted contacts. Be sure to tap 'Verify' so they can opt in and confirm the system can reach them.
3. **Set Your Alarm Type:**

Choose the alarm type that fits your needs:

- Exact Alarms: Trigger at a specific time you set (choose up to 3 times).
- Interval Alarms: Trigger at regular intervals between 1 and 24 hours.

4. **Customize** your check-ins further by excluding certain times of day or days of the week.

Additional Features

Step Alerts:

If no steps are detected over a set period, the app will automatically check in on you. This feature is easy to activate and configure in the Settings menu.

Apple Watch Companion App:

If you have an Apple Watch, be sure to install the companion app for added convenience. With the watch app, you can check in or alert your contacts directly from your wrist. It also supports Apple Watch Complications, allowing you to place the app icon directly on your watch face for quick access.

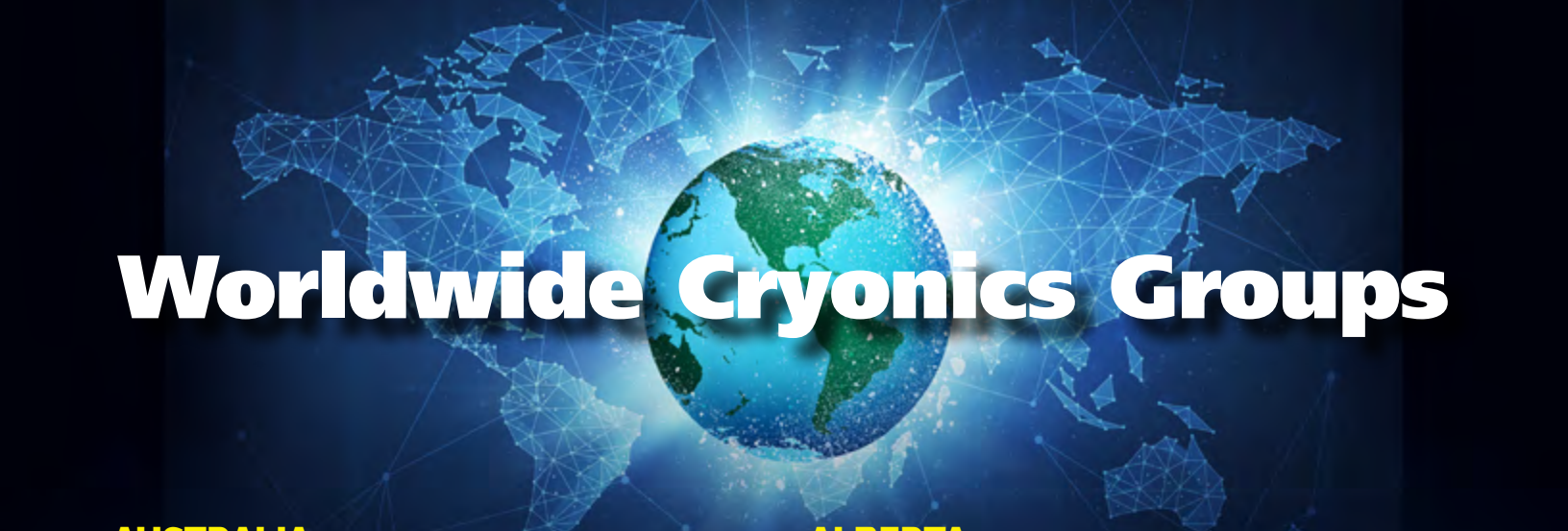
Explore More

Explore the Settings to further customize your setup with options for notification sounds, personalized messages, and other system preferences.

For users of the legacy Android Check-In App, you can expect an update that will bring new features to the Android version, along with a UI refresh.

Thanks again to Lauren and Nikki for volunteering to take on this important project and for delivering a professional quality product far above and beyond expectations. Both of them spent months developing, refining and thoroughly testing both versions, which would have easily cost thousands to outsource.

Both Android and iOS versions are completely free to both CI Members and the wider cryonics community. Download links for both can be found on the **CI website**.



Worldwide Cryonics Groups

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

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

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

CANADA: This is a very active group that participated in Toronto's first cryopreservation. President, Christine Gaspar; Vice President, Gary Tripp. Visit **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**

ALBERTA: Founded in Calgary in 2024, Futurist Club is a cryonics-centered community hub for exploring emerging technologies and future trends, with a facility located in downtown Calgary. Get in touch with Carrie Radomski at **carrie@futuristclub.com** or visit **futuristclub.com**.

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 Robert Lang, President at **robert@lifespanbc.ca**. Web site **www.lifespansociety.com**

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

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.**

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** Their President is Ville Salmensuu **ville@salmensuu.fi**

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** • **Facebook group**

https://www.francecryonics.fr/a-propos/ Vivien Gruss, member of Cryonics Institute, has opened a web site for the information of persons interested in cryonic suspension.

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**. If there are further questions, contact their Board at **vorstand@biostase.de**

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**.

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** Phones : Bioster / 918148049058 & Br Sankeerth / 917795115939

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

Kriorus Italy: Representative Filippo Polistena, email: filippopolistena45@gmail.com. phone: +39 334 298 9378

JAPAN: Takaaki Kaburagi 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 **kabu@ops.dti.ne.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** 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**

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 Begegravelsesbyraa / 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** for additional information or visit **http://www.kriorus.ru**. Phone: +7 962 947-50-79

SPAIN: **https://asociacioncrionica.es/** The Spanish Cryonics Association (ACE). A group of enthusiastic civilians, scientists and medical volunteers dedicated to research, education and support in the field of cryonics. We offer information, advice and support to those interested in cryonics including consutation, legal advice, financial planning and veterinary services.

SWEDEN: **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**

CRYOSUISSE The Swiss Society for Cryonics is an active group with over 30 members. To join, **email 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**.

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**.

Southeast Wisconsin: Great Lakes Cryonics Association. CI President Dennis Kowalski's cryonics group serving the Greater Milwaukee and Southeastern Wisconsin region. Phone: 1-414-322-1320 **Dennis@cryonics.org**.

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

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

INTERNATIONAL: The Cryonics Society is a global cryonics advocacy organization. **www.CryonicsSociety.org**. They publish an e-newsletter *FutureNews*. Phone: 1-585-643-1167.

PROFESSIONAL STANDBY:

Companies providing professional standby, stabilization and transport services.

International Cryomedicine Experts (ICE):

https://www.cryomedics.org/
info@cryomedics.org
844-INTL-CRYO (468-5279)

Suspended Animation Inc:

https://suspendedanimationlabs.com/
info@suspendedanimationlabs.com
1-949-482-2109

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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.

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 prudence in dealing with any organization and/or individual listed.

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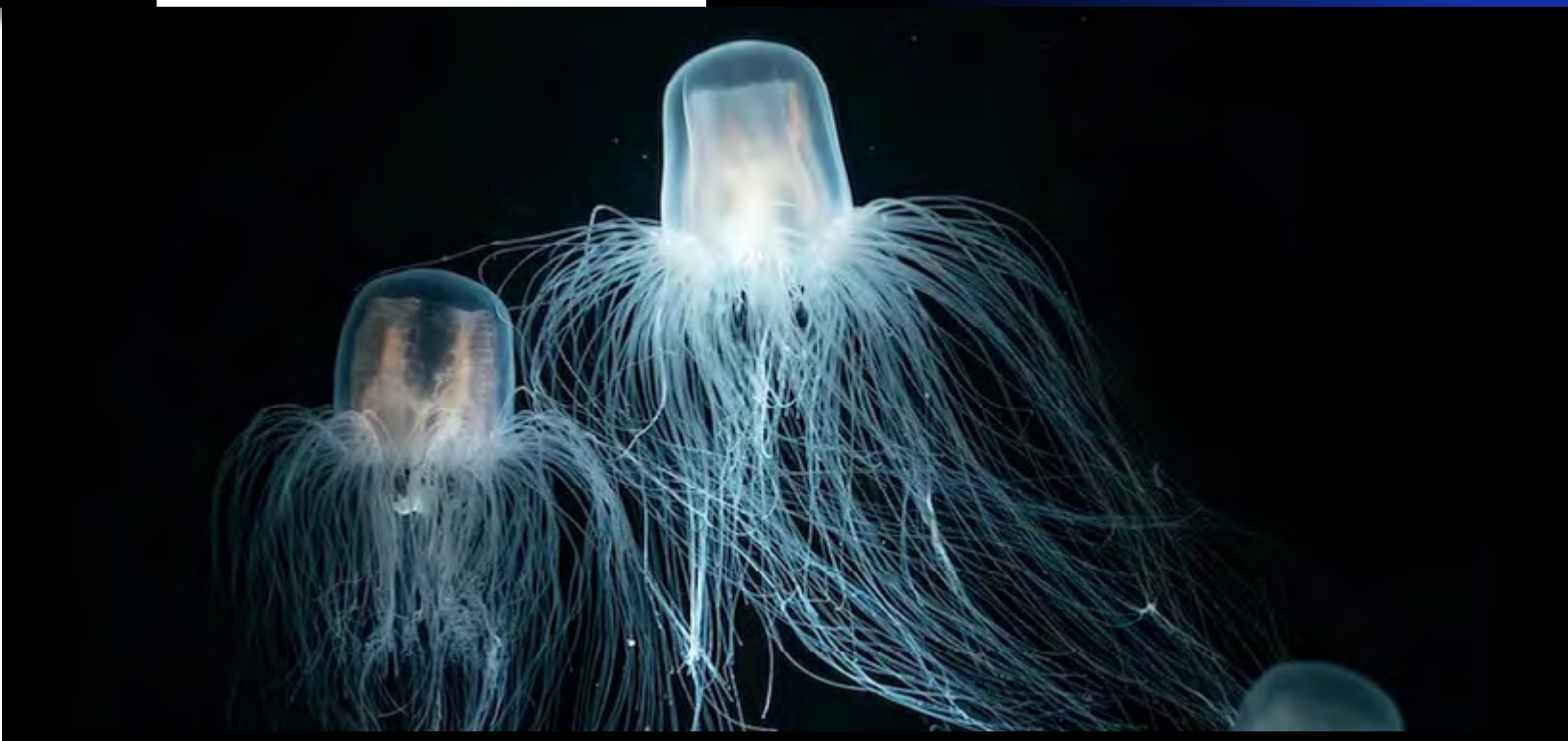

Immortal jellyfish can theoretically live forever. (Image credit: Duangkamon Panyapatiphan via Getty Images)

Extreme longevity: The secret to living longer may be hiding with nuns... and jellyfish

Some people live to be well beyond 100. But what genes and environmental factors contribute to such extreme longevity, and what can we learn from other long-lived animals?

By Jennifer Nalewicki published March 30, 2023

On March 4, María Branyas Morera turned 116. In January, the great-grandmother, who was born in San Francisco in 1907 and now lives in a nursing home in Catalonia, Spain, became the world's oldest person following the death of Sister André (née Lucile Randon), a French nun who lived to be 118.

Branyas Morera, who goes by the nickname "super grandmother," has lived through the 1918 Spanish flu pandemic, both World Wars and the Spanish Civil War. She also survived a bout of COVID-19 just weeks after turning 113, according to Guinness World Records.

Branyas Morera attributes her long life to a number of things, from enjoying nature and good company to "staying away from toxic people," but she ultimately credits her extreme longevity to "luck and good genetics," she told Guinness World Records.

Branyas Morera is part of a super-exclusive club: She is a supercentenarian, meaning a person who is 110 years or older. For instance, in Japan only about 30 people can claim this title, meaning only 1 in 871,600 people reaches this milestone, according to the New England Centenarian Study. In comparison, approximately 573,400 centenarians (people

who are at least 100 years old) were alive worldwide in 2021, according to the United Nations.

Related: We're nowhere near reaching the maximum human life span, controversial study suggests

People like Branyas Morera could help scientists better understand what allows some people to live so long. Is their longevity just luck, or is it due to good genes and other factors? And which genes are the most critical to defying the aging process?

Studying centenarians and supercentenarians also could reveal insight into the maximum life span for humans — and potentially ways to extend it. Supercentenarians tend to have certain lifestyle factors in common, which may help people overall lead longer, healthier lives. But to dramatically extend the human life span, scientists may have to venture beyond Homo sapiens and look to our long-lived animal counterparts.

Are good genes the key to extreme longevity?

Genes clearly play a role in longevity. Children and siblings of centenarians tend to live longer than average, according to Medline, a service of the National Library of Medicine. And a 2016 study in the journal Aging found that genes tied to immune function and cell repair were more active in these extremely old people.

In general, scientists estimate that about 25% of life span is determined by genetics. But which specific genes, if any, play the largest roles in aging?

For decades, Dr. Annibale Puca, a professor of genetics at the University of Salerno in Italy, has been trying to answer that question.

In 2011, Puca discovered a human gene called BPIFB4 that halts cardiovascular aging and even reverses some aspects of aging when inserted into mice. In a 2015 paper in the journal Circulation Research, Puca and his colleagues showed that a certain version of BPIFB4 was associated with exceptional longevity and was overrepresented in centenarians. Those with two copies of the gene variant had less cardiovascular illness, lower blood pressure and less arteriosclerosis, compared with people without two copies of the gene variant. Puca estimates that about 10% of humans have this gene variant.

Could BPIFB4 partly explain why certain people are predisposed to living longer than others? Puca thinks so. "You don't live to 110 unless you have good genes," he told Live Science.

In follow-up research, Puca's team not only halted heart damage in middle-age and elderly mice but also reversed the biological age of the mice's hearts by the human equivalent of 10 years, according to the study.

"In the lab, we were able to regenerate their blood vessels and vascular (circulatory) systems, which converted inflammatory cells into anti-inflammatory cells," Puca said. "We found that cardiovascular function was corrected in the mice."

In a paper published Jan. 13 in the journal Cardiovascular Research, Puca and his team introduced the gene into heart cells collected from organ donors who had died of heart failure. As with the lab mice, the mutated gene rewound the clock and reversed cardiac aging by increasing cardiovascular function by 20% to 60%. Inflammatory cells also morphed into healthy cells.

"We now know that it works in human tissue," Puca said.

Puca's colleague Paolo Madeddu, a professor of experimental cardiovascular medicine at the University of Bristol in England, said that if more research backs up the effect, BPIFB4 could be inserted via gene therapy into the cells of people who don't carry the gene. However, the application of this treatment is still many years away.

"You would need to repeat the therapy over and over again," Madeddu told Live Science. "It doesn't last forever."

The researchers are currently testing whether the protein the gene codes for, rather than the anti-aging gene itself, can have similar effects in cardiac cells.

BPIFB4 isn't the only gene tied to a longer life span. In 2019, researchers described a so-called "longevity gene," Sirtuin 6 (SIRT6), in the journal Cell. SIRT6 helps repair DNA, which aging cells can't repair efficiently, leading to gene mutations that can drive cancer and other illnesses.

The researchers analyzed the activity of SIRT6 in a range of rodent species, from mice to beavers, and found that the animals with the longest life spans also had the most efficient DNA repair capabilities due to their SIRT6 proteins being "more potent," according to the study.

Last year, a follow-up study in The Embo Journal looked at a cohort of 450 Ashkenazi Jewish centenarians and 550 Ashkenazi Jewish individuals who didn't have a family history of extreme longevity. The researchers discovered that a "novel rare variant," which they dubbed "centSIRT6," was twice as prevalent in the centenarians than in the latter group.

In lab dishes, they also found that centSIRT6 not only helped repair broken DNA but also "more robustly kill[ed] cancer cells" when compared with the more common version of SIRT6, according to the study.

Approximately 573,400 centenarians (people who are at least 100 years old) are alive today. (Image credit: Freemixer via Getty Images)

Environmental factors tied to extreme longevity

While variations in human genes affect longevity, environmental factors also play a role. Numerous studies have shown that things like being optimistic, having a healthy diet and not smoking are tied to living a longer life.

But can supercentenarians tell us about other factors that may extend life span? Some researchers say they've uncovered hints in a surprising place: convents.

Before Branyas Morera held the title of the world's oldest person, a French nun, Sister André, was the oldest living person. That may not be a coincidence. Many Catholic nuns live to become centenarians — and even supercentenarians. But why is this?

Several years ago, anthropologist Anna Corwin, author of "Embracing Age: How Catholic Nuns Became Models of Living Well" (Rutgers University Press, 2021), spent time at a convent in the Midwest, interviewing the nuns who lived there. Corwin noticed similar patterns in the women's lives that may be tied to longevity.

"It's not specifically because they're nuns that they're able to live for so long, but rather the types of cultural practices they engaged in," Corwin, an associate professor of women's spirituality and anthropology at the California Institute of Integral Studies in San Francisco, told Live Science.

In general, nuns were living lives full of meaning. It also helped that they were part of a tight-knit, supportive community. The nuns also tended to reject the stigma around aging. Corwin said they participated in day-to-day activities, such as prayer and socializing, well into old age. And they didn't necessarily view themselves as elderly.

"One of my first months at the convent, I met this 95-year-old woman who was in a wheelchair totally hunched over, who you would imagine couldn't participate in anything," Corwin said. "I asked her what she does with her days, and she said, 'I serve the infirm and visit the elderly.' Sure enough, as I watched her, she would wheel slowly down the hallway and check in on her neighbors in the infirmary to make sure they were doing well."

Corwin concluded that the nun found fulfillment and meaning in life by helping others. She also viewed herself as having autonomy and agency, Corwin said.

While this evidence may be anecdotal, a study conducted by epidemiologist and leading Alzheimer's expert David Snowdon backed up these observations. In 2003, Snowdon conducted a longitudinal study of 678 nuns from the School Sisters of Notre Dame, an international organization recognized by the Catholic Church.

Snowdon found that nuns had "lower all-cause mortality rates than did the general population and this mortality advantage increased over time." In fact, these nuns were "27% more likely to live into their 70s than their lay peers, and their likelihood of living longer increased with time," Corwin wrote in her book. In addition, the nuns were less likely to smoke, and they ate healthily and lived peaceful and communal lives.

It's not clear how some of the most obvious differences between nuns and the general population — namely, that they make vows of celibacy and don't have children — affect longevity. Some research has found that each child a woman gives birth to shaved off years of a woman's life, while other studies have shown that people with children live longer than the child-free.

What animals reveal about extreme longevity

While human genes and environmental influences may lead to incremental improvements in longevity, to make leaps and bounds, it may help to look to the animal kingdom.

That's what Steven Austad, a distinguished professor in the department of biology at The University of Alabama at Birmingham, is doing.

Last year, Austad, who is also senior scientific director interim chair with the American Federation for Aging Research, wrote a book titled "Methuselah's Zoo: What Nature Can Teach Us about Living Longer, Healthier Lives" (MIT Press, 2022). (The title is a nod to Methuselah, a biblical patriarch who supposedly lived to be 969 years old.) Austad's book focuses on the longest-living animals on Earth, from bowhead whales (Balaena mysticetus), which can live 200-plus years, to Escarpia laminata, a species of tube worm found in the Gulf of Mexico that has an average life span of about 300 years.

However, the creature that captured Austad's attention was the world's oldest animal, a 507-year-old ocean quahog (Arctica islandica) dubbed "Ming the Mollusk."

One factor in Ming's longevity is clearly its underwater environment: It's "cold, safe and deficient of any real predators," Austad wrote in 2022 in an article for The Atlantic.

"Mollusks like Ming spend most of their lives living in really cold water burrowed in the mud and covered by a thick shell," Austad told Live Science. "Living at the bottom of the ocean is very stable, and being in the mud probably adds a layer of safety as well as having a shell."

Austad suspects that when animals aren't prone to predation or to the vagaries of a harsh or chaotic environment, evolution favors physiology that lasts a long time.

Bivalves also draw heat from their surroundings rather than generating it themselves the way humans and other mammals do. This may lead to creatures like Ming that are better protected from oxidative stress, Austad hypothesized. (Oxidative stress, or damage to tissue by chemically reactive oxygen compounds, has long been linked to aging.)

To test his theory, Austad and his students brought a variety of mollusk species into their lab, including bay scallops (Argopecten irradians), which live an average of two years; table clams, which can live up to a century; and a handful of super-aging ocean quahogs like Ming, and introduced oxygen-radical generating chemicals to their tanks. The scallops succumbed within two days, while the table clams held on for 11.

Two weeks into the experiment, the quahogs remained "happy as a clam" despite living in tainted water, Austad said. This suggested that the quahogs were recovering from or preventing oxidative stress.

"As humans, we can't replicate their living conditions, but we can figure out how they do it," Austad said. "[There are] no doubt some genetic tricks, but it could also be something that we could replicate pharmacologically if we understood it well enough."

Currently, there's only one animal species that could theoretically live forever: the immortal jellyfish (Turritopsis dohrnii). No bigger than a pinky nail, these translucent blobs can turn back their biological clocks when injured and revert into plant-like polyps sprouting from the ocean floor. If enough of these polyps colonize, they can eventually begin to bud and "release medusae that are genetically identical to the injured adult," according to the American Museum of Natural History.

This shape-shifting is possible thanks to a process known as transdifferentiation, which restarts cell generation and essentially gives these amorphous blobs a second lease on life. For the past three decades, scientists have been studying this mechanism and different ways to apply it to humans.

So far, no one has pinpointed the reason cells can transdifferentiate. But a 2022 paper published in the journal Proceedings of the National Academy of Sciences found that T. dohrnii had double the DNA repair genes of other jellyfish species. They also had gene mutations that protect telomeres, the caps on the ends of chromosomes, which typically shorten with age, according to the study.

However, that doesn't mean humankind could borrow these genes and seemingly live forever — or become supercentenarians like Branyas Morera, for that matter. Only time will tell.

Editor's Note: This story was corrected on Friday, March 31 at 9:45 a.m. EDT to note that there are only 30 supercententarians alive today in Japan, not worldwide. It was also corrected to note that the U.N. data on the the total number of centenarians alive worldwide was from 2021.

Due to an editing error, the article also mistakenly said that Snowdon's research compared the health outcomes of nuns with different lifestyles; his research only compared the health outcomes of nuns with the general population, not with each other. That reference was removed on April 4.

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Scientists discover a new class of ice called 'Ice 0'

ByRodielon Putol | Earth.com staff writer

Cold drinks, frosty windows, ice sculptures; ice in its various forms is deeply ingrained in our everyday life. Yet, for most of us, it's nothing more than a taken-for-granted phenomenon. We see it as just "frozen water," but science begs to differ.

There are more than 20 different types of ice, formulating under a plethora of pressure and temperature combinations.

Ice I, the common form we use to chill our drinks, naturally occurs on Earth along with a few other forms. However, a recent breakthrough has uncovered yet another type, the enigmatic Ice 0.

Ice 0: New class of ice revealed

In an intriguing endeavor, experts from the Institute of Industrial Science at the University of Tokyo have achieved a monumental breakthrough.

The scientists have unraveled the existence of ice 0, an eccentric class of ice that triggers the formation of ice crystals in supercooled water.

The process of ice formation usually begins with small precursor crystals with a configuration identical to ice 0.

According to research recently published in Nature Com-

munications, these ice 0-like structures can trigger the freezing of a water droplet near its surface, contradicting the traditionally established notion that droplets freeze from their core.

A shift in understanding ice formation

Ice formation, or ice nucleation, is typically a heterogeneous process. It often occurs at the point of contact where liquid water meets a solid surface, like the container's surface.

But, the new study has defied these norms by showcasing that ice nucleation can also occur slightly below the water's surface, where it encounters air. At this juncture, the ice forms around small precursors, embodying the trademark ring-shaped structure of ice 0.

"Simulations have shown that a water droplet is likely to crystallize near the free surface under isothermal conditions," said study lead author Gang Sun. This settles a longstanding dispute about the preferred site of crystallization – surface or internal.

The role of ice 0 precursors

The ice 0 precursors closely resemble supercooled water, thus enabling water molecules to crystalize more readily from it, bypassing direct formation into the structure of regular ice.

These tiny ice 0 precursors are spontaneously formed, a result of negative pressure effects invoked by the surface tension of water.

The initiation of crystallization from these precursors prompts structures akin to ice 0 to rapidly reorganize themselves into the more familiar ice I.

Hajime Tanaka, the senior author of the study, emphasized the broader implications of the research.

"The findings regarding the mechanism of surface crystallization of water are expected to contribute significantly to various fields, including climate studies and food sciences, where water crystallization plays a critical role," said Tanaka.

Implications across various fields

A comprehensive understanding of ice and its formation process can provide invaluable insights into various niche areas.

In meteorology, the formation of ice via ice 0-like precursors could play a pivotal role in small water droplets, like those found in clouds.

Moreover, understanding ice could lead to technological advancements in areas ranging from food sciences to air conditioning.

This remarkable discovery underscores the immense trajectory science can take, leading us from a simple water droplet all the way to the clouds.

The future of ice research

As researchers delve deeper into the complexities of ice and its various forms, the future of ice research promises to unlock even more mysteries.

One exciting area of exploration is the link between ice formation and climate change. Understanding how various types of ice interact with the environment is key, offering important insights into weather patterns and Earth's overall climate system.

In addition, the study of ice 0 and its precursors could lead to advancements in materials science. The unique properties of ice 0 may inspire innovative applications, such as the development of new cooling systems or insulation materials that leverage its distinct crystalline structure.

Moreover, ongoing investigations into ice's role in biological processes could shed light on how living organisms survive in extreme cold conditions. This knowledge might pave the way for breakthroughs in cryopreservation techniques, potentially revolutionizing fields like medicine and biotechnology.

The study is published in the journal Nature Communications.

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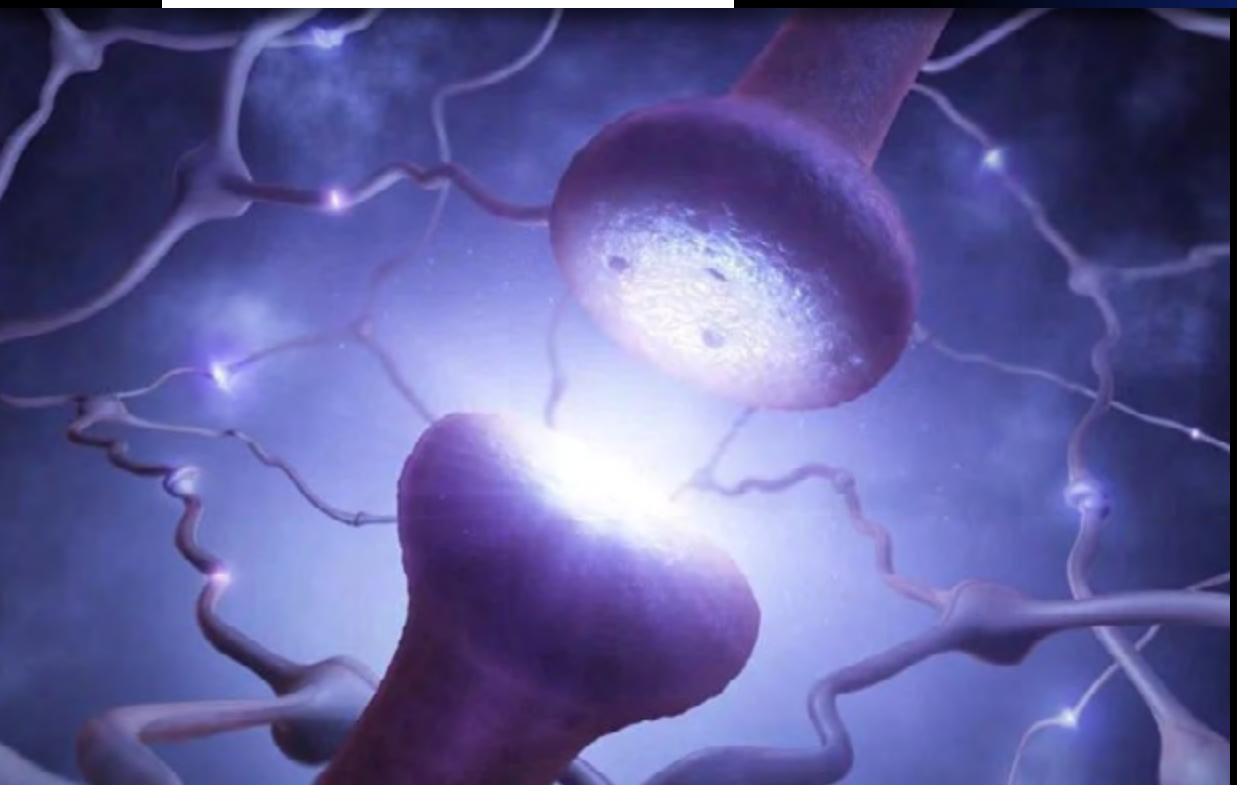

Axons in brain cells may resemble "pearls on a string" rather than tubes. A new study highlights how axon shape impacts brain signaling and offers new insights into neuron structure.

Rewriting Biology Textbooks: Johns Hopkins Scientists Debunk Century-Old Assumption About Brain Cells

BY JOHNS HOPKINS MEDICINE | DECEMBER 9, 2024

Axons in brain cells resemble a string of pearls rather than smooth tubes, according to Johns Hopkins researchers. This discovery, aided by advanced imaging and modeling, reveals how physical and membrane properties influence axon structure and function, challenging long-held beliefs and offering insights into brain signaling and disease.

Biology textbooks may require revision, according to Johns Hopkins Medicine scientists, who have presented new evidence suggesting that an armlike structure of mammalian brain cells might have a different shape than what scientists have assumed for over a century.

Their study on mouse brain cells shows that the cells' axons — the armlike structures that reach out and exchange information with other brain cells — are not the cylindrical tubes often pictured in books and on websites but more like pearls on a string.

A report on the findings was recently published in the journal Nature Neuroscience.

"Understanding the structure of axons is important for understanding brain cell signaling," says Shigeki Watanabe, Ph.D., associate professor of cell biology and neuroscience at the Johns Hopkins University School of Medicine. "Axons are the cables that connect our brain tissue, enabling learning, memory and other functions."

Scientists have known that pearl-like structures in axons, referred to as axon beading, can develop in dying brain

cells and in people with Parkinson's and other neurodegenerative diseases due to the loss of membrane and skeletal integrity in neurons.

Under normal conditions, axons are thought to be shaped like tubes with a mostly constant diameter and occasional bubble-like structures (synaptic varicosities that hold globs of neurotransmitters, which enable signaling to other brain cells).

Investigating Axon Pearling

Watanabe had initially seen repeated axon pearling in the nervous system of worms and grew more curious about the structures after a discussion with Swiss scientist Graham Knott, Ph.D. A research team from Harvard University had published a study in 2012 that identified repeated "skeletal" components in axons, so the pair of researchers discussed experiments to get rid of the axon skeleton to see if the pearl structures disappear, says Watanabe.

Johns Hopkins graduate student and study first author Jacqueline Griswold tested the idea but found no effect on axon pearling.

Then, Watanabe and Griswold worked with theoretical biophysics colleague Padmini Rangamani, Ph.D., professor of pharmacology at the University of California San Diego School of Medicine, to look more closely at axons' physical properties.

To be able to see axons on brain cells (neurons), which are 100 times smaller than the width of a human hair, the scientists used high pressure freezing electron microscopy. Like standard electron microscopy, which shoots beams of electrons at a cell to outline its structure, Watanabe and his team froze mouse neurons to preserve the structures' shape.

"To see nanoscale structures with standard electron microscopy, we fix and dehydrate the tissues, but freezing them retains their shape — similar to freezing a grape rather than dehydrating it into a raisin," says Watanabe.

The researchers studied three types of mouse neurons: ones grown in the lab, those taken from adult mice, and those taken from mouse embryos. The neurons were non-myelinated (they were without the myelin-insulating cover that surrounds the axon).

The researchers found the bubbly, pear shape of axons among all of the tens of thousands of images taken of the tissue samples.

The scientists named the pearl-like structures in which the axon swells "non-synaptic varicosities."

"These findings challenge a century of understanding about axon structure," says Watanabe.

Insights from Mathematical Modeling and Experiments

The scientists also used mathematical modeling to see if the axon membrane influenced the shape or presence of the pearl on a string structure. They found that simple mechanical models could be used to explain these structures very effectively.

Furthermore, experiments with the mathematical model and mouse brain samples showed that increasing the concentration of sugars in the solution around the axon or decreasing tension in the axonal membranes reduced the pearl structures' size.

In another experiment, the scientists removed cholesterol from the neuron's membrane to make it less stiff and more fluid-like. Under this condition, they found less pearling in both mathematical models and mouse neurons, along with reduced ability of the axon to transmit electrical signals.

"A wider space in the axons allows ions [chemical particles] to pass through more quickly and avoid traffic jams," says Watanabe.

The scientists also applied high frequency electrical stimulation to the mouse neurons, which made pearled structures along axons swell, on average, 8% longer and 17% wider for at least 30 min after stimulation and increased the speed of electrical signals. However, when cholesterol was removed from the membrane, the axon's pearls lost their swollen state and had no change in the speed of electrical signals.

The research team plans to examine axonal "arms" in human brain tissue taken with permission from people having brain surgery and those who have died from neurodegenerative diseases. This work formed the basis of a recently awarded Multiple Principal Investigator grant to Watanabe and Rangamani from the National Institute of Mental Health.

Reference: *"Membrane mechanics dictate axonal pearls-on-a-string morphology and function" by Jacqueline M. Griswold, Mayte Bonilla-Quintana, Renee Pepper, Christopher T. Lee, Sumana Raychaudhuri, Siyi Ma, Quan Gan, Sarah Syed, Cuncheng Zhu, Miriam Bell, Mitsuo Suga, Yuuki Yamaguchi, Ronan Chéreau, U. Valentin Nägerl, Graham Knott, Padmini Rangamani and Shigeki Watanabe, 2 December 2024, Nature Neuroscience.*

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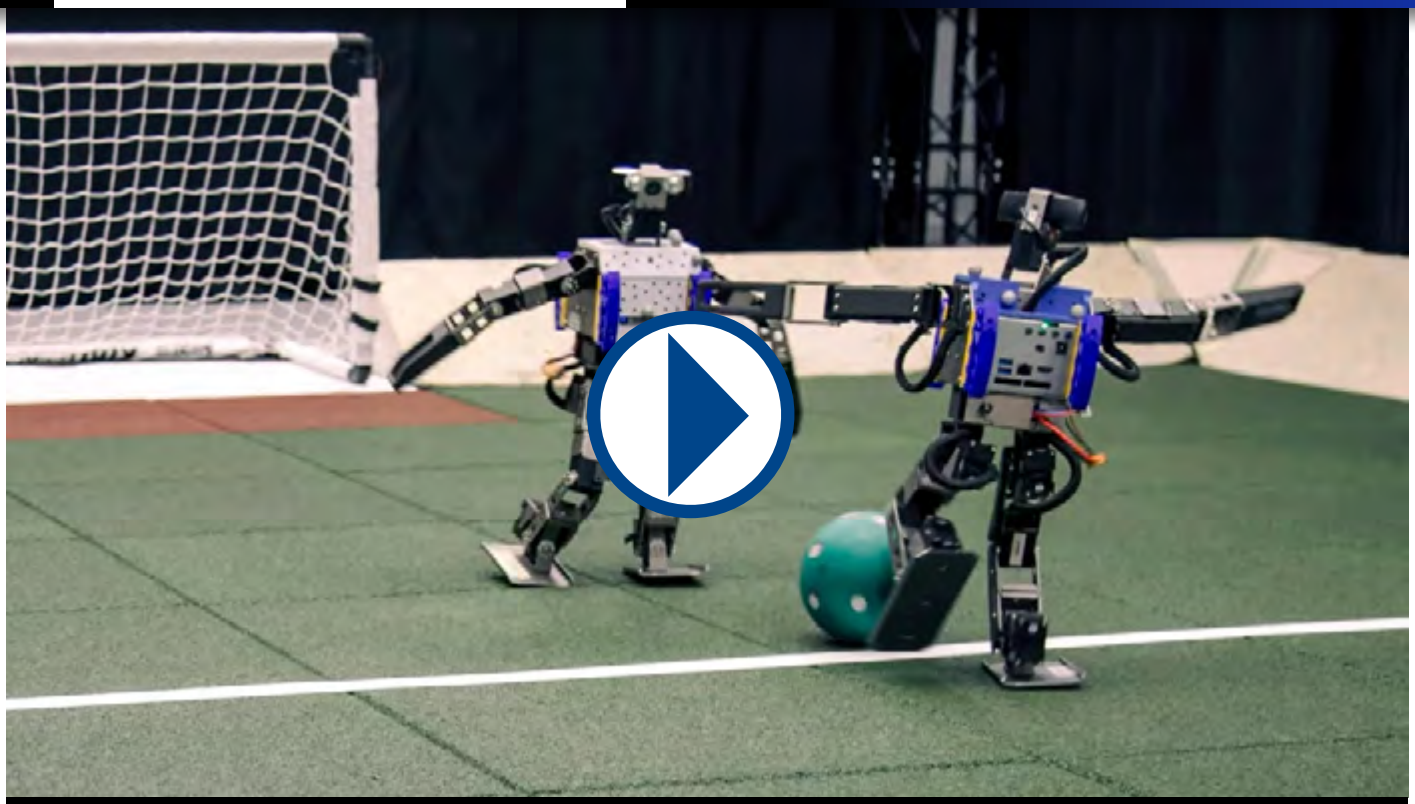


Two small, humanoid robots play soccer after being trained with reinforcement learning. The AI tool helps the robots to be more agile and resilient compared with traditional computer programming, according to a recent study.

Reinforcement learning AI might bring humanoid robots to the real world

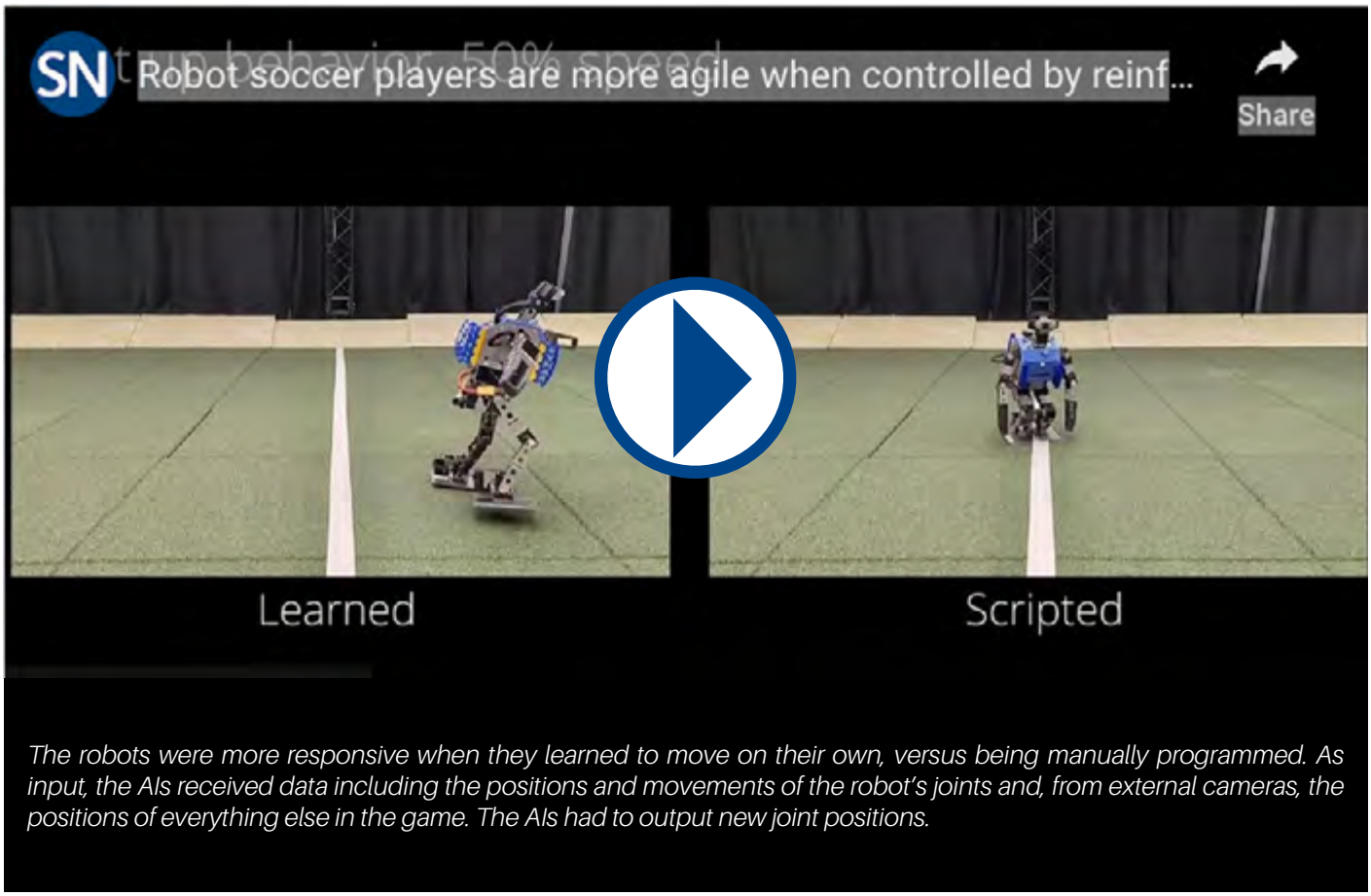
These robots that play soccer and navigate difficult terrain may be the future of AI

By Matthew Hutson | MAY 24, 2024

ChatGPT and other AI tools are upending our digital lives, but our AI interactions are about to get physical. Humanoid robots trained with a particular type of AI to sense and react to their world could lend a hand in factories, space stations, nursing homes and beyond. Two recent papers in Science Robotics highlight how that type of AI — called reinforcement learning — could make such robots a reality.

"We've seen really wonderful progress in AI in the digital world with tools like GPT," says Ilija Radosavovic, a computer scientist at the University of California, Berkeley. "But I think that AI in the physical world has the potential to be even more transformational."

The state-of-the-art software that controls the movements of



The robots were more responsive when they learned to move on their own, versus being manually programmed. As input, the AIs received data including the positions and movements of the robot's joints and, from external cameras, the positions of everything else in the game. The AIs had to output new joint positions.

bipedal bots often uses what's called model-based predictive control. It's led to very sophisticated systems, such as the parkour-performing Atlas robot from Boston Dynamics. But these robot brains require a fair amount of human expertise to program, and they don't adapt well to unfamiliar situations. Reinforcement learning, or RL, in which AI learns through trial and error to perform sequences of actions, may prove a better approach.

"We wanted to see how far we can push reinforcement learning in real robots," says Tuomas Haarnoja, a computer scientist at Google DeepMind and coauthor of one of the Science Robotics papers. Haarnoja and colleagues chose to develop software for a 20-inch-tall toy robot called OP3, made by the company Robotis. The team not only wanted to teach OP3 to walk but also to play one-on-one soccer.

"Soccer is a nice environment to study general reinforcement learning," says Guy Lever of Google DeepMind, a coauthor of the paper. It requires planning, agility, exploration, cooperation and competition.

The toy size of the robots "allowed us to iterate fast," Haarnoja says, because larger robots are harder to operate and repair. And before deploying the machine learning software in the real robots — which can break when they fall over — the researchers trained it on virtual robots, a technique known as sim-to-real transfer.

Training of the virtual bots came in two stages. In the first stage, the team trained one AI using RL merely to get the virtual robot up from the ground, and another to score goals without falling over. As input, the AIs received data including the positions and movements of the robot's joints and, from external cameras, the positions of everything else in the game. (In a recently posted preprint, the team created a version of the system that relies on the robot's own vision.) The AIs had to output new joint positions. If they performed well, their internal parameters were updated to encourage more of the same behavior. In the second stage, the researchers trained an AI to imitate each of the first two AIs and to score against closely matched opponents (versions of itself).

To prepare the control software, called a controller, for the real-world robots, the researchers varied aspects of the simulation, including friction, sensor delays and body-mass distribution. They also rewarded the AI not just for scoring goals but also for other things, like minimizing knee torque to avoid injury.

Real robots tested with the RL control software walked nearly twice as fast, turned three times as quickly and took less than half the time to get up compared with robots using the scripted controller made by the manufacturer. But more advanced skills also emerged, like fluidly stringing together

actions. "It was really nice to see more complex motor skills being learned by robots," says Radosavovic, who was not a part of the research. And the controller learned not just single moves, but also the planning required to play the game, like knowing to stand in the way of an opponent's shot.

"In my eyes, the soccer paper is amazing," says Joonho Lee, a roboticist at ETH Zurich. "We've never seen such resilience from humanoids."

But what about human-sized humanoids? In the other recent paper, Radosavovic worked with colleagues to train a controller for a larger humanoid robot. This one, Digit from Agility Robotics, stands about five feet tall and has knees that bend backward like an ostrich. The team's approach was similar to Google DeepMind's. Both teams used computer brains known as neural networks, but Radosavovic used a specialized type called a transformer, the kind common in large language models like those powering ChatGPT.

Instead of taking in words and outputting more words, the model took in 16 observation-action pairs — what the robot had sensed and done for the previous 16 snapshots of time, covering roughly a third of a second — and output its next action. To make learning easier, it first learned based on observations of its actual joint positions and velocity, before using observations with added noise, a more realistic task. To further enable sim-to-real transfer, the researchers slightly randomized aspects of the virtual robot's body and created a variety of virtual terrain, including slopes, trip-inducing cables and bubble wrap.

After training in the digital world, the controller operated a real robot for a full week of tests outside — preventing the robot from falling over even a single time. And in the lab, the robot resisted external forces like having an inflatable exercise ball thrown at it. The controller also outperformed the non-machine-learning controller from the manufacturer, easily traversing an array of planks on the ground. And whereas the default controller got stuck attempting to climb a step, the RL one managed to figure it out, even though it hadn't seen steps during training.

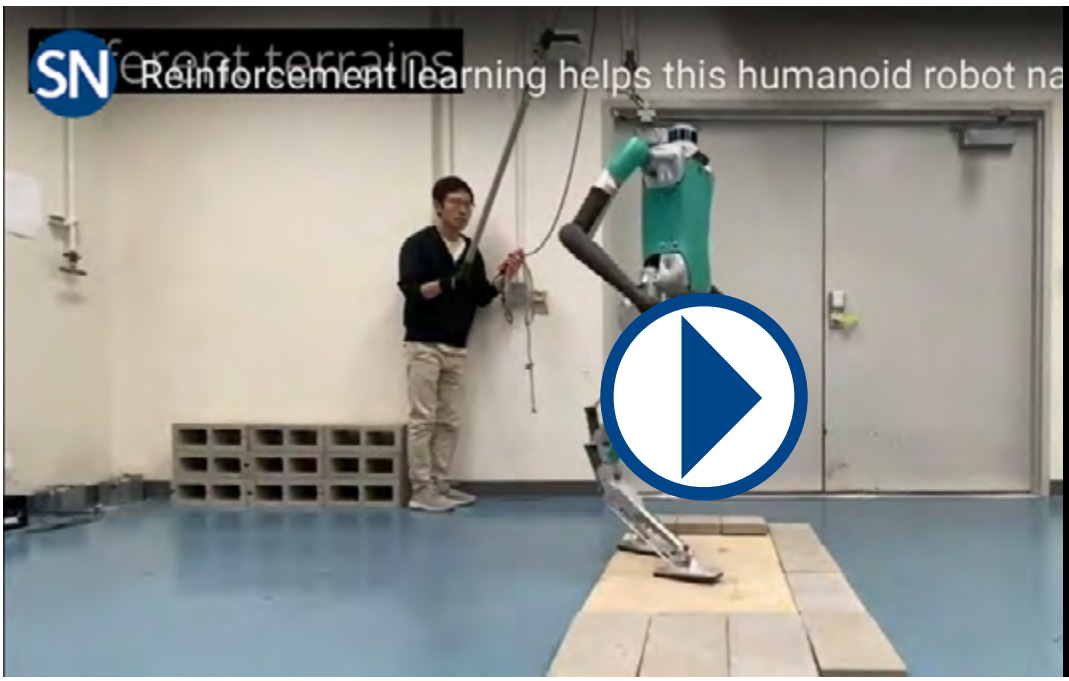
Reinforcement learning for four-legged locomotion has become popular in the last few years, and these studies show the same techniques now working for two-legged robots. "These papers are either at-par or have pushed beyond manually defined controllers — a tipping point," says Pulkit Agrawal, a computer scientist at MIT. "With the power of data, it will be possible to unlock many more capabilities in a relatively short period of time."

And the papers' approaches are likely complementary. Future AI robots may need the robustness of Berkeley's system and the dexterity of Google DeepMind's. Real-world soccer incorporates both. According to Lever, soccer "has been a grand challenge for robotics and AI for quite some time."

CITATIONS

T. Haarnoja et al. Learning agile soccer skills for a bipedal robot with deep reinforcement learning. Science Robotics. April 10, 2024. doi: 10.1126/scirobotics.adi8022.

I. Radosavovic et al. Real-world humanoid locomotion with reinforcement learning. Science Robotics. April 17, 2024. doi: 10.1126/scirobotics.adi9579.



This bipedal robot learned to handle a variety of physical challenges, including walking on different terrains and being bumped off balance by an exercise ball. Part of the robot's training involved a transformer model, like the one used in ChatGPT, to process data inputs and learn and decide on its next movement.

CRYONICS NEWS
Science, Technology and Medical News from the Web
ScienceDaily
from SCIENCEDAILY.COM

Newly discovered gene may influence longevity

University of Copenhagen - The Faculty of Health and Medical Sciences | September 4, 2024

Sleep, fasting, exercise, green porridge, black coffee, a healthy social life ...

There is an abundance of advice out there on how to live a good, long life. Researchers are working hard to determine why some people live longer than others, and how we get the most out of our increasingly long lives.

Now researchers from the Center for Healthy Aging, Department of Cellular and Molecular Medicine at the University of Copenhagen have made a breakthrough. They have discovered that a particular protein known as OSER1 has a great influence on longevity.

"We identified this protein that can extend longevity (long duration of life, red.). It is a novel pro-longevity factor, and it is a protein that exists in various animals, such as fruit flies, nematodes, silkworms, and in humans," says Professor Lene Juel Rasmussen, senior author behind the new study.

Because the protein is present in various animals, the researchers conclude that new results also apply to humans:

"We identified a protein commonly present in different animal models and humans. We screened the proteins and linked the data from the animals to the human cohort also used in the study. This allows us to understand whether it is translatable into humans or not," says Zhiquan Li, who is a first author behind the new study and adds:

"If the gene only exists in animal models, it can be hard to translate to human health, which is why we, in the beginning, screened the potential longevity proteins that exist in many organisms, including humans. Because at the end of the day we are interested in identifying human longevity genes for possible interventions and drug discoveries."

Paves the way for new treatment

The researchers discovered OSER1 when they studied a larger group of proteins regulated by the major transcription factor FOXO, known as a longevity regulatory hub.

"We found 10 genes that, when -- we manipulated their expression -- longevity changed. We decided to focus on one of these genes that affected longevity most, called the OSER1 gene," says Zhiquan Li.

When a gene is associated with shorter a life span, the risk of premature aging and age-associated diseases increases. Therefore, knowledge of how OSER1 functions in the cells and preclinical animal models is vital to our overall knowledge of human aging and human health in general.

"We are currently focused on uncovering the role of OSER1 in humans, but the lack of existing literature presents a challenge, as very little has been published on this topic to date. This study is the first to demonstrate that OSER1 is a significant regulator of aging and longevity. In the future, we hope to provide insights into the specific age-related diseases and aging processes that OSER1 influences," says Zhiquan Li.

The researchers also hope that the identification and characterization of OSER1 will provide new drug targets for age-related diseases such as metabolic diseases, cardiovascular and neuro degenerative diseases.

"Thus, the discovery of this new pro-longevity factor allows us to understand longevity in humans better," says Zhiquan Li.

10 Worst Mistakes in Cryonics

Don't ruin your chance for a succesful 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 then favorable conditions

This seems harder to control then 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.

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