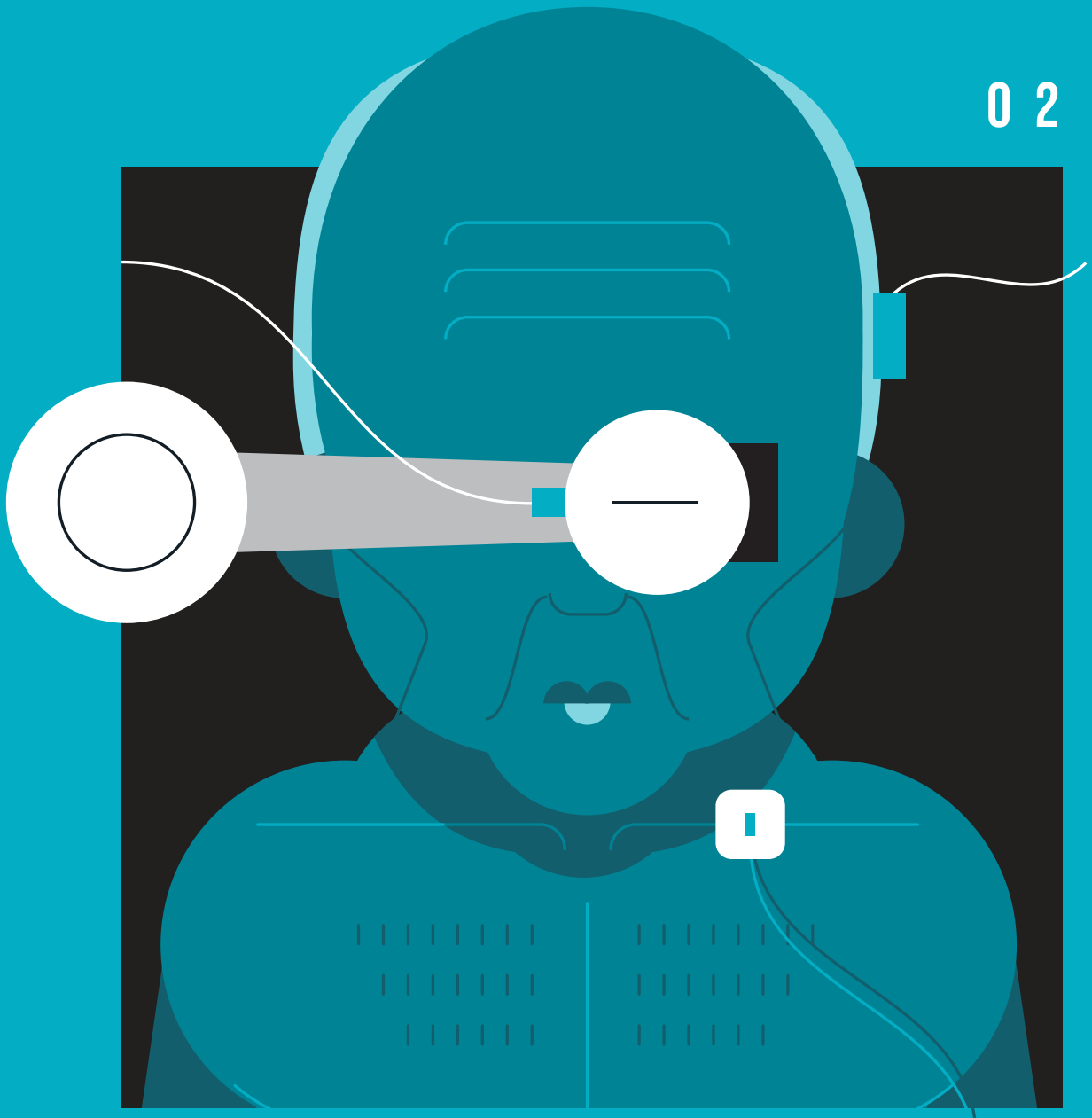
GRAPHONAUT

02



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Launchpad

"We are called to be architects of the future, not its victims."

— R. Buckminster Fuller

At Graphonaut, we take that call seriously. The blueprints of tomorrow are a collective draft, sketched in laboratories and coffee shops alike, encoded into algorithms, debated in policy rooms, and tested in systems already under strain. Our role is to help everyone at the drafting table navigate oceans of data, translating complexity into clarity. Graphonaut continues its mission to explore the forces shaping tomorrow and map them into stories you can absorb in a single sitting, yet reflect on long after.

In our second issue, we examine three frontiers where the future is actively under construction: Cryonics: Humanity's Coldest Gamble, following the boldest bet imaginable – staking life on technology not yet invented; Bias In, Bias Out, unpacking how we pass our inherited biases on to our digital offspring; and Why Edible Insects Could Be the Future of Food, exploring how the dinner table of tomorrow may shift as traditional food systems strain under a growing global population. Each story in this issue asks the same underlying question: if we are the architects, what kind of structure are we building?

Why Graphonaut? Because how we build the future matters as much as what we build. The draft is in our hands.

Colin Eldridge, Content Director

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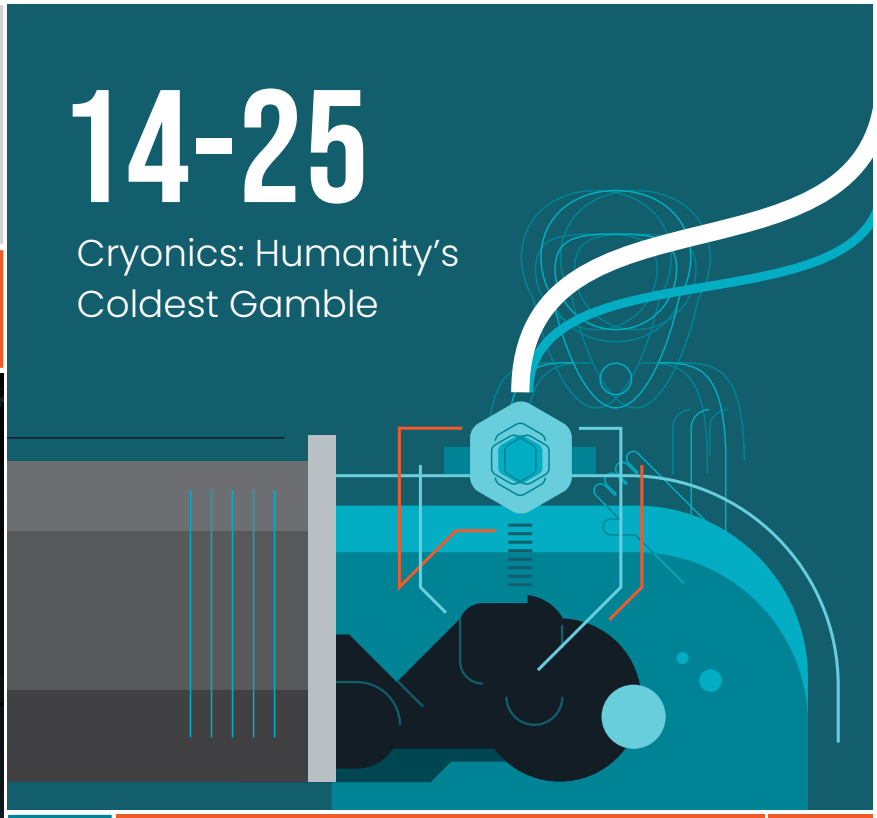
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Graphoverse

INFOGRAPHIC
INSIGHTS

The 4000-Meter Club



48
Switzerland

36
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26
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82

There are 82 mountain peaks in the Alps higher than 4000 meters, spread across three countries.*

*Some summits lie on international borders, so the total does not add up exactly.

These extremely high Alpine peaks form an exclusive group of mountains towering far above the rest of the range. Most of them are concentrated in the western Alps, where the highest mountain in the Alps, Mont Blanc (4,809 m) rises on the border between France and Italy.

SOURCE: UIAA / PHOTO: BORIS BENKO



Written by Ash Holland

Bias In, Bias Out

Gender Discrimination in the Age of AI

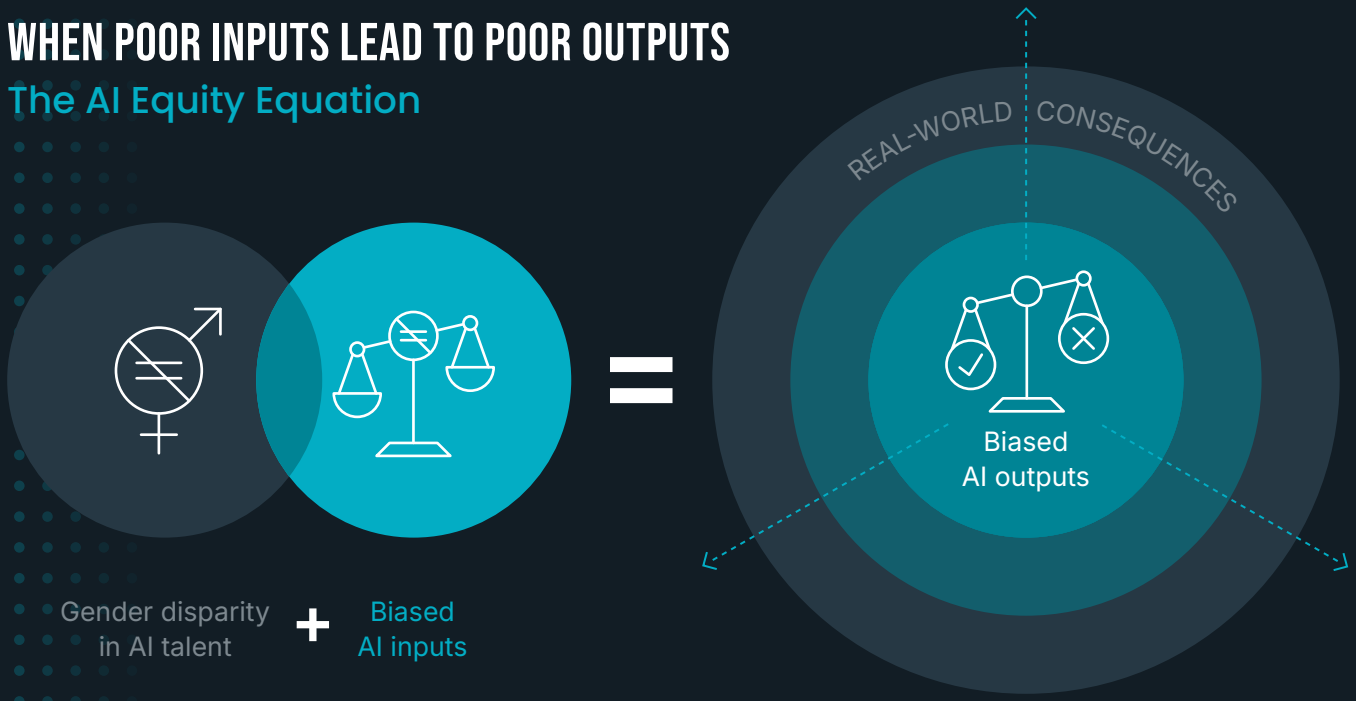
From streamlining work to connecting us with the information we need to analyzing massive data sets in mere seconds, artificial intelligence (AI) has promised us big things. But while the benefits might be great, AI — like every other technology — relies on the human element.

As centuries of research have shown, humans are deeply flawed, and our gender-based biases and stereotypes are rampant in nearly every area of communication and work.

What does this mean for our increasing usage of AI? AI tools are data tools, which means they're dependent on the information we feed them. As such, AI tools have the tendency to serve up our own biases, and, if left unchecked, lead to potentially dangerous and damaging outcomes.

WHEN POOR INPUTS LEAD TO POOR OUTPUTS

The AI Equity Equation



AI gender bias is common across fields, impacting hiring practices, healthcare, finances, and so many more areas of work and life. Why and how? The answers lie in both who is largely responsible for creating and managing AI tools and what kinds of information they're training their algorithms on. Here's a look at three elements that make up the AI equity equation.

Biased Inputs

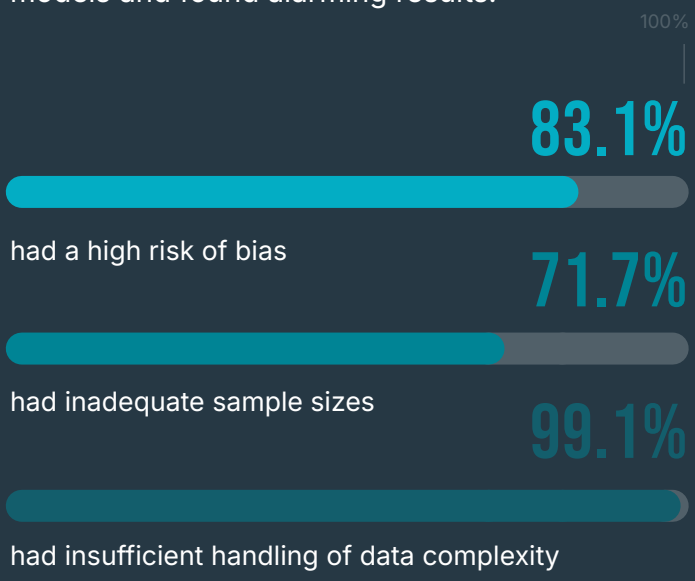
As UN Women notes, biased, flawed, or limited inputs are a big reason why AI tools are perhaps inadvertently reinforcing gender inequalities.

Take healthcare, for example. Research from the European Parliament found that compared to men, women face longer diagnostic delays, underestimation of pain, and underrepresentation in clinical trials. When AI-powered diagnostic tools are developed using data from such trials and experiences, their ability to accurately assess women's conditions is severely limited, thereby perpetuating dangerous healthcare trends that lead to women spending more time in poor health.



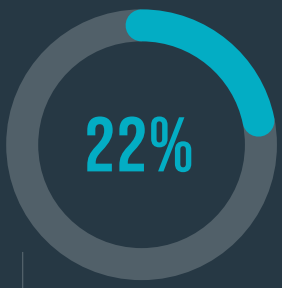
THE PREVALENCE OF BAD AI INPUTS IN HEALTHCARE

A 2023 study analyzed 555 AI diagnostic models and found alarming results:

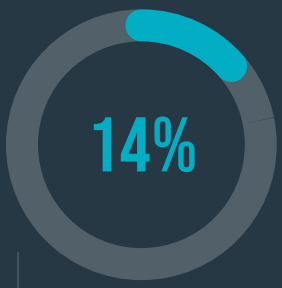


DISPARITY IN AI ROLES

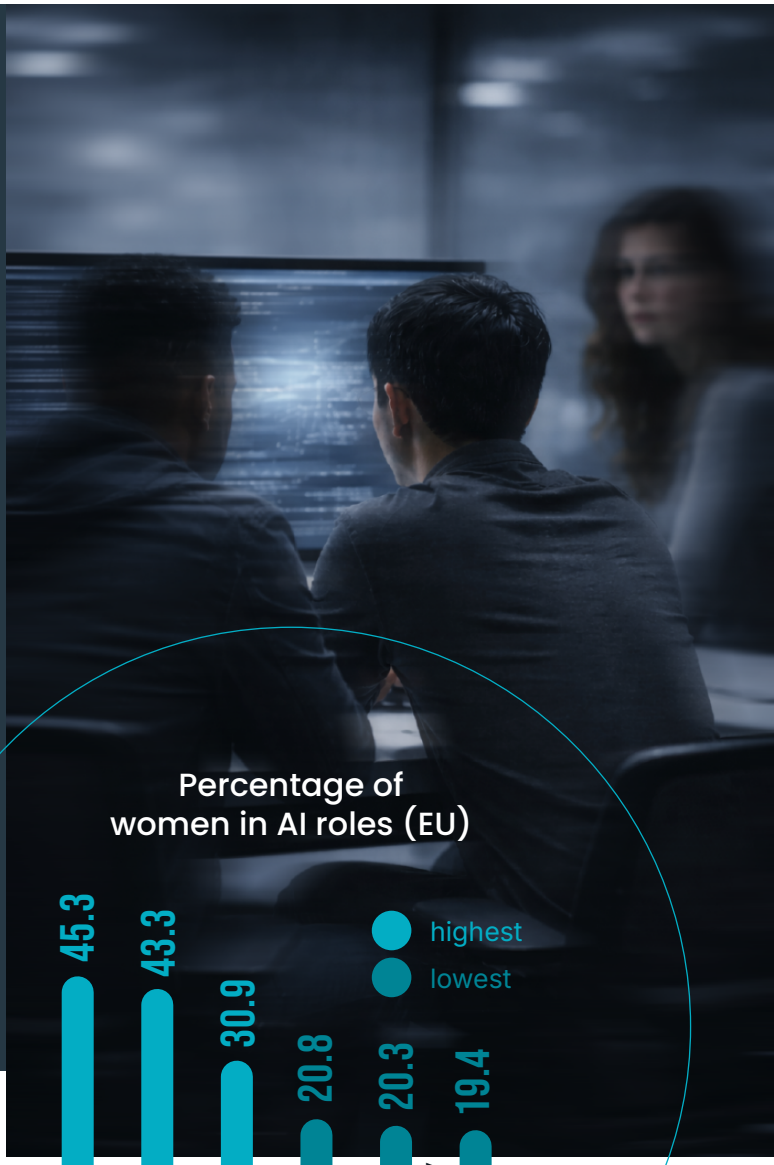
Here's a breakdown of AI talent gender disparity from interface researchers who analyzed data from 1.6 million AI professionals worldwide:



of AI roles worldwide are held by women



of AI senior executive roles worldwide are held by women



Gender Gap in AI Talent

It's not just about the data, though. It's about who's responsible for collecting, evaluating, and inputting the data that feeds our AI-powered chatbots, content generators, and analytical tools. Gender disparity is common in most professions, but it's pretty startling in the AI field.

The gender disparity that's so prevalent in the global AI workforce doesn't just hamper women's abilities to achieve successful careers in burgeoning STEM fields. It impacts the ways in which professionals do — and, more importantly, don't — catch biases in AI inputs. The fewer women handling the data, the more likely it is for biases and negative stereotypes to filter into AI analyses.

Biased Outputs and Real-World Consequences

The dangerous combination of biased data and a lack of diversity in AI roles has a direct impact on what we get out of AI tools. In short, flawed inputs lead to flawed outputs — and we're seeing this impact people in a number of ways:



Some healthcare AI tools are focused more on spotting male symptoms than female symptoms, resulting in poor diagnostics and treatment for women.

Amazon's old AI-backed hiring tool favored men's applications over women's, leading the company to ultimately scrap the tech.

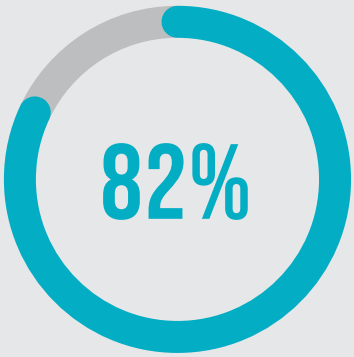
Research found that some AI tech associated terms like "nurse" with women and "doctor" with men, perpetuating gendered workforce norms.

UNESCO research discovered that large language models were connecting women with domestic terms and men with career-based terms, reinforcing problematic gender norms.

AI BIASES BEYOND GENDER



of AI outputs in one study were found to convey terms and images of LGBTQ+ people negatively.



of studies in a literature review showed that AI applications served up racially or ethnically biased content.



AI has contributed to the inequitable treatment of people with disabilities in terms of social protections, hiring processes, and health insurance coverage.

When we consider AI-powered information as the absolute truth, we ignore the biases that have very real-world impacts.



It's difficult to avoid biases, as we live in collective societies in which our differences are often used as fodder for social conflict.

But just because biases are common doesn't mean they're harmless. The real problem occurs when we take AI outputs at face value without thinking critically about where the information came from. When we consider AI-powered information as the absolute truth, we ignore the biases that have very real-world impacts, often perpetuating damaging stereotypes and inequitable treatment of women, people with disabilities, BIPOC individuals, and queer people.

Initiatives Aimed at Addressing Gender Bias

While the implications of gender bias in AI make the future look bleak, not all is lost, and several initiatives aimed at correcting course are currently underway. Here's a look at four large-scale efforts to mitigate bias in current and future technologies.



The UK Science and Technology Framework

The UK Science and Technology Framework offers a vision for what leaders want the UK to achieve by 2030, covering 10 key actions designed to advance the country's tech goals. The framework lists AI as critical to stimulating the economy, but leaders acknowledge the technology's potential for bias and discrimination and call for measures to detect and address such problems.



AI Bias in Law Enforcement: A Practical Guide

Published by Europol's Innovation Lab, this guide offers insights on how biases in AI can replicate discrimination and inequalities and argues for the responsible use of AI by law enforcement agencies. It directly names gender-based biases and provides tactics for addressing bias when using AI.



The Digital Services Act

The Digital Services Act is a European legislation directed at regulating online platforms and promoting user safety by preventing discriminatory activities. The act covers gender-based violence stemming from online activities, though orgs like the European Institute for Gender Equality argue that it doesn't go far enough.



The Artificial Intelligence Act

The 2024 Artificial Intelligence Act offers comprehensive regulatory guidance for AI usage in an effort to boost Europe's digital economy and promote safety. While gender isn't central to the act, it nonetheless explicitly addresses biases and gender equality in AI and breaks down criteria for "high-risk" AI solutions.

In addition to some of the continent-wide initiatives currently in the works, several AI and brands are working hard to create tech that serves women equitably and meets issues disproportionately experienced by women. bSafe, for example, is a personal safety app that provides near-instant mobile emergency response. Sophia is an AI chatbot that offers support for people experiencing domestic violence or unhealthy relationships. LOLA is an AI solution that provides evidence-based evaluations of how public entities perform against Gender Seal benchmarks.

Beyond the Algorithm

While efforts are underway to fix the AI gender problem, it's clear that there's still considerable work to be done. The Council of the European Union has issued a clear call to combat gender bias in AI tools.



The Council urges member states to take measures to combat this problem through the use of clear, representative, high-quality data, as well as to install human oversight and ensure the systems' compliance with non-discrimination rules and AI sectoral legislation.

The Council's call can be implemented at all levels, too, from government entities to individual contributors. If we're collectively conscious of AI outputs and consider them a starting point — rather than a destination — from which we can apply our own critical thinking, we can get the most out of these tools without replicating misogyny or discrimination.

AI is incredibly useful, but it isn't perfect, and as long as humans are responsible for creating the tech, it likely never will be. It's up to all of us to do a better job of using AI in ways that beat bias and bring out the best — not the worst — of our humanity.

Cryonics

Humanity's Coldest Gamble

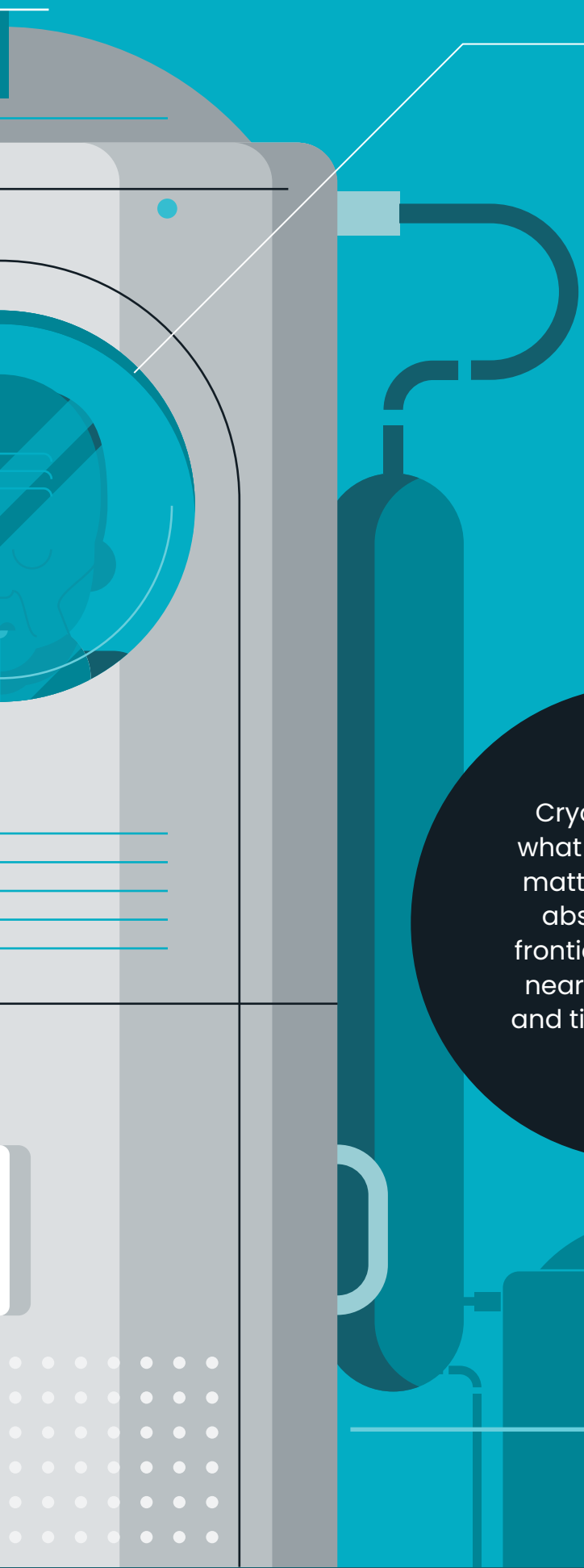
The science of human preservation remains speculative, tempting humanity with the idea of bridging the gap between life and eternity.

Written by Goran Koprenica

From rocket fuel and superconductors to organ preservation and the quest to halt biological decay, cryonics spans industries and imaginations alike. It enables space travel, powers quantum computers, and safeguards living cells—a technology both practical and profoundly visionary.

Yet among its many applications, none captures human fascination more than the idea of freezing ourselves for another tomorrow. It promises a way to preserve life, materials, and information far beyond their natural lifespans. The science of human preservation remains speculative, tempting humanity with the idea of bridging the gap between life and eternity.





Cryopreserved individuals worldwide (approx.)

600

Breakdown by Top 3

30+
Arizona (pets)



300
U.S.

100
Europe

50
Russia

Cryonics explores what happens when matter approaches absolute zero—a frontier where atoms nearly stop moving and time itself seems to pause.

Waiting list for cryonic preservation: (approx.)

4,000

Timeline: Milestones & Historical Numbers

world total Alcor future projection

1892

James Dewar invents the vacuum flask, enabling practical cryogenic liquids



1898

Liquid hydrogen first produced



1948

First cryogenic electron microscopy experiments



1960s

Cryonics concept proposed by Robert Ettinger; first human preserved in 1967



1985

Vitrification introduced for biological cells to avoid ice crystal damage



1997

Industry leaders, Alcor, report 27 patients in long-term care; <50 cryopreserved patients worldwide



world total Alcor future projection

2008

First operation of Large Hadron Collider, the largest cryogenic facility in the world



2011

Alcor passes 100th patient, world total estimated at approx. 200 patients



2021

Record low temperature reached: 38 pK



2025

Around 600 people have had themselves cryonically preserved



2035

Based on historic trend—more than 1,300 cryopreserved patients





2050

Based on historic trend—more than 4,100 cryopreserved patients

AT THE EDGE OF SCIENCE

The Long Goodbye

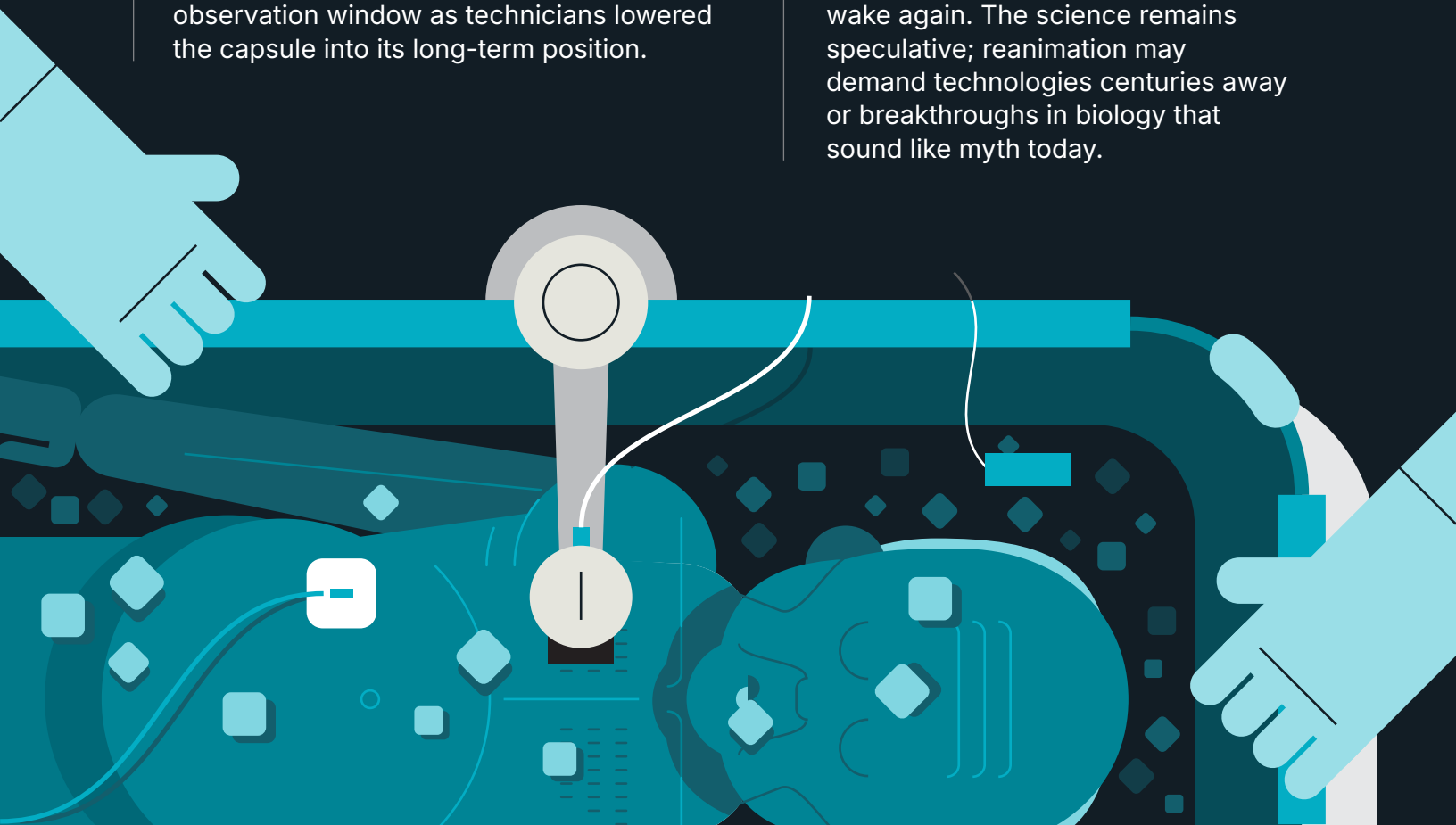
When the doctors said there was nothing more they could do, Mara found herself scrolling through the website of a cryonics foundation. One she'd mocked years before. Her father, a retired engineer, had always believed that nothing truly ends, only pauses.

A week later, she signed the preservation papers. The process was clinical, almost mundane: A standby team even monitored the moment of death; the body cooled with ice; blood was replaced by cryoprotectant fluids to prevent ice crystal damage. Within hours, her father's cells were vitrified. Not frozen solid but in a suspended state below –320°F (–196°C) inside a stainless steel cryostat filled with liquid nitrogen.

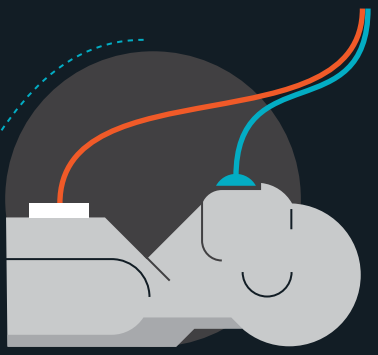
She remembered watching through the observation window as technicians lowered the capsule into its long-term position.

The room hummed with compressors and sensors, a quiet symphony of machines built to protect a future no one could define. For the first time, the idea of "indefinite storage" felt less like science fiction and more like a strange kind of patience.

Now, his ID number sits on a digital registry. No. 789, three consecutive numbers that make it impossible to forget. No one can promise he'll ever wake again. The science remains speculative; reanimation may demand technologies centuries away or breakthroughs in biology that sound like myth today.

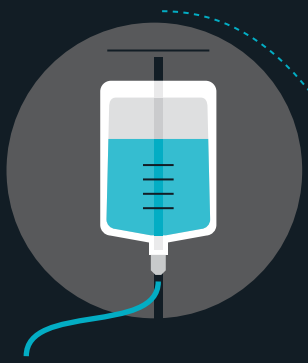


THE CRYOPRESERVATION PROCESS



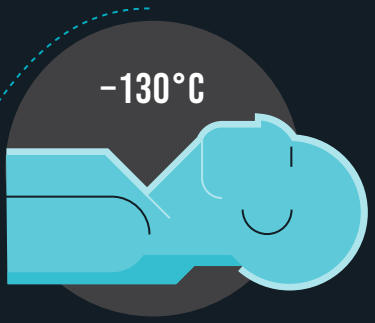
1 REMOVAL OF BODILY FLUIDS

To prevent ice crystal formation, natural fluids (which would freeze and rupture cells) are removed from the body.



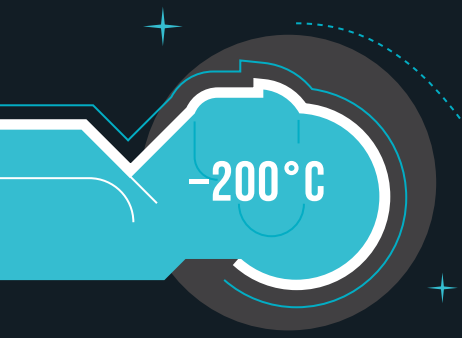
2 INFUSION OF CRYOPROTECTANTS

Medical-grade antifreeze compounds replace the fluids, protecting cells and tissues from freezing damage.



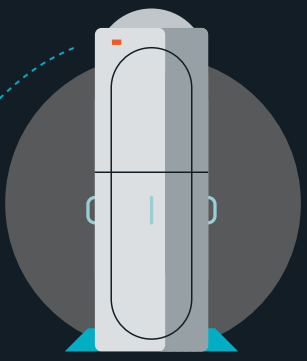
3 CONTROLLED COOLING AND VITRIFICATION

The body is gradually cooled; at about −130°C (−266°F / 403 K), tissues vitrify, becoming glass-like rather than icy and halting all decay.



4 DEEP-FREEZE PRESERVATION

The temperature is slowly lowered further to around −200°C (−392°F / 473 K), ensuring complete metabolic suspension.



5 LONG-TERM STORAGE

The vitrified body is placed into a liquid-nitrogen cryostat, where it remains indefinitely at roughly −321°F (−196°C / 77 K).

Scientists haven't figured out how to reverse the process yet, but before attempting it, there are a couple of questions that need to be answered: How would reanimation work? And how would you make your way in the world for a second time?

EXPERT OPINION

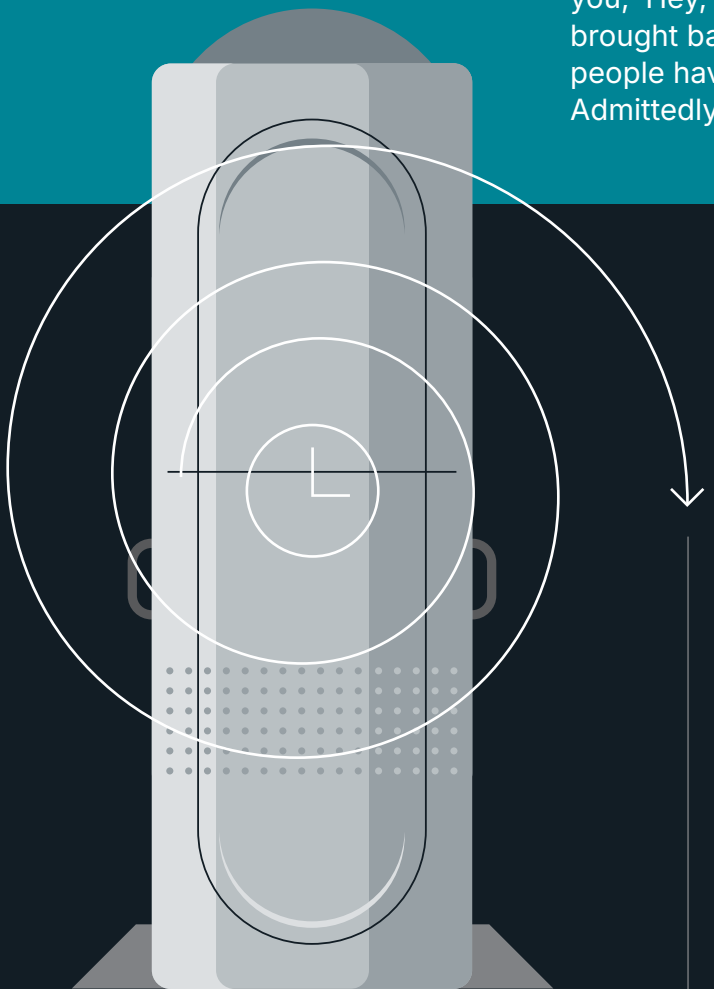
Joao Pedro De Magalhães

(Department of Inflammation and Ageing, Professor of Molecular Biogerontology @ the University of Birmingham; UK Cryonics and Cryopreservation Research Network Coordinator)

Let's say that cryopreservation is already achievable. What are the limitations for the revival side of the process?

The main challenge is re-warming. There are ways around it, and currently in development are iron particles that are warmed with magnetic fields, so-called nano-warming. The second issue is repair. Presumably, there will be some damage to the tissues and cells you'd have to repair. I'd say that's still a challenge we'll have to face, either with nanotechnology or some technologies we don't have available yet.

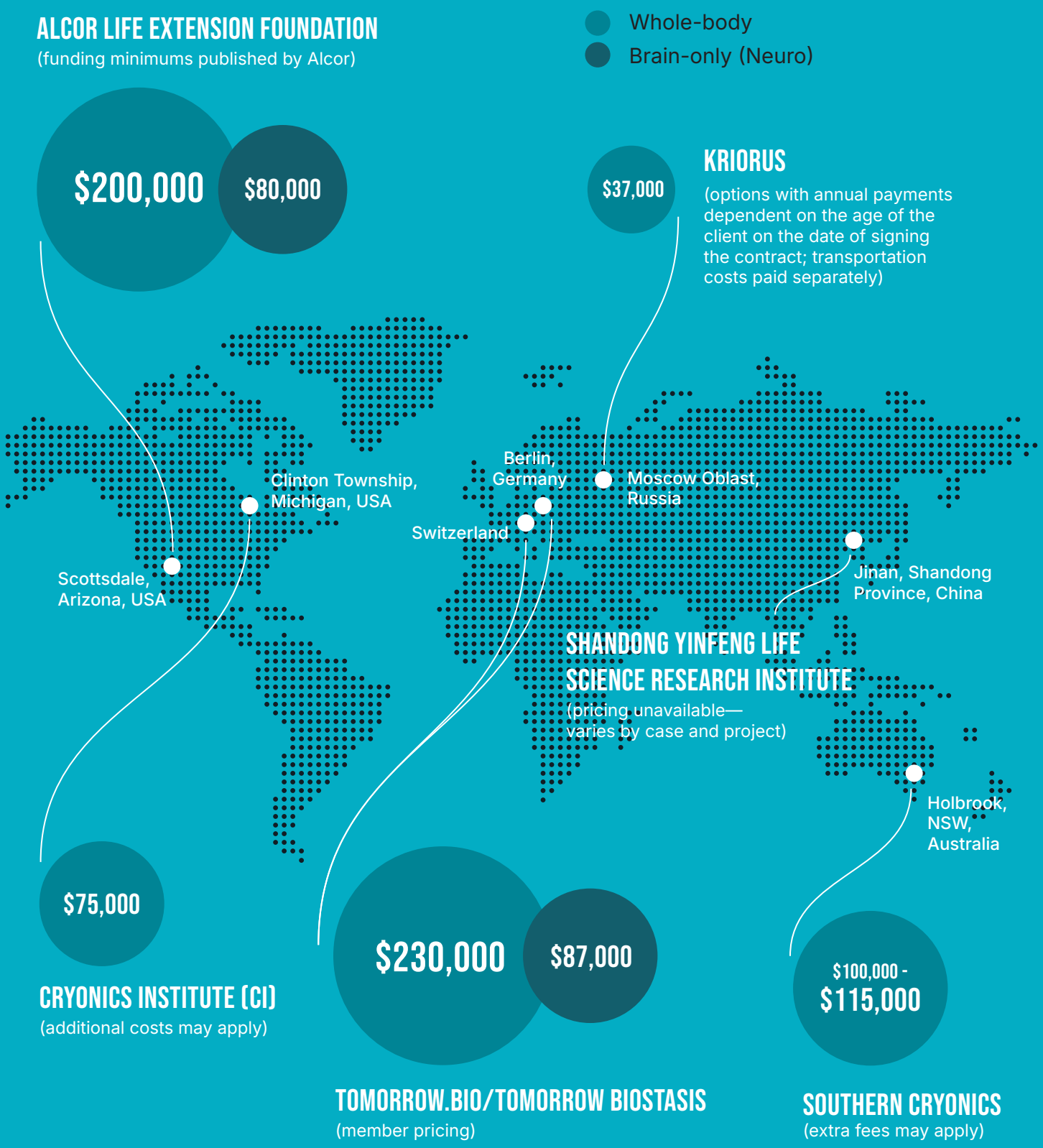
We've figured out the methods, so we just need to develop the tools and the engineering approaches that will allow us to overcome these issues. If someone tells you, 'Hey, nobody has ever been cryopreserved and brought back to life,' that's technically not true—some people have been cryopreserved and brought back to life. Admittedly, they were tiny embryos, but that's a caveat.

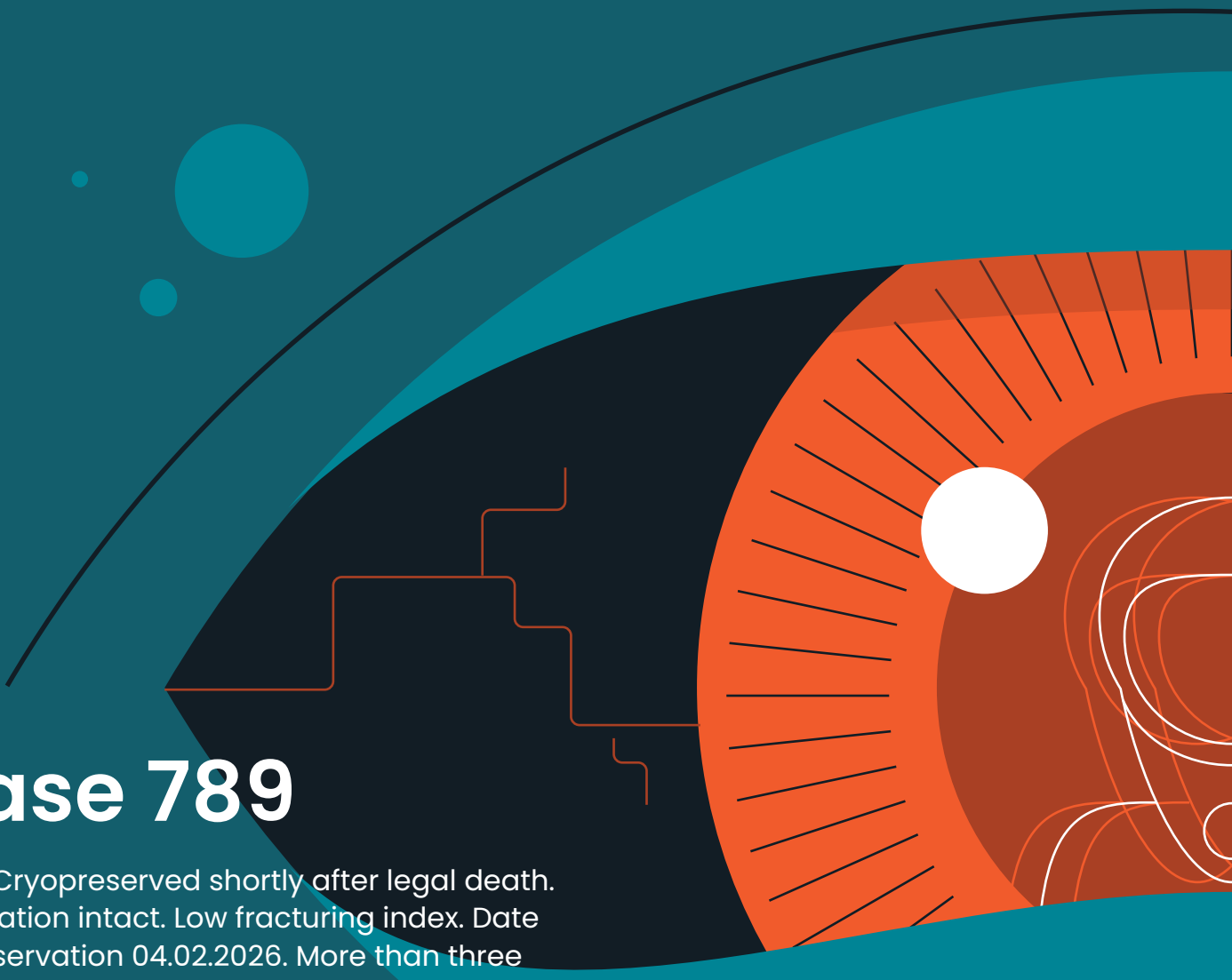


Still, Mara visits the facility's feed once a year. She reads the data logs: nitrogen levels, temperature oscillations, pressure cycles. There's plenty of other data she doesn't understand: cryostat integrity checks, fluid density curves, micro-vibration reports. But the charts remain steady, reassuringly flat.

For now, her father's bet on tomorrow looks good. And on some days, when she's feeling hopeful, she lets herself imagine him opening his eyes in a world finally ready for him.

THE GLOBAL CRYONICS LANDSCAPE: LOCATIONS & COSTS





Case 789

Male. Cryopreserved shortly after legal death. Vitrification intact. Low fracturing index. Date of preservation 04.02.2026. More than three centuries ago. The numbers felt unreal.

Deep beneath the surface, in a cryonics vault that had survived three reorganizations and two energy crises, Technician Lin entered the chamber with a tablet full of overdue tasks. The interface adjusted to his biometrics as he walked, its text hovering just above the glass like a tired companion.

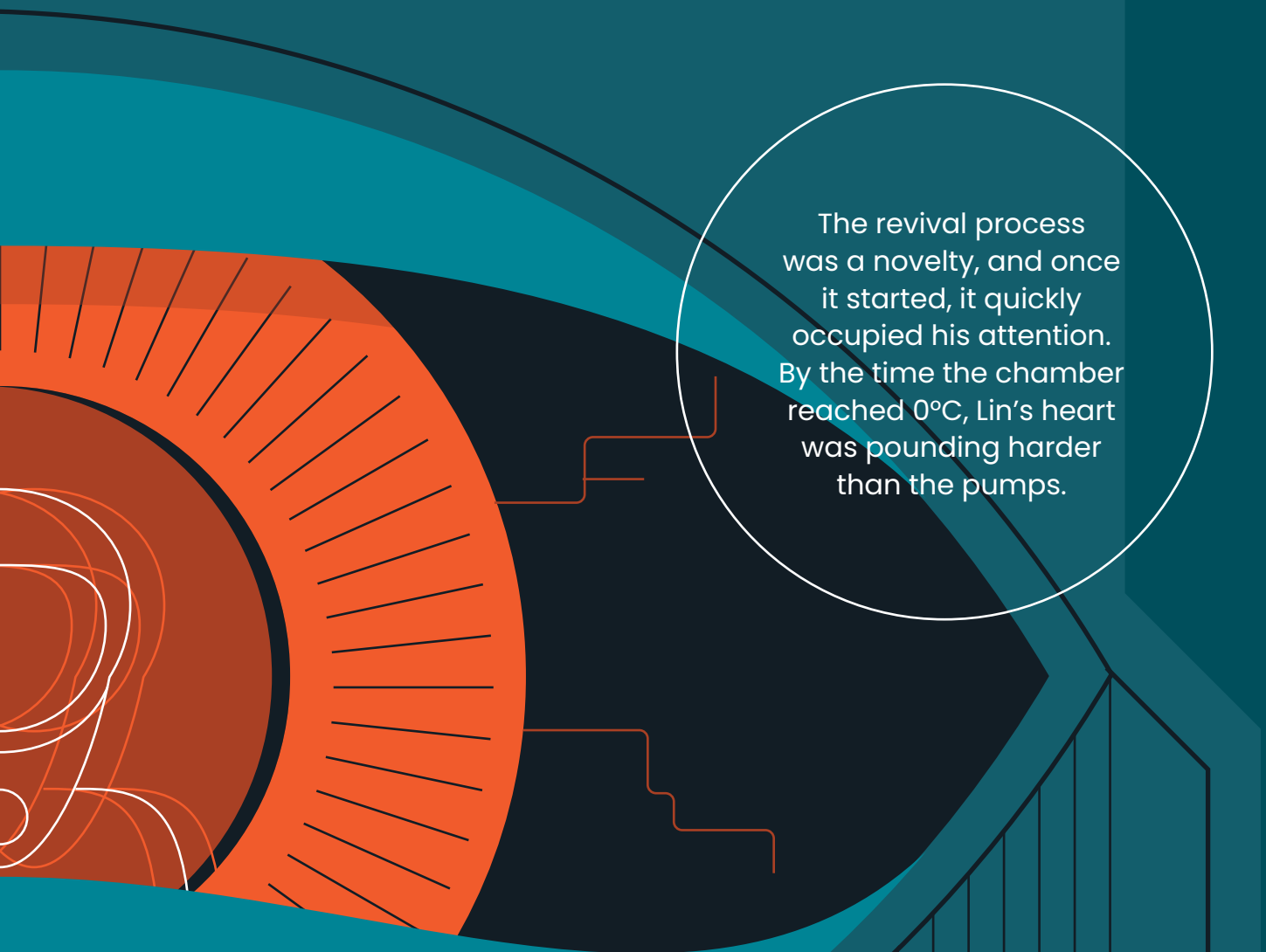
Case 789 was at the top of the list.

The patient had outlived his funding decades earlier. No relatives remained to claim him; no foundation had stepped forward to subsidize his upkeep. Under the new austerity protocols, the board had voted to classify him as a research candidate, one of the first humans allowed to enter the experimental revival program.

Lin tried not to think about the ethics. He reviewed the file instead: Male. Cryopreserved shortly after legal death. Vitrification intact. Low fracturing index. Date of preservation 04.02.2026. More than three centuries ago. The numbers felt unreal.

The revival suite looked deceptively simple—an array of warm-fluid perfusion lines, microvascular nanoprobes, and the new quantum-phase tissue rehydrator. No one knew if any of this would work. The literature was full of cautious optimism and buried failures.

He initiated the sequence.



The revival process was a novelty, and once it started, it quickly occupied his attention. By the time the chamber reached 0°C, Lin's heart was pounding harder than the pumps.

Lin stepped back and let the systems work. The chamber sealed with a muted resonance, and a supervisory unit, humanoid only in outline, shifted its stance beside the console. Lin switched his attention to the window—basically, a screen showing deep-space cameras.

Lin made a swift eye movement, switching from the documentary about mining the asteroid belt to a live game of floating handball from Lunar base. Second eye movement, a rerun of a reality show starring anthropomorphic robots trying to kill each other on some island. Boring.

The revival process was a novelty, and once it started, it quickly occupied his attention.

Editorial Note

This narrative is a fictional scenario informed by current scientific understanding of cryonics. While it reflects real principles and ongoing research, it does not imply that successful reanimation is achievable or foreseeable. Cryonics remains speculative, and the future outcomes of such technologies are unknown. The purpose of this piece is to explore ideas, not to endorse or critique cryonics in any direction.

First, low-temperature perfusion to replace the cryoprotectant with a buffered nanosolution designed to scaffold damaged cellular structures. Then, a controlled rise from −320°F (–196°C) to −4°F (–20°C), pausing every few degrees while the system scanned for microfractures. By the time the chamber reached 32°F (0°C), Lin's heart was pounding harder than the pumps.

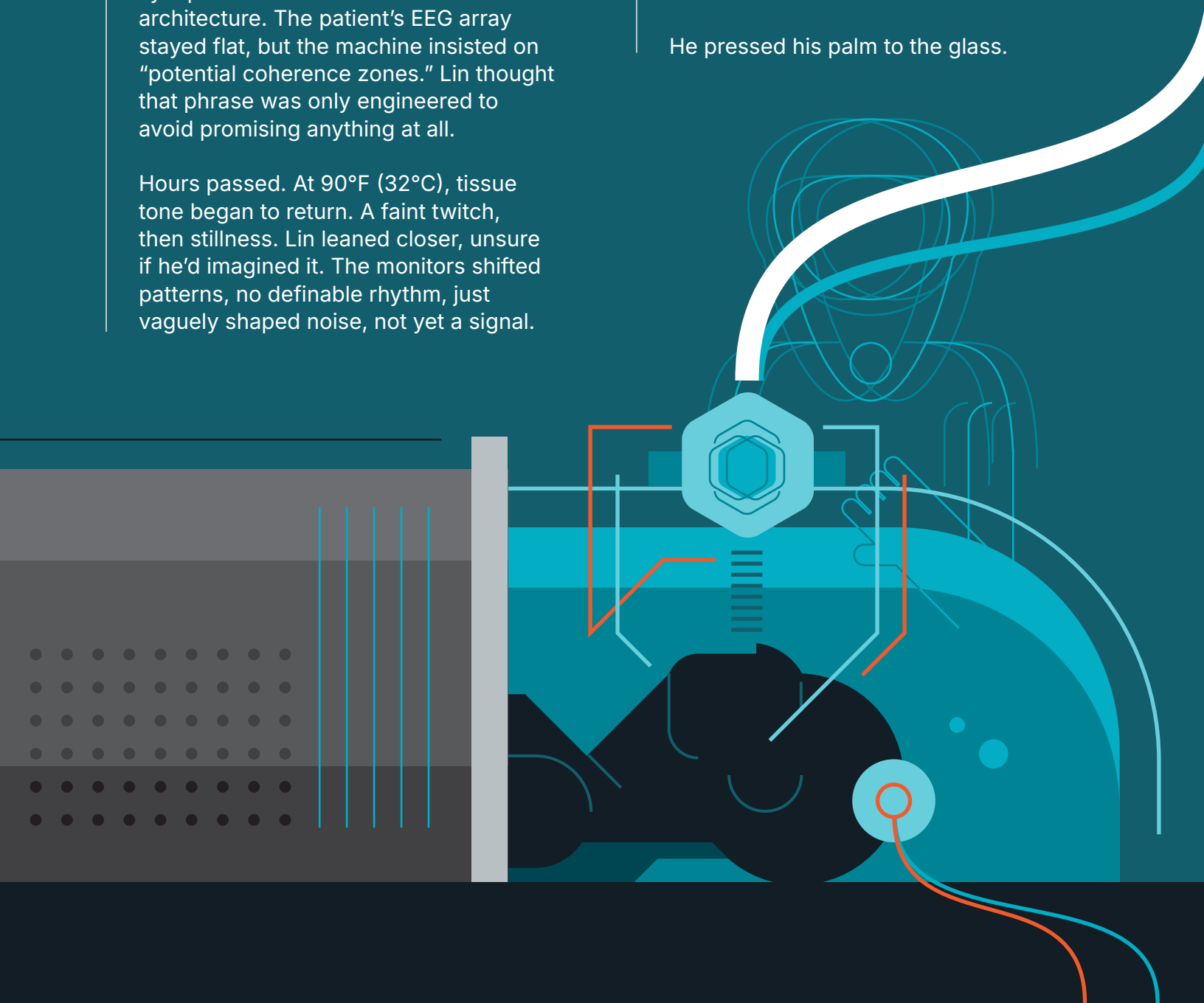
At 46°F (8°C), neural rehydration cycles began. The quantum-phase device flickered as it attempted to coax vitrified synapses back into a workable architecture. The patient's EEG array stayed flat, but the machine insisted on "potential coherence zones." Lin thought that phrase was only engineered to avoid promising anything at all.

Hours passed. At 90°F (32°C), tissue tone began to return. A faint twitch, then stillness. Lin leaned closer, unsure if he'd imagined it. The monitors shifted patterns, no definable rhythm, just vaguely shaped noise, not yet a signal.

Lin exhaled shakily. The protocol required him to record the outcome as inconclusive and alert the oversight board. The supervisory unit awaited human confirmation—it was protocol. But he kept watching the patient's face, the faint rise and fall of reconstructed respiration, the eyes that remained closed but not lifeless. He couldn't put it as inconclusive, not yet.

Was this flicker a step toward consciousness? A reflex? A machine artifact?

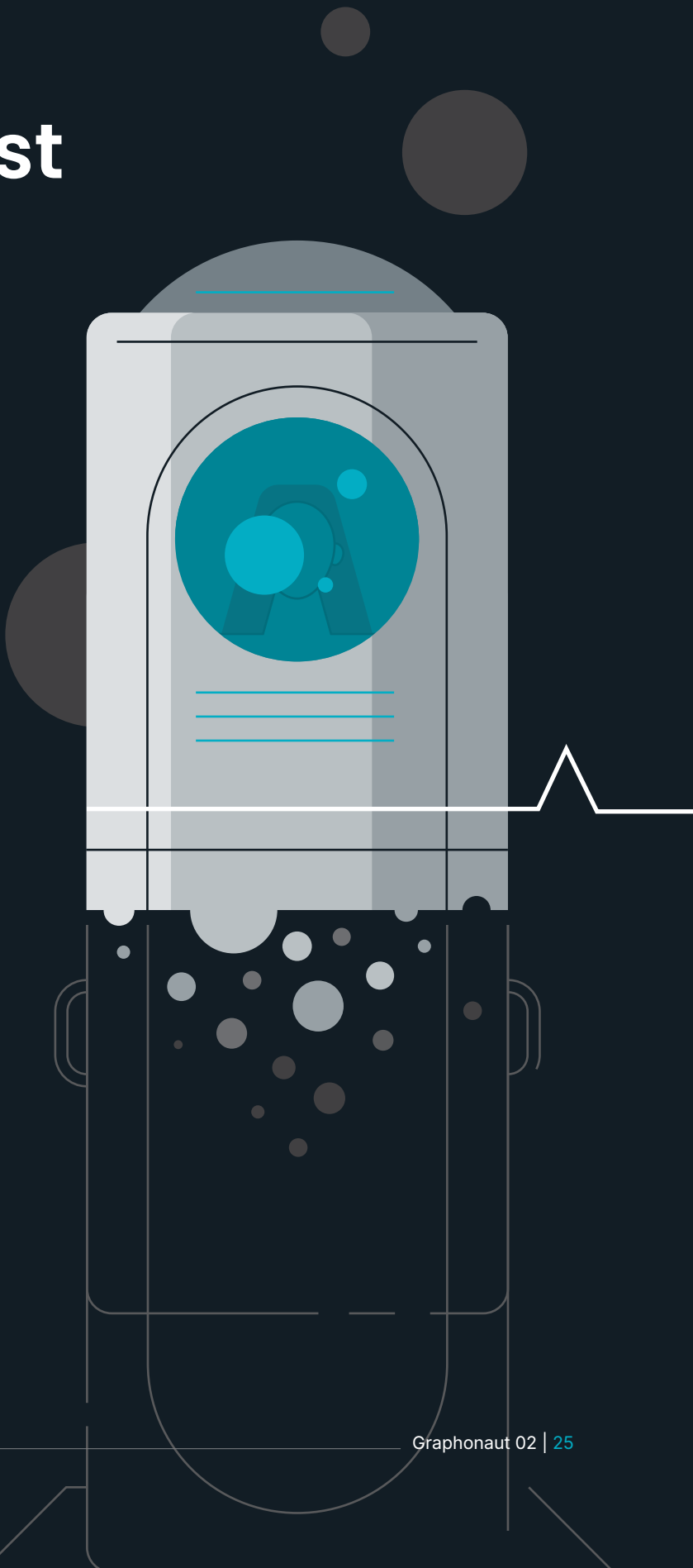
He pressed his palm to the glass.



WHAT'S NEXT

More Than Just a Dream?

Cryonics sits at the edge of science and science fiction. It's a field driven as much by hope as by biology. Its promise is enormous: the possibility that future medicine could repair today's incurable damage and even revive those considered beyond saving.



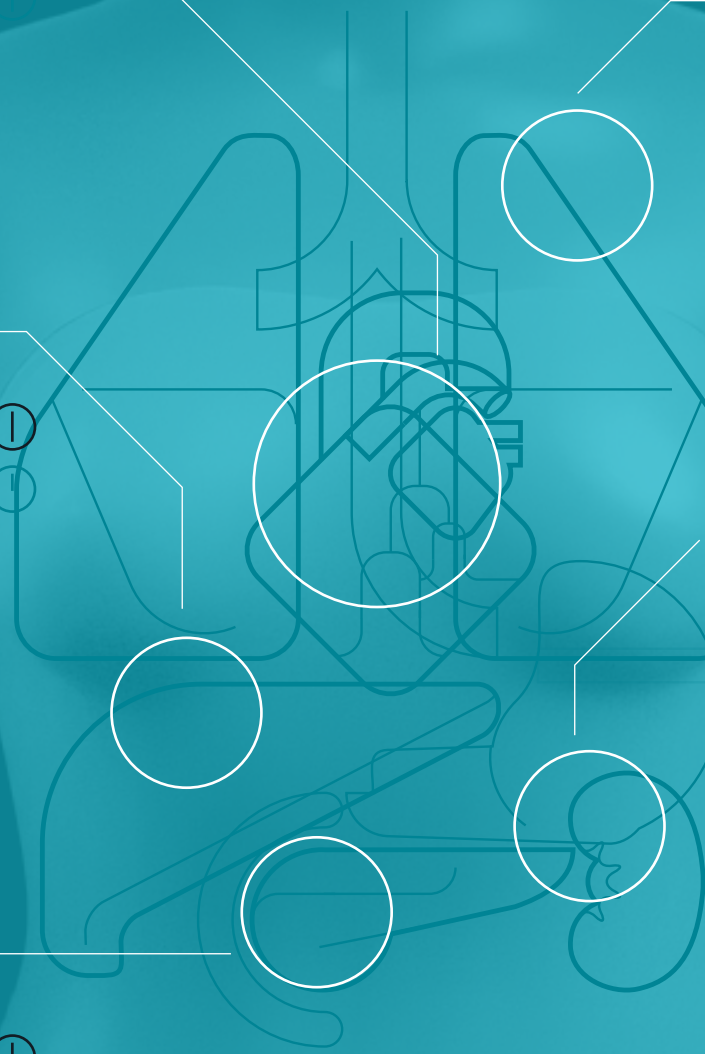
But that promise is paired with deep uncertainty. No organism has ever been revived from true cryonic preservation, and the technology needed to do so may remain out of reach for decades... or forever.

As ice crystals, cellular rupture, and currently unknown long-term chemical changes accumulate, each patient becomes a bet placed on a future humanity that may or may not have the tools or the will to help them. Ethical dilemmas loom, too: Who gets revived, who pays for it, and what kind of society would they be returning to?

Cryonics challenges our belief that death is final but poses a lot of interdisciplinary questions. In the end, the real question is not just whether cryonics can work but what it means if one day it finally does work—and whether humanity will be ready for the people who awaken.

HOW LONG ORGANS CAN SURVIVE OUTSIDE THE BODY

Even with modern preservation techniques, most human organs remain viable for only a few hours outside the body, while cells and embryos can be preserved for decades through freezing methods.



HEART

4–6 HOURS

~4–6 hours at ~39°F (~4°C / 277 K) using perfusion solutions.

LIVER

12 HOURS

Up to 12 hours in traditional cold storage or up to 24 hours in experimental cryopreservation with machine perfusion.

PANCREAS

8–12 HOURS

About 8–12 hours in cold storage before transplantation to maintain optimal graft viability.

LUNGS

6–8 HOURS

About 6–8 hours in cold storage before transplantation using standard preservation methods.

KIDNEY

12–24 HOURS

~12–24 hours in tatic cold storage.

CELLS

in research preserved long-term: decades (frozen cell lines from the 1960s are still viable)

HUMAN EMBRYOS

at least **30 YEARS**



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THE FUTURE OF FOOD



Edible Insects

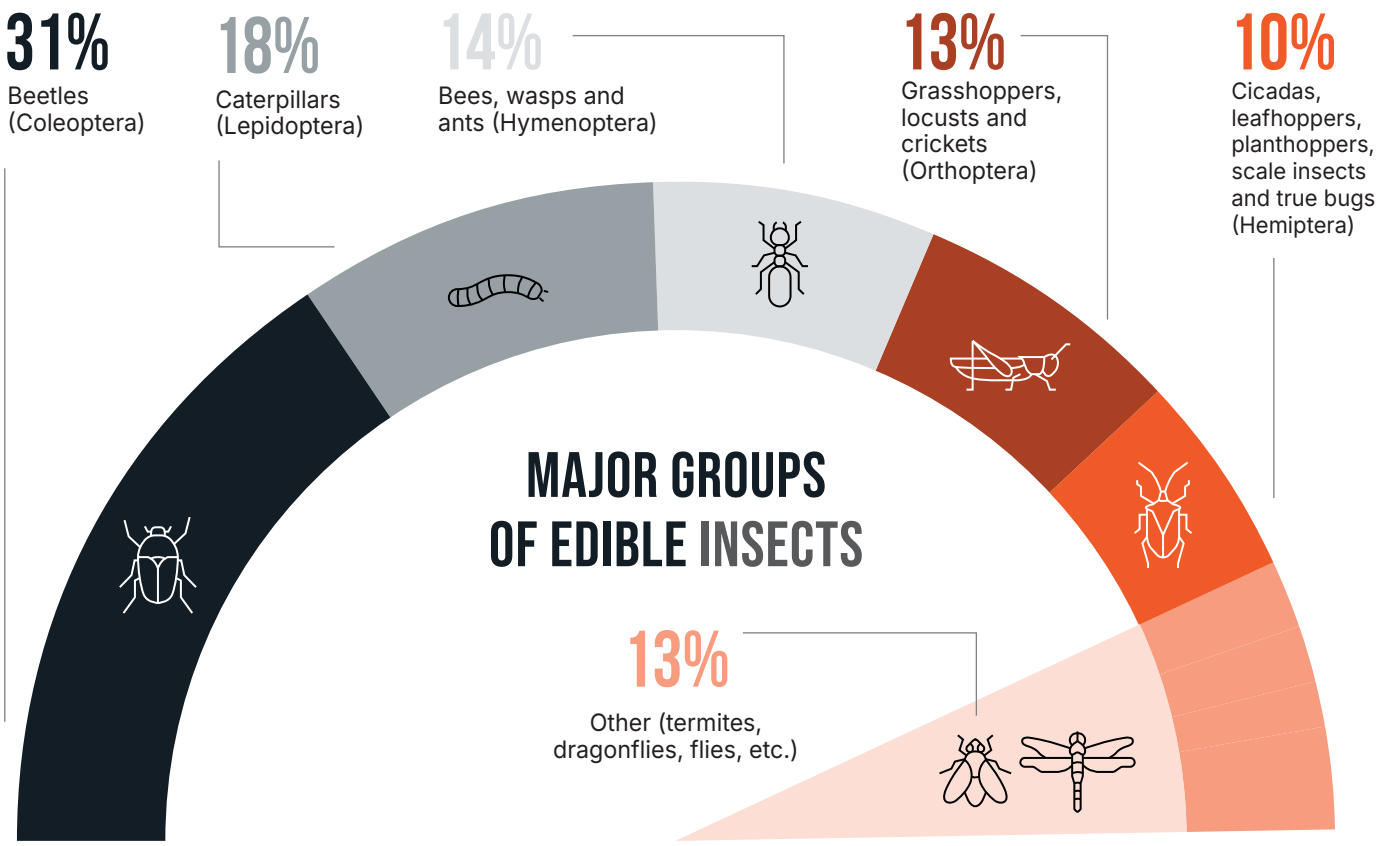
Fried insects, anyone? While it might sound strange to some, edible insects are quickly gaining recognition as a sustainable and highly nutritious food source.

2B

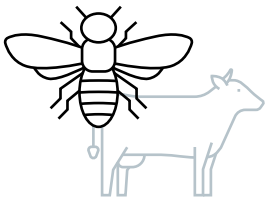
At least 2 billion people are believed to include insects as a component of their traditional diets.

1900

Over 1900 species of insects have been consumed as food.



Written by Kristina Glodić



Edible insects offer a more efficient and eco-friendly alternative. They require far fewer resources to raise and produce significantly lower greenhouse gas emissions.

Scientists are increasingly sounding the alarm about the limitations of current food systems. As the global population rises and environmental pressures mount, traditional food systems are struggling to keep up. Conventional livestock farming consumes massive amounts of land, water, and feed, placing significant strain on ecosystems.

In contrast, edible insects offer a more efficient and eco-friendly alternative. They require far fewer resources to raise and produce significantly lower greenhouse gas emissions.

According to Global Market Insights, insects grow rapidly and convert feed into protein more efficiently than cattle or poultry. They're also packed with essential nutrients, offering high levels of protein, healthy fats, fiber, and important vitamins and minerals.

From Food Novelty to Sustainable Staple

Why Eating Insects Makes Sense

Edible insects, long part of traditional diets, are now gaining global attention as a sustainable and nutritious food source.

While eating insects may seem like a new idea in some parts of the world, it's been a dietary staple in regions across Africa, Asia, and Latin America for centuries. Now, interest is growing in Western countries, as well, driven by increasing awareness of sustainability and food security.

A survey conducted by the International Platform of Insects for Food and Feed (IPIFF), which involved 3,000 participants from six EU countries, revealed growing curiosity about insect-based products. About 60% of those who tried them said they enjoyed the taste. The study also found that adults aged 25 to 44 were the most open to including insects in their diets. Taste, nutritional value, price, and environmental impact were the top factors influencing consumer attitudes.

Edible insects aren't just being served as novelty snacks anymore. They're being incorporated into everyday products, like protein powders, energy bars, pasta, baked goods, and meat alternatives.

Research has shown that insect-based ingredients can improve food texture and boost mineral content. Insects also contain bioactive compounds, such as antioxidants, anti-inflammatory agents, and insulin-regulating peptides, which may offer various health benefits, from reducing inflammation to lowering the risk of chronic diseases. In animal feed, insect protein is already being used as a sustainable alternative to soy and fishmeal in products for livestock, aquaculture, and pets.





Health

Insects serve as healthy and nutritious alternatives, providing ample protein and beneficial fats, to conventional staples like chicken, pork, beef, and even fish.



Environment

Insects raised for food produce significantly lower greenhouse gas emissions than most livestock, with far lower ammonia emissions as well.



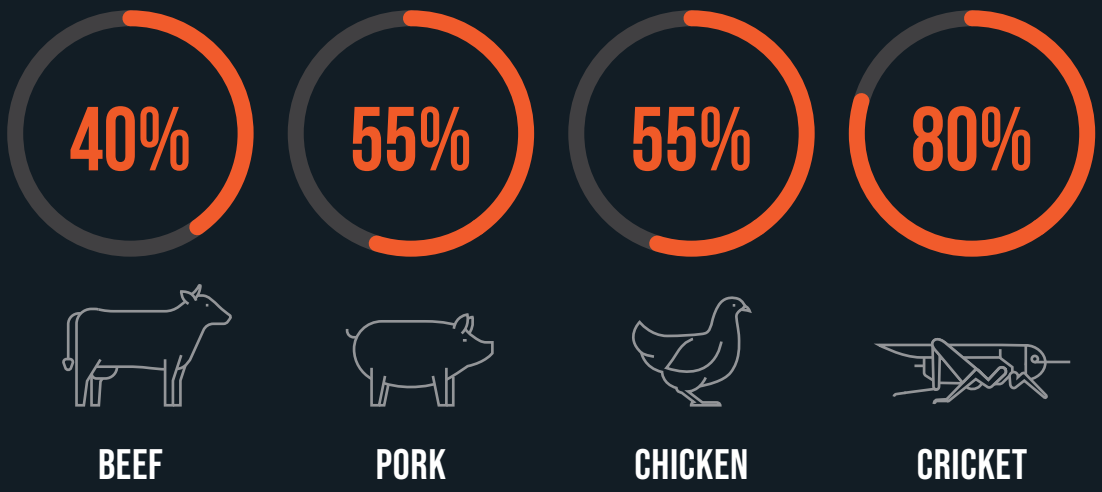
Livelihoods

Insect harvesting and rearing provide a low-tech and low-capital investment opportunity, enabling even the most economically disadvantaged segments of society to participate.

A COST-EFFICIENT ALTERNATIVE TO TRADITIONAL MEAT PRODUCTION

Insects are reported to emit fewer greenhouse gases and less ammonia than cattle or pigs, and they require significantly less land and water than cattle rearing.

■ The percentage of each animal that is edible



Feed-to-meat conversion rates (kg)

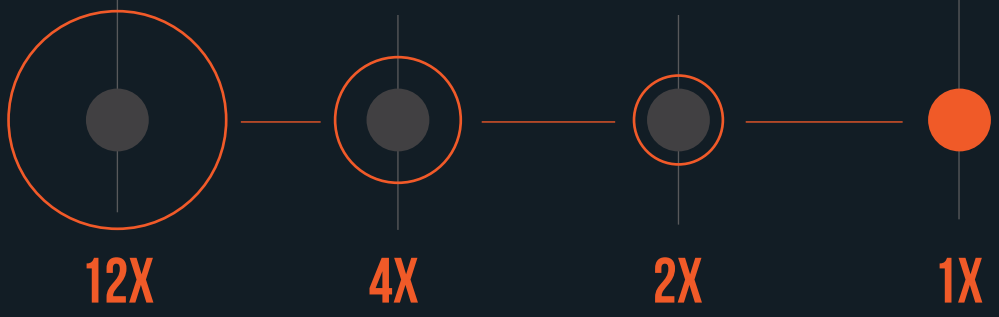
Based on a typical United States production system



Feed-to-meat conversion rates describe how much feed is required to produce a 1 kg increase in body weight, and they vary significantly depending on the animal and production system.

Relative efficiency (crickets vs. livestock)

Based on the same amount of edible mass



Crickets require significantly less feed to produce the same amount of edible mass—up to 12× less than cattle—thanks to their cold-blooded biology.

Barriers to Insect Consumption



Disgust factor

Entomophagy is generally regarded with disgust by individuals in the majority of Western countries. The concept of consuming insects is met with significant reluctance, as many perceive it to be linked with primitive behavior.



Unclear regulations

Both nationally and globally, there is a scarcity of clear standards and regulations that acknowledge the utilization of insects as ingredients for food and feed.



High price / Low demand

Insufficient consumer and buyer awareness regarding existing markets results in diminished demand. Insect products are currently substantially more expensive than regular meat products.

Future Perspectives



Rising awareness

Education is pivotal in raising public awareness and shaping positive consumer perspectives on insects as food and feed. It is important to convince consumers that eating insects is not only beneficial for their health but also for the planet.



Legal framework

Establish a comprehensive and well-defined global legal framework that fosters increased investment, enabling the full development of production and trade in insect-based products for food and feed.



Protein revolution

In the future, rising animal protein prices may position insects as a cost-effective alternative to conventionally produced meat. In addition, insect-based foods offer a sustainable and efficient solution to meet the rising protein demands of the growing global population in the 21st century.

The Trajectory of the Edible Insect Market

With all these advantages, the edible insect market is expected to grow rapidly. Market projections estimate an annual growth rate of over 47% between 2023 and 2032.

Europe currently leads in regulating insect-based foods, setting high safety and quality standards. Many of the world's largest insect farming companies are based there, creating thousands of jobs and driving innovation. Other regions — including North and South America, Asia, and Australia — are also building frameworks to support this emerging industry.

As awareness spreads and global food systems evolve, edible insects could move from an exotic curiosity to a regular item on dinner plates worldwide.



HEALTH AND SAFETY CONSIDERATIONS

Allergenicity and Microbial Risks

While edible insects offer clear sustainability benefits, they also come with certain health and safety considerations. One of the main concerns is allergenicity. People with shellfish allergies, for example, may experience cross-reactions because insects contain similar proteins, such as tropomyosin. Insects can also carry microbial hazards, including bacteria and parasites, which makes proper heat treatment and strict hygiene during production essential for safe consumption.

Chemical Risks and Nutritional Variability

There are also potential chemical risks. Some insect species can accumulate heavy metals, such as cadmium and arsenic, if their feed is contaminated. In addition, the nutritional composition of insects can vary significantly depending on their diet and stage of development, which can complicate labeling and regulation. Addressing these issues will require standardized farming practices and clear guidance for consumers to ensure insects can be safely incorporated into the human diet.

Graphoverse

INFOGRAPHIC
INSIGHTS

Longer Life in Zoos



50
Zoo

33
Wild

50

Chimpanzees in zoos can live around 50 years, while those in the wild live about 33 years on average.

Animals in zoos often live longer because they receive regular food, veterinary care, and protection from predators. In the wild, injuries, disease, and food shortages can shorten their lifespan. Yet this longer life also comes with a trade-off: instead of roaming large natural habitats, zoo animals spend their lives in confined spaces that can never fully replicate the complexity of their natural environments.

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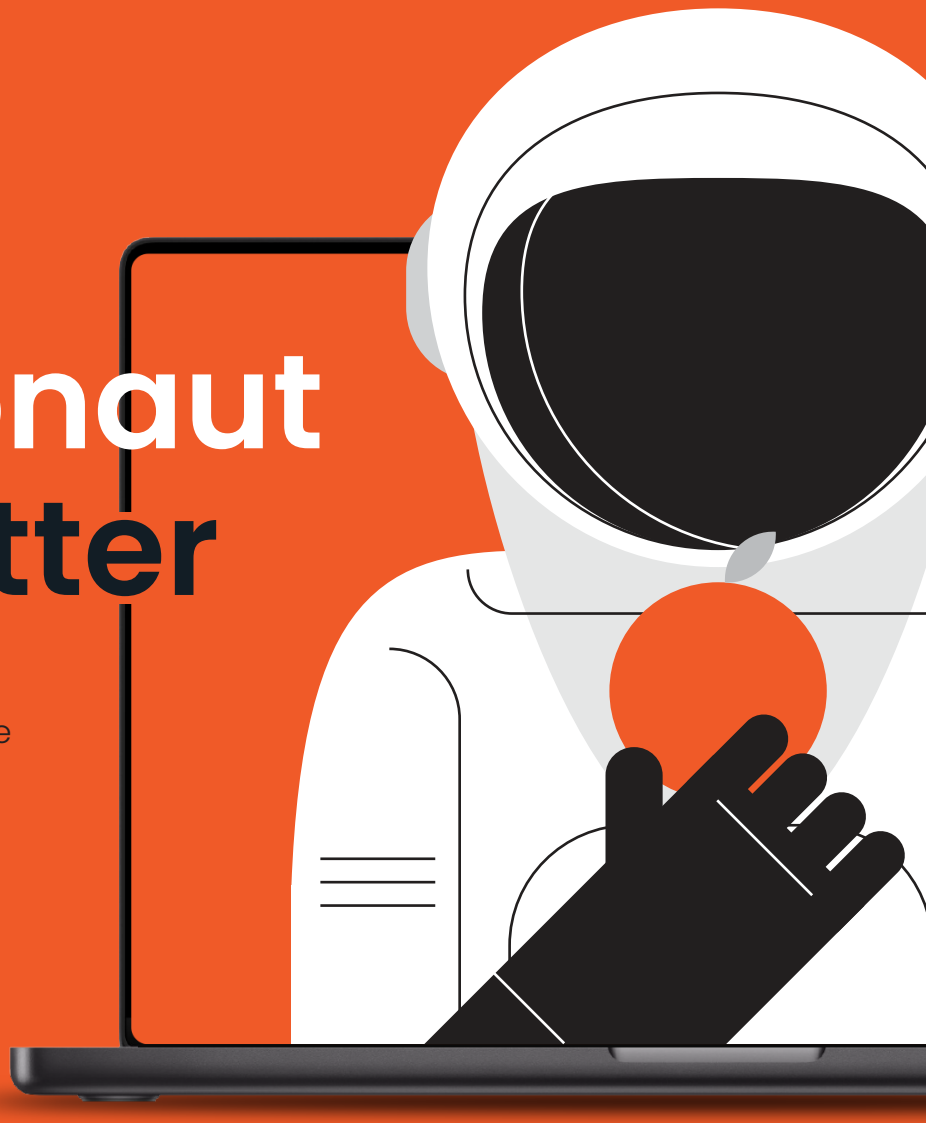
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