Maximising the impact of published research

Ruth Francis

Nature Publishing Group

Nature's Mission Statement

First, to serve scientists through prompt publication of significant advances in any branch of science, and to provide a forum for the reporting and discussion of news and issues concerning science.

Second, to ensure that the results of science are rapidly disseminated to the public throughout the world, in a fashion that conveys their significance for knowledge, culture and daily life.

How do we do it?

- The *Nature* press site
- Press releases
- Providing access to full research papers
- Communication with authors, journalists other press offices
- Preempting controversy
- Preempting what media will want

The Nature Press Site

- Database of our media contacts
- Press releases
- Papers
- Supplementary Information
- News and Views
- Images
- Video
- Audio files
- Institution/Funder press releases

Confinement of antihydrogen for 1,000 seconds

DOI: 10.1038/nphys2025

Atoms made of a particle and an antiparticle are unstable, usually surviving less than a microsecond. Antihydrogen, made entirely of antiparticles, is believed to be stable, and it is this longevity that holds the promise of precision studies of matter–antimatter symmetry.

We have recently demonstrated trapping of antihydrogen atoms by releasing them after a confinement time of 172ms. A critical question for future studies is: how long can anti-atoms be trapped? Here, we report the observation of anti-atom confinement for 1,000 s, extending our earlier results by nearly four orders of magnitude. Our calculations indicate that most of the trapped anti-atoms reach the ground state.

Further, we report the first measurement of the energy distribution of trapped antihydrogen, which, coupled with detailed comparisons with simulations, provides a key tool for the systematic investigation of trapping dynamics. These advances open up a range of experimental possibilities, including precision studies of charge–parity–time reversal symmetry and cooling to temperatures where gravitational effects could become apparent.

Upping the anti

DOI: 10.1038/nphys2025

The creation, trapping and storage of antihydrogen atoms for up to 1,000 seconds is reported online in *Nature Physics* this week. This achievement not only represents the longest time period so far that antihydrogen has been captured, but it also brings us closer to answering the question: 'Do matter and antimatter obey the same laws of physics?'

Antimatter particles are routinely produced in particle accelerators as well as in space, but holding onto them, particularly the neutral ones, is the main difficulty. This is because antimatter and matter will annihilate on contact and conventional containers are made of matter. The ALPHA collaboration at CERN demonstrated last year that they could instead use a magnetic trap to capture antihydrogen particles, and managed to store them for 172 milliseconds. The team now increase that period by more than 5,000-fold, meaning that the antihydrogen atoms have time to reach their ground state, rather than only existing in the highly excited states created by previous experiments, in which they are quickly annihilated. Such long storage times allowed the first measurements of the characteristics of trapped anti-atoms, which provide information about the formation dynamics of antihydrogen atoms and their kinetic energy distribution.

Improved traps will potentially provide plenty of interaction time for future experiments to probe the anti-atoms' quantum nature with lasers or microwaves, or to cool them down to study the gravitational effects on antimatter.

What was the strategy?

- Work with authors and press officers
- Press briefing under embargo – telephone
- CERN website updated as paper published
- Twitter feeds and responding to comments
- Facebook group posting and responding to comments

Compartir

Recommend 760

Twittear 131

FÍSICA | Experimento del CERN

Atrapan la antimateria que movía la nave de Star Trek

La nave 'Enterprise', dirigida por **el capitan Kirk en la ya clásica serie de ciencia ficción Star Trek**, se impulsaba gracias a la energía proporcionada por la antimateria presente en el Universo. Es sólo ciencia ficción, porque en la realidad la antimateria es, cuanto menos, difícil de encontrar.

Sin embargo, el experimento Alpha del acelerador de partículas del CERN ha conseguido **atrapar átomos de antimateria durante más de 1.000 segundos** (16 minutos): el tiempo suficiente para empezar a estudiar sus propiedades en detalle. El hallazgo ha sido publicado en la revista 'Nature Physics'.

SCIENTISTS have successfully stored anti-matter for a record 16 minutes.
Boffins at the European nuclear research facility, CERN, created 300 atoms of anti-hydrogen and stopped them from imploding for more than quarter of an hour. This is 5,000 times longer than they had previously managed to bottle the elusive substance.
The feat is so incredible because anti-matter is destroyed as soon as it comes into contact with its nemesis, matter - which is anything known to man, even thin air.

It is hoped the anti-matter might help physicists increase their understanding of the nature and origins of the universe.

De novo cardiomyocytes from within the activated adult heart after injury

DOI:10.1038/nature10188

A significant bottleneck in cardiovascular regenerative medicine is the identification of a viable source of stem/progenitor cells that could contribute new muscle after ischaemic heart disease and acute myocardial infarction. A therapeutic ideal—relative to cell transplantation—would be to stimulate a resident source, thus avoiding the caveats of limited graft survival, restricted homing to the site of injury and host immune rejection. Here we demonstrate in mice that the adult heart contains a resident stem or progenitor cell population, which has the potential to contribute bona fide terminally differentiated cardiomyocytes after myocardial infarction. We reveal a novel genetic label of the activated adult progenitors via re-expression of a key embryonic epicardial gene, Wilm's tumour 1 (*Wt1*), through priming by thymosin β4, a peptide previously shown to restore vascular potential to adult epicardium-derived progenitor cells with injury. Cumulative evidence indicates an epicardial origin of the progenitor population, and embryonic reprogramming results in the mobilization of this population and concomitant differentiation to give rise to *de novo* cardiomyocytes. Cell transplantation confirmed a progenitor source and chromosome painting of labelled donor cells revealed transdifferentiation to a myocyte fate in the absence of cell fusion. Derived cardiomyocytes are shown here to structurally and functionally integrate with resident muscle; as such, stimulation of this adult progenitor pool represents a significant step towards resident-cell-based therapy in human ischaemic heart disease.

Stem cells: Mending a broken heart (AOP) *PRESS BRIEFING*

DOI: 10.1038/nature10188

A small peptide can boost the formation of new heart muscle cells (cardiomyocytes) after a heart attack, according to research in mice published this week in *Nature*. These findings indicate that resident progenitor cells can be encouraged to differentiate into cardiomyocytes after heart damage and may have important implications for cardiovascular regenerative medicine.

One of the biggest hurdles for effective cell-based therapy in cardiovascular regenerative medicine is the identification of an appropriate source of resident cells that can give rise to functional cardiomyocytes. Thymosin b4, previously shown to encourage regrowth of blood vessels and improve heart function after injury in mice, can activate progenitor cells that could differentiate into new cardiomyocytes, Paul Riley and colleagues report. Evidence suggests that these progenitor cells might be derived from the epicardium — the outer layer of heart tissue. However, the researchers can not entirely rule out a contribution from a non-epicardial source.

The new cardiomyocytes structurally and functionally integrate with resident muscle and could potentially replace damaged muscle following a heart attack. Stimulation of a progenitor pool as shown by Riley and co-workers could prove valuable in the development of resident-cell-based therapy in human ischaemic heart disease.

What was the strategy?

- British Heart Foundation made online video
- Broadcasters assisted with patient interviews/filming in the lab
- Press briefing – in London
- Two authors talk at Science Festival as paper published
- Tweets
- Press release
- Facebook group posting and responding to comments

Corazones reparados por células madre

Logran regenerar tejido cardiaco dañado tras un infarto en un experimento con ratones

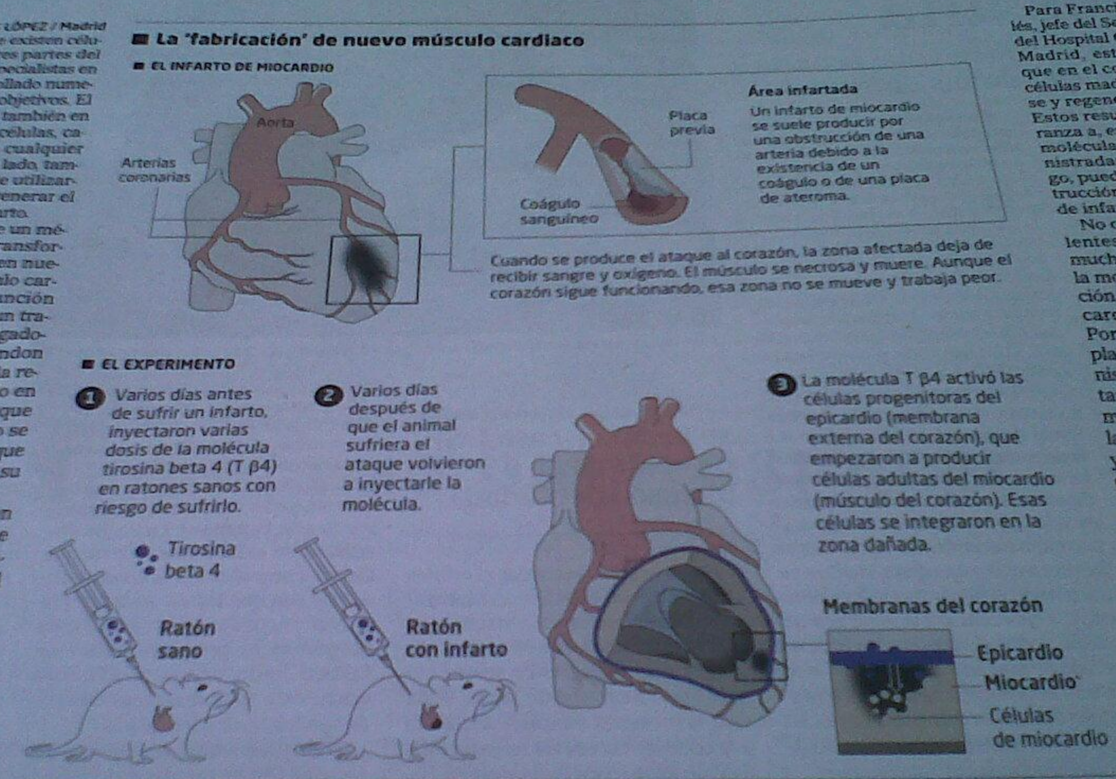
ÁNGELES LÓPEZ / Madrid

Desde que se sabe que existen células madre en diferentes partes del cuerpo humano, los especialistas en cardiología han desarrollado numerosos estudios con dos objetivos. El primero, demostrar que también en el corazón existen esas células, capaces de convertirse en cualquier otro tipo celular. Por otro lado, también buscan una forma de utilizarlas como terapia para regenerar el tejido cardiaco tras un infarto.

En definitiva, se persigue un método eficaz y seguro que transforme esas células primarias en nuevos componentes del músculo cardiaco para restablecer la función de la zona infartada. Ahora un trabajo, desarrollado por investigadores del University College London (Reino Unido) y publicado en la revista Nature, parece haber dado en el clavo de esa búsqueda. Aunque de momento los resultados sólo se han probado en ratones, por lo que habrá que esperar años para ver su uso en humanos.

Estos científicos se centraron en las células madre del epicardio, que se encuentran en la membrana externa que recubre al corazón. En el

Se 'fabricó' nuevo músculo cardiaco con células de los propios animales



FUENTE: Nature. EL MUNDO

...ón, son capaces de transformarse en otras especializadas. Sin embargo, parece que cuando nos hacemos adultos ya no pueden dar lugar a otras células. Por ... que no existían en ... El logro de este equipo ...

molécula llamada timosina beta 4 (TB4) en corazones sanos de ratones adultos y luego volvieron a inocular varias dosis de recuerdo en los ratones que sufrieron un infarto. Esta sustancia desencadenó la activación de las células madre del epicardio, que comenzaron a transfor-

lo cardiaco y a integrarse con el resto de compañeras sanas.

«Nuestras investigaciones anteriores probaron que era posible regenerar vasos sanguíneos en corazones adultos, pero teníamos dudas de si ocurriría lo mismo en el músculo cardiaco. Este trabajo ha-

ra reparar corazones dañados por un infarto y podría tener un mayor impacto en futuras terapias orientadas a tratar la insuficiencia cardiaca», explica el catedrático Paul Riley, del Instituto de Salud Infantil del UCL y principal autor del estudio, patrocinado por la Funda-

Para Francisco Fernández-Avilés, jefe del Servicio de Cardiología del Hospital Gregorio Marañón de Madrid, este estudio «confirma que en el corazón adulto existen células madre que pueden activarse y regenerar el tejido destruido. Estos resultados abren una esperanza a, en el futuro, poder utilizar moléculas activadoras que, administradas a pacientes de alto riesgo, puedan evitar o atenuar la destrucción de tejido cardiaco en caso de infarto».

No obstante, a pesar de los excelentes resultados, todavía queda mucho trabajo por delante. Aunque la molécula TB4 permitió la forma-ción de células adultas del múscul... cardiaco, su número fue limitad... Por este motivo, los investigador... planean seguir estudiando el me...nismo por el que funciona esta ...tancia para desarrollar un mé... más eficaz de transformar las ...las madre en células especial... y tener una alternativa que ...da trasladar a los humanos.

A esas limitaciones hay ... los posibles riesgos. «Si e... cula es capaz de transfo... células madre en otras ...

Futuros traba... deben descar... riesgo de que... generen tum...

podría ocasionar ... lo principal ahor... seguridad farm... molécula. Todo... da por delante... un marco de ... de llevar ... traslado al ...

THE TIMES
Leading Articles

Cheltenham's Science Fare

Among scientists, if you're not part of the solution you're part of the precipitate

June 9 2011 12:01AM

If you were to judge solely from a knowledge of television commercials, you'd think that the most dramatic scientific breakthroughs being made in the world today are being made in the fields of three-in-one dishwasher tablet technology and automated room air-freshener delivery systems.

But papers presented at *The Times* Cheltenham Science Festival this week show that Britain still teems with the sort of scientists who gleefully hum Tom Lehrer's *The Elements* to themselves while they stare at a Petri dish of microbes that they hope will evolve into something interesting before 2014.

Some of the findings promise huge hope. Paul Riley, of University College London, yesterday explained how his team had shown for