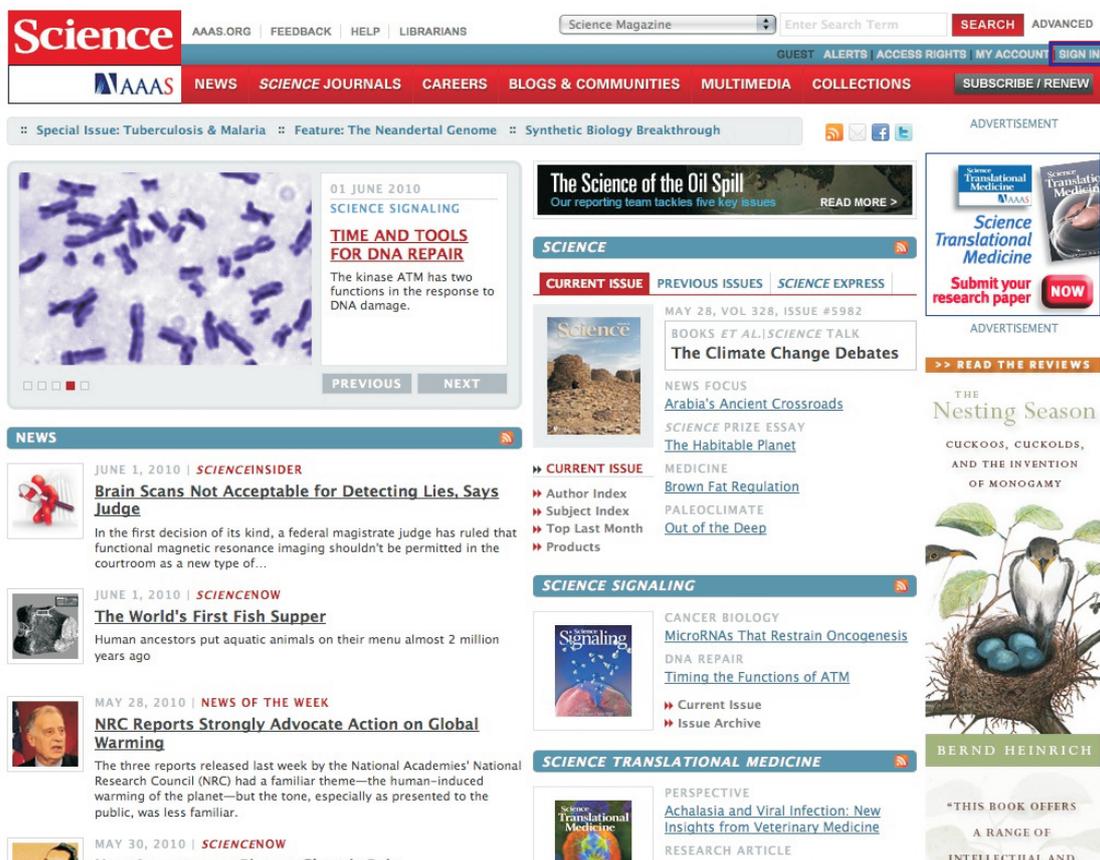


Guía del Usuario

Guía Rápida



1. Ingrese en el sitio web <http://www.sciencemag.org/>
2. En la página de inicio haga clic en **Sign In** en la parte superior derecha para acceder a su cuenta personal. Algunas herramientas como salvar búsquedas, solicitar alertas, etc., sólo podrán ser usadas dentro de su cuenta personal. En el apartado 16 de esta guía encontrará los pasos para crearla.



The screenshot shows the Science AAAS website homepage. At the top, there is a navigation bar with the Science AAAS logo, a search bar, and links for AAAS.ORG, FEEDBACK, HELP, and LIBRARIANS. Below the navigation bar, there are several featured articles and sections. The main content area includes a featured article titled "TIME AND TOOLS FOR DNA REPAIR" with a date of 01 JUNE 2010. To the right, there is a section for "The Science of the Oil Spill" and a "CURRENT ISSUE" section for MAY 28, VOL 328, ISSUE #5982. The "CURRENT ISSUE" section lists various topics such as "Arabia's Ancient Crossroads", "The Habitable Planet", "Brown Fat Regulation", and "Out of the Deep". There is also a "SCIENCE SIGNALING" section and a "SCIENCE TRANSLATIONAL MEDICINE" section. The bottom of the page features a "NEWS" section with several articles, including "Brain Scans Not Acceptable for Detecting Lies, Says Judge" and "The World's First Fish Supper".

3. En la página de inicio puede realizar una **Búsqueda Simple**. Sólo ingrese el termino de búsqueda en la parte superior derecha. Del lado izquierdo se encuentra el menú de publicaciones, puede seleccionar la de su interés.



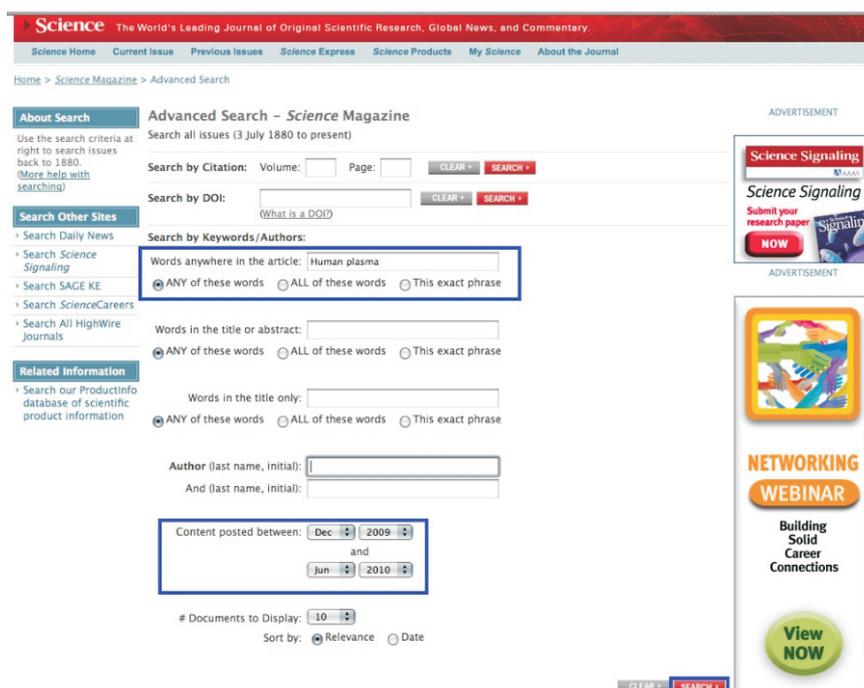
4. Haga clic en **Search** para ejecutar la búsqueda.



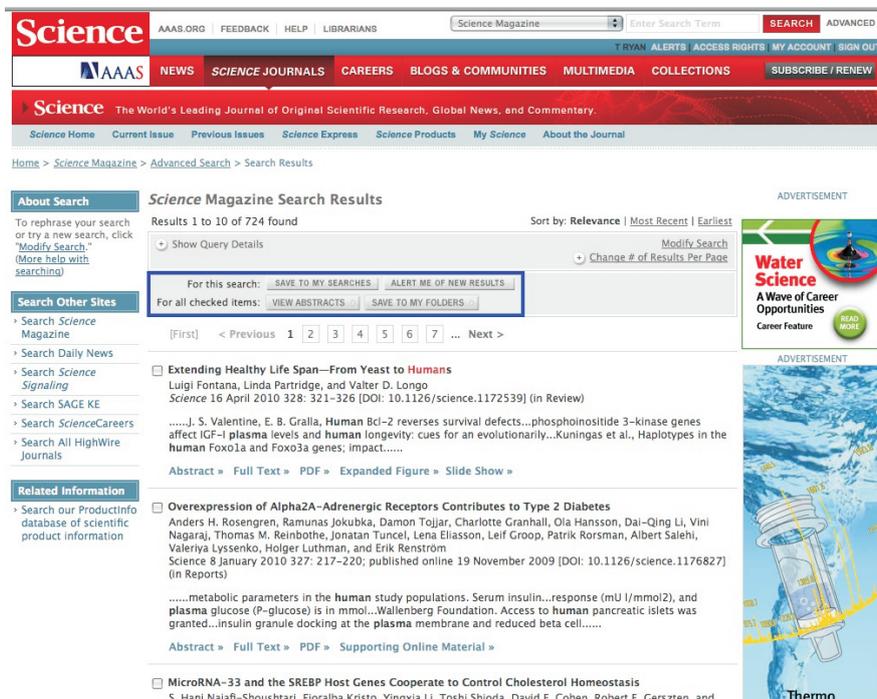
5. Haga clic en **Advanced**, junto al campo de **Búsqueda Simple**, para acceder a la página de **Búsqueda Avanzada**.



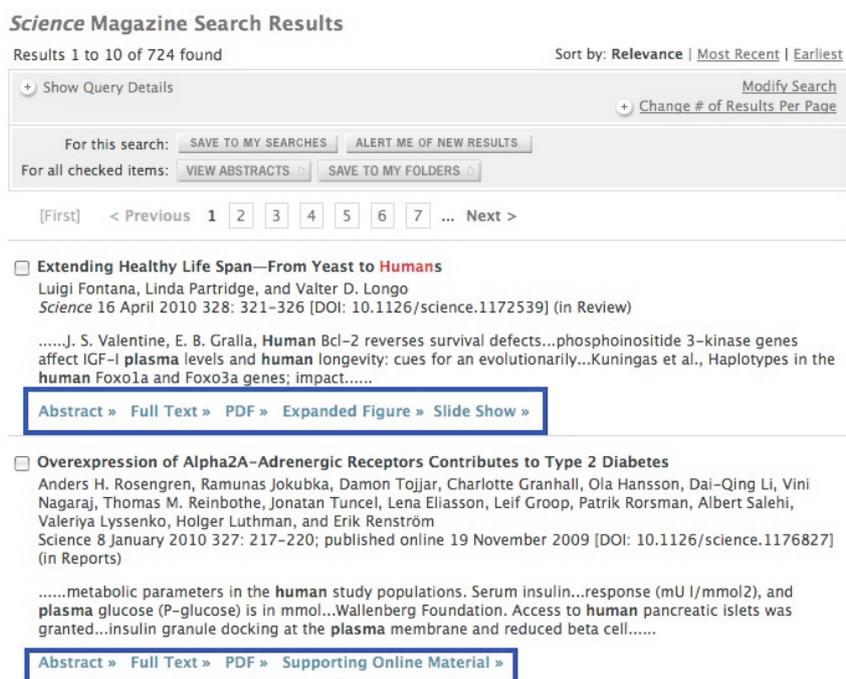
6. En la página de **Búsqueda Avanzada** ingrese el término de búsqueda o campo de interés, defina el período de tiempo y haga clic en **Search**.



7. En la página de resultados puede observar las herramientas para guardar las búsquedas, solicitar alertas, visualizar los Abstracts de los artículos seleccionados y guardar los mismos en su carpeta personal.



8. En la página de resultados haga clic en el enlace de interés para acceder a: **Abstract, Full Text, PDF o Supporting Online Material.**



9. En la página del artículo a texto completo en formato **HTML** se observan los hipervínculos para referencias y figuras.

Extending Healthy Life Span—From Yeast to Humans
Luigi Fontana,^{1,2,3} Linda Partridge,^{3,4} Valter D. Longo^{4,5}

When the food intake of organisms such as yeast and rodents is reduced (dietary restriction), they live longer than organisms fed a normal diet. A similar effect is seen when the activity of nutrient-sensing pathways is reduced by mutations or chemical inhibitors. In rodents, both dietary restriction and decreased nutrient-sensing pathway activity can lower the incidence of age-related loss of function and disease, including tumors and neurodegeneration. Dietary restriction also increases life span and protects against diabetes, cancer, and cardiovascular disease in rhesus monkeys, and in humans it causes changes that protect against these age-related pathologies. Tumors and diabetes are also uncommon in humans with mutations in the growth hormone receptor, and natural genetic variants in nutrient-sensing pathways are associated with increased human life span. Dietary restriction and reduced activity of nutrient-sensing pathways may thus slow aging by similar mechanisms, which have been conserved during evolution. We discuss these findings and their potential application to prevention of age-related disease and promotion of healthy aging in humans, and the challenge of possible negative side effects.

¹ Division of Geriatrics and Nutritional Science, Washington University School of Medicine, St. Louis, MO 63110, USA.
² Division of Nutrition and Aging, Istituto Superiore di Sanità, Rome, Italy.
³ Institute of Healthy Aging, and G.E.E., University College London, London WC1E 6BT, UK.
⁴ Andrus Gerontology Center and Department of Biological Sciences, University of Southern California, Los Angeles, CA 90089, USA.
⁵ E-mail: fontana@dom.wustl.edu (L.F.); l.partridge@ucl.ac.uk (L.P.); vlongo@usc.edu (V.D.L)

Aging is a complex process of accumulation of molecular, cellular, and organ damage, leading to loss of function and increased vulnerability to disease and death. Despite the complexity of aging, recent work has shown that dietary and genetic alterations can substantially increase healthy life span of laboratory model organisms (Fig. 1). Many of the mutations that extend life span decrease activity of nutrient-signaling pathways, such as the IGF (insulin-like growth factor)/insulin and the TOR (target of rapamycin) pathways, suggesting that they may induce a physiological state similar to that resulting from periods of food shortage. Indeed, dietary restriction, a reduction in food intake without malnutrition, extends life span of diverse organisms, including yeast, flies, worms, fish, rodents, and rhesus monkeys. The level of restriction usually ranges from 10 to 50% below the level in mammals

KEY ARTICLE POINTS
Nutrient-sensing pathways are central to the aging process.
Both dietary restriction -- a reduction of food intake without malnutrition -- and manipulation of nutrient-sensing pathways through mutations or drugs can increase life span and reduce age-related disease in several model organisms. These pathways are conserved during evolution.
Single-celled yeast provides a simple model system for studying aging.
The life span of yeast can be increased substantially through both dietary restriction and mutation or drugs. Reduced activity in two major nutrient-sensing pathways is involved.

10. Haga clic en una figura para visualizarla en un tamaño mayor y descárguela en su ordenador en formato **Power Point**. Para volver a la página del artículo, sólo tiene que seleccionar **Return to Article** en la parte inferior y superior de la figura.

Science The World's Leading Journal of Original Scientific Research, Global News, and Commentary.

Science Home Current Issue Previous Issues Science Express Science Products My Science About the Journal

Home > Science Magazine > 16 April 2010 > Fontana et al., pp. 321 - 326

[Return to article](#)

| | Life-span increase | | Beneficial health effects | |
|---------|---|---|---|--|
| | Dietary restriction | Mutations/drugs | Dietary restriction | Mutations/drugs |
| Yeast | 3-fold | 10-fold (with silencing DR) | Extended reproductive period | Extended reproductive period, decreased DNA damage/mutations |
| Worms | 2- to 3-fold | 10-fold | Resistance to misexpressed toxic proteins | Extended vitality Resistance to misexpressed toxic proteins and germ-line cancer |
| Flies | 2-fold | 60-70% | None reported | Resistance to bacterial infection, extended ability to fly |
| Mice | 30-50% in 100% in combination with DR) | 30-50% | Protection against cancer, diabetes, atherosclerosis, cardiomyopathy, subnormal kidney, and respiratory diseases; reduced neurodegeneration | Reduced tumor incidence; protection against age-dependent cognitive decline, cardiomyopathy, fatty liver and renal lesions. Extended insulin sensitivity |
| Monkeys | Trend noted | Not tested | Prevention of obesity; protection against diabetes, cancer, and cardiovascular disease | Not tested |
| Humans | Not determined | Not determined (DHR-deficient subjects reach old age) | Prevention of obesity, diabetes, hypertension. Reduced risk factors for cancer and cardiovascular disease | Possible reduction in cancer and diabetes |

Fig. 1 Experiments on dietary restriction (DR) and genetic or chemical alteration of nutrient-sensing pathways have been performed on a range of model organisms. The results differ widely, and little is known about the long-term effects in humans.

CREDITS: WIKIMEDIA COMMONS (YEAST), NIH (WORMS), THINKSTOCK (FLIES AND MICE), K. SUTLIFF (MONKEYS), JUPITERIMAGES (HUMANS)

[Download PowerPoint Slide for Teaching](#)

[PowerPoint download feature is available to paid individual subscribers and to registered users at subscribing institutions (register for free)]

ADVERTISEMENT

STAY PLUGGED IN

Archaeology on Arabian Peninsula and More

with Science PODCAST

ADVERTISEMENT

Introducing:

Science Translational Medicine

The new journal from AAAS & Science.

At the expanding intersection of basic science and clinical medicine.

Click Here for more information

11. En la página del artículo visualice el menú lateral izquierdo. Este contiene diversas herramientas para trabajar como acceder al texto completo, guardar, descargar una citación, compartir, etc.

Article Views

- > Abstract
- > Full Text (HTML)
- > Full Text (PDF)
- > Figures Only
- > Expanded Figure
- > Slide Show

Article Tools

- > Save to My Folders
- > Download Citation
- > Alert Me When Article is Cited
- > Post to CiteULike
- > E-mail This Page
- > Submit an E-Letter
- > Commercial Reprints and Permissions
- > View PubMed Citation

Related Content

Similar Articles In:

- > Science Magazine
- > PubMed

Search Google Scholar for:

- > Articles by Fontana, L.
- > Articles by Longo, V. D.

Science 16 April 2010:
Vol. 328, no. 5976, pp. 321 – 326
DOI: 10.1126/science.1172539

< Prev | Table of Contents | Next >

REVIEW

Extending Healthy Life Span—From Yeast to Humans

Luigi Fontana,^{1,2,4} Linda Partridge,^{3,2} Valter D. Longo^{4,2}

When the food intake of organisms such as yeast and rodents is reduced (dietary restriction), they live longer than organisms fed a normal diet. A similar effect is seen when the activity of nutrient-sensing pathways is reduced by mutations or chemical inhibitors. In rodents, both dietary restriction and decreased nutrient-sensing pathway activity can lower the incidence of age-related loss of function and disease, including tumors and neurodegeneration. Dietary restriction also increases life span and protects against diabetes, cancer, and cardiovascular disease in rhesus monkeys, and in humans it causes changes that protect against these age-related pathologies. Tumors and diabetes are also uncommon in humans with mutations in the growth hormone receptor, and natural genetic variants in nutrient-sensing pathways are associated with increased human life span. Dietary restriction and reduced activity of nutrient-sensing pathways may thus slow aging by similar mechanisms, which have been conserved during evolution. We discuss these findings and their potential application to prevention of age-related disease and promotion of healthy aging in humans, and the challenge of possible negative side effects.

¹ Division of Geriatrics and Nutritional Science, Washington University School of Medicine, St. Louis, MO 63110, USA.
² Division of Nutrition and Aging, Istituto Superiore di Sanità, Rome, Italy.
³ Institute of Healthy Aging, and G.E.E., University College London, London WC1E 6BT, UK.
⁴ Andrus Gerontology Center and Department of Biological Sciences, University of Southern California, Los Angeles, CA 90089, USA.
* E-mail: lfontana@dom.wustl.edu (L.F.); l.partridge@ucl.ac.uk (L.P.); vlongo@usc.edu (V.D.L)

12. En la pestaña **Science Journals** usted tendrá acceso a cada una de las publicaciones de la familia **Science**.

The screenshot shows the Science Journals website. At the top, there is a navigation bar with the Science logo, AAAS.ORG, FEEDBACK, HELP, LIBRARIANS, a search bar, and links for ADVANCED, T RYAN, ALERTS, ACCESS RIGHTS, MY ACCOUNT, and SIGN OUT. Below this is a secondary navigation bar with NEWS, SCIENCE JOURNALS, CAREERS, BLOGS & COMMUNITIES, MULTIMEDIA, COLLECTIONS, and SUBSCRIBE / RENEW. A breadcrumb trail shows Science > Science Journals > Science Journals.

The main content area is divided into several sections:

- About Our Sites:** Links to About Science, About ScienceNOW, About Science Signaling, About Science Translational Medicine, About Science Careers, About Multimedia, and About Collections.
- Alerts & Feeds:** Links to E-Mail Alerts, RSS Feeds, Author Index, Subject Index, Top Last Month, and Products.
- Recent Highlights:** Links to Arabia's Ancient Crossroads, Science Podcast, and More from Science.
- SCIENCE:** Features a 'CURRENT ISSUE' section with a cover image and a 'PREVIOUS ISSUES' section. A featured article is 'The Climate Change Debates' from the 'NEWS FOCUS' section. Other articles include 'Arabia's Ancient Crossroads' (NEWS FOCUS), 'The Habitable Planet' (SCIENCE PRIZE ESSAY), 'Brown Fat Regulation' (MEDICINE), and 'Out of the Deep' (PALEOCLIMATE).
- SCIENCE SIGNALING:** Features a 'CURRENT ISSUE' section with a cover image. A featured article is 'MicroRNAs That Restrain Oncogenesis' from the 'CANCER BIOLOGY' section. Other articles include 'DNA REPAIR' and 'Timing the Functions of ATM'.
- SCIENCE TRANSLATIONAL MEDICINE:** Features a 'CURRENT ISSUE' section with a cover image. A featured article is 'Achalasia and Viral Infection: New Insights from Veterinary Medicine' from the 'PERSPECTIVE' section. Other articles include 'Proteins Required for Centrosome Clustering in Cancer Cells' (RESEARCH ARTICLE).
- ADVERTISEMENTS:** Includes the '2010 Eppendorf & Science Prize for Neurobiology' and 'Complete Antibody Solution' by EPITOMICS.

13. En la página de cada una de las publicaciones se permite el acceso al contenido del número actual de la revista, las ediciones anteriores y las herramientas disponibles, como alertas y RSS.

Search the Journal

Vol#

Pg# **GO >**

Enter Keyword

Full text

GO >

Advanced >

Search HighWire Journals >

Science Magazine

The world's leading journal of original scientific research, global news, and commentary.

Current Issue >



Previous Issues >



Special: Visit our policy blog, [SciencInsider](#), and our evolution/Darwin blog, [Origins](#).

About the Journal

- > Staff and Editorial Board
- > How to Access
- > Free Sample
- > Order an Issue/Article
- > Reprints & Permissions
- > Magazine Help/FAQ
- > Join AAAS/Subscribe
- > Advertise in *Science*

Alerts & Feeds

- > E-mail Alerts
- > RSS Feeds

Contributing to Science

- > Information for Authors
- > Submit a Manuscript

RECENT HIGHLIGHTS



Arabia's Ancient Crossroads >
Arabia was perfectly positioned to be the linchpin of trade among the world's first great civilizations of Egypt, Mesopotamia, and the Indus.



The Habitable Planet >
An online course takes a systems approach to teaching environmental science.

- > BOOKS ET AL.: The Climate Change Debates (Plus: Online Discussion Forum)
- > PALEOCLIMATE: Out of the Deep
- > MEDICINE: Prion Strain Variation
- > PODCAST: Fairness During Adolescence, Arabia's Ancient Crossroads, and More

IN SCIENCE MULTIMEDIA

Science Podcast

In this week's show: How adolescents gauge fairness, Arabia's ancient crossroads, your letters to *Science*, and more

- > Listen to the 05/28 show [MP3]
- > Transcript of show

Special Feature: The Neandertal Genome

A presentation with video commentary highlights the sequencing and analysis of the Neandertal genome. [View the presentation.](#)

SCIENCE EXPRESS: Articles Published in Advance of Print

- > Structure of the Human BK Channel Ca²⁺-Activation Apparatus at 3.0 Å Resolution
- > Control of Membrane Protein Topology by a Single C-Terminal Residue

14. En la página de **Science Signaling** encontrará las mismas herramientas de **Science Magazine** y algunas más como **Connection Map, Resources, etc.**

Science Signaling The Signal Transduction Knowledge Environment

Sci. Signal Home

Issue Archive

Literature

Community

Resources

Database of Cell Signaling

My Science Signaling

About Science Signaling

Search Science Signaling

Enter Keyword

Full text

GO >

Advanced >

Call for Papers

> Submit a Research Article

Access to Science Signaling

Access to the full text of articles in Research, Perspectives, Reviews, Protocols, Presentations, Meeting Reports, and the Virtual Journal, and use of My Science Signaling personalization tools requires a Science Signaling subscription. All other Science Signaling features are available free with registration.

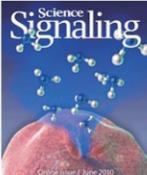
- > How to Access
- > Free Samples
- > Subscribe to Science Signaling

Alerts & Feeds

- > E-mail Alerts
- > RSS Feeds

My Science Signaling

In the Current Issue



Research Articles

EGF Decreases the Abundance of MicroRNAs That Restrain Oncogenic Transcription Factors
Roi Avraham, Aldema Sas-Chen, Ohad Manor, Israel Steinfeld, Reut Shalgi, Gabi Tarcic, Noa Bossel, Amit Zeisel, Ido Amit, Yaara Zwang, Espen Enerly, Hege G. Russnes, Francesca Biagioni, Marcella Mottolise, Sabrina Strano, Giovanni Blandino, Anne-Lise Børresen-Dale, Yitzhak Pipel, Zohar Yakhini, Eran Segal, and Yosef Yarden
[Editor's Summary](#) | [Abstract](#) | [Full Text](#) | [PDF](#) | [Supplementary Materials](#)

Transient ATM Kinase Inhibition Disrupts DNA Damage-Induced Sister Chromatid Exchange
Jason S. White, Sarah Choi, and Christopher J. Bakkenist
[Editor's Summary](#) | [Abstract](#) | [Full Text](#) | [PDF](#) | [Supplementary Materials](#)

Perspective

Ammonia: A Diffusible Factor Released by Proliferating Cells That Induces Autophagy
Guillermo Mariño and Guido Kroemer
[Abstract](#) | [Full Text](#) | [PDF](#)

ST NetWatch

Bioinformatics Resources
Website for Alternative Splicing Prediction (WASP)
[Description](#)

Protein Databases
Phospho.ELM
[Description](#)

Events

Plan your 2010 travel schedule with this list of cell signaling meetings, conferences, and workshops.
[Calendar](#)

Editors' Choice

01 June 2010 (Issue 124)

ADVERTISEMENT

Available in Print & Online



Subscribe Today!

ADVERTISEMENT

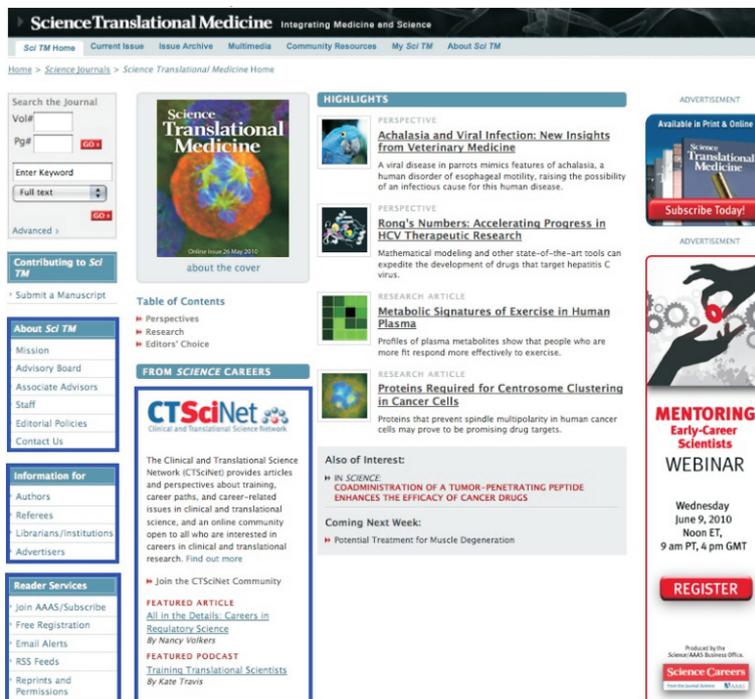




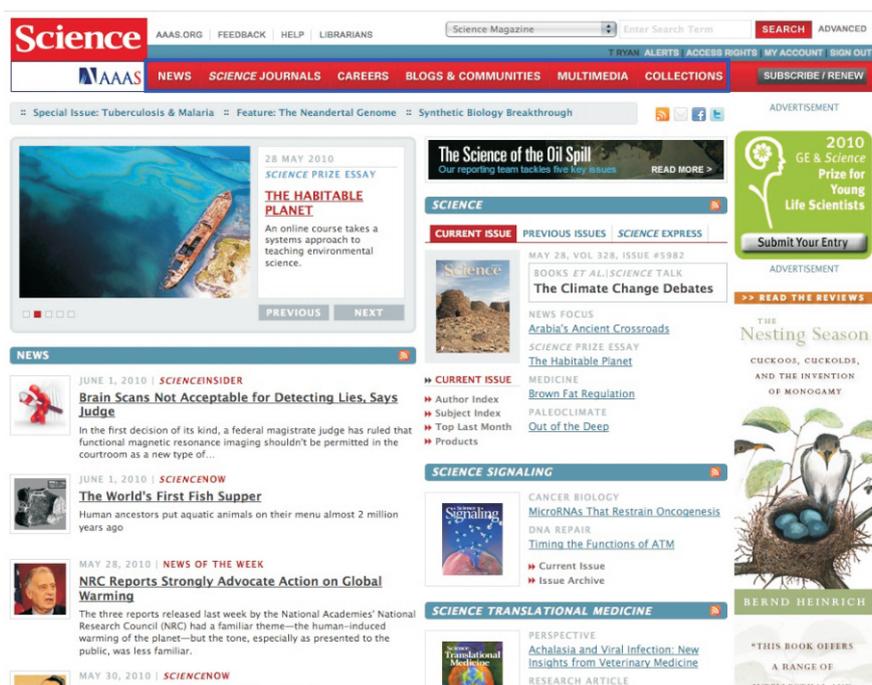
Presented by



15. En la página de **Science Translational Medicine** localizará las mismas herramientas disponibles en **Science Magazine**.



16. En la página principal es posible navegar por: **News, Careers, Blogs & Communities, Multimedia y Collections**. Todos cuentan con varios recursos.



17. En la página principal haga clic en **Subscribe/Renew** en la parte superior derecha. Posteriormente seleccione **Register for Free Access to Science** en el menú lateral derecho. A continuación aparecerá una nueva página en donde debe seleccionar la opción **Register** y completar el formulario.



18. En cualquier página de se **Science** haga clic en **My Science**, en el menú superior o lateral izquierdo. Aquí tendrá acceso a sus preferencias, alertas, búsquedas guardadas, etc.

