

HOME > SCIENCE ADVANCES > VOL. 11, NO. 11



SCIENCE ADVANCES

VOLUME 11 | ISSUE 11 | 14 MAR 2025

ONLINE COVER: A photo illustration showing the isothermal assembly of nucleic acid nanostructures (center triangle) using various metal salts (left). Created at a constant temperature, this process is similar to the sous vide method of cooking. Typical DNA self-assembly requires multi-step synthesis or steep temperature gradients. Rodriguez *et al.* show that specific metal ions... [VIEW MORE](#)

[< PREVIOUS](#) [ALL ISSUES](#) [NEXT >](#)

EDITORIAL

10 years of progress and change

BY LAURA REMIS, H. HOLDEN THORP • 12 MAR 2025

SOCIAL AND INTERDISCIPLINARY SCIENCES AND PUBLIC HEALTH

Privacy violations in election results

BY SHIRO KURIWAKI, JEFFREY B. LEWIS, MICHAEL MORSE • 12 MAR 2025

Voters' vote choices are rarely deducible even if cast vote records, indicating how every ballot cast was marked, are made public.

ABSTRACT

NEUROSCIENCE

Shaping early neural development by timed elevated tissue oxygen tension: Insights from multicomic analysis on human cerebral organoids

BY HUANG-HSIUAN LIU, MENG-TING CHANG, HSI-CHEN LIN, TSE-ANG LEE, YA-JEN CHENG, CHEN-CHANG HUANG, HSIAO-MEI WU, YI-CHENG TUNG • 12 MAR 2025

Multicomic analysis identifies critical roles of timed oxygen tension elevation on early neural development in cerebral organoids.

ABSTRACT

Thermosensory predictive coding underpins an illusion of pain

BY FILomenA GRAZIA ALVINO, SILVIA GINI, ANTEA MINETTI, MARCO PAGANI, DAVID SASTRE-YAGÜE, NOEMI BARSOZZI, ELIZABETH DE GUZMAN, CHARLES SCHLEIFER, ALEXIA STUEFER, LEILA KUSHAN, [...] ALESSANDRO GOZZI • +4 authors • 12 MAR 2025

Computational modeling reveals how uncertainty transforms harmless stimuli into perceptions of pain.

ABSTRACT

Synaptic-dependent developmental dysconnectivity in 22q11.2 deletion syndrome

BY FILOMENA GRAZIA ALVINO, SILVIA GINI, ANTEA MINETTI, MARCO PAGANI, DAVID SASTRE-YAGÜE, NOEMI BARSOZZI, ELIZABETH DE GUZMAN, CHARLES SCHLEIFER, ALEXIA STUEFER, LEILA KUSHAN, [...] ALESSANDRO GOZZI • +4 authors • 12 MAR 2025

Synaptic dysfunction underlies brain connectivity alterations in 22q11DS, a syndrome linked to neuropsychiatric disorders.

ABSTRACT

FlyVISTA, an integrated machine learning platform for deep phenotyping of sleep in *Drosophila*

BY MATHIEU F. KELES, ALI OSMAN BERK SAPICI, CASEY BRODY, ISABELLE PALMER, ANURADHA MEHTA, SHAHIN AHMADI, CHRISTIN LE, ÖZKAR TAŞTAN, SÖNDÜZ KELES, MARK N. WU • 12 MAR 2025

A machine learning platform identifies and characterizes the dynamics of microbehaviors during fly sleep.

ABSTRACT

Genetically supported targets and drug repurposing for brain aging: A systematic study in the UK Biobank

BY YAN YI, JING YUAN, JUDITH SOMERBY, MOR PELES, YI-CHENG ZHU, ZHONG JIA, FEI WU, ZHENGGUO HUANG • 12 MAR 2025

Uncovering genetic architecture, druggable targets, and repurposed drugs for brain aging.

ABSTRACT

Phagocytosis-driven neurodegeneration through opposing roles of an ABC transporter in neurons and phagocytes

BY XINCHEN CHEN, BEI WANG, ANKITA SARKAR, ZIXIAN HUANG, NICOLAS VERGARA RUIZ, ANN T. YEUNG, RACHAEL CHEN, CHUN-HAN • 12 MAR 2025

An ABC lipid transporter both protects neurons against phagocytes and enables phagocytes to attack and eat live neurons.

ABSTRACT

EARTH, ENVIRONMENTAL, ECOLOGICAL, AND SPACE SCIENCES

Active restoration of a long-lived octocoral drives rapid functional recovery in a temperate reef

BY YANIS ZENTNER, JOAQUIM GARRABOU, NÚRIA MARGARIT, GRACIELA ROVIRA, DANIEL GÓMEZ-GRAS, CRISTINA LINARES • 12 MAR 2025

After a decade, a community with restored red coral nears the functional structure of natural ones.

ABSTRACT

Seabirds in crisis: Plastic ingestion induces proteomic signatures of multiorgan failure and neurodegeneration

BY ALIX M. DE JERSEY, JENNIFER L. LAVERS, ALEXANDER L. BOND, RICHARD WILSON, GRAEME R. ZOSKY, JACK RIVERS-AUTY • 12 MAR 2025

Plastic consumption in seabirds causes blood signatures of widespread organ damage including brain, stomach, kidney, and liver.

ABSTRACT

Refugium amidst ruins: Unearthing the lost flora that escaped the end-Permian mass extinction

BY HUPPING PENG, WAN YANG, MINJIA WAN, JUN LIU, FENG LIU • 12 MAR 2025

The Taodonggou refugium helped the rapid establishment of a diverse terrestrial ecosystem after the end-Permian mass extinction.

ABSTRACT

Confronting Earth System Model trends with observations

BY ISLA R. SIMPSON, TIFFANY A. SHAW, PAULO CEPPY, AMY C. CLEMENT, ERICH FISCHER, KEVIN M. GRISE, ANGELINE G. PENDERGRASS, JAMES A. SCREEN, ROBERT C. J. WILLS, TIM WOOLLINGS, [...] STEPHEN PO-CHIELEY • +2 authors • 12 MAR 2025

The science of confronting Earth System Model trends with observations is reviewed, and future directions are discussed.

ABSTRACT

PHYSICAL AND MATERIALS SCIENCES

On-demand heralded MIR single-photon source using a cascaded quantum system

BY JAKE ILES-SMITH, MARK KAMPER SVENDSEN, ANGEL RUBIO, MARTIN WUBS, NICOLAS STENDER • 12 MAR 2025

Electron-phonon coupling enables heralded single-photon generation in the mid-IR.

ABSTRACT

A flexible pressure sensor array for self-powered identity authentication during typing

BY TONGTONG ZHANG, FARID MANSHAI, CHRIS R. BOWEN, MAOYI ZHANG, WEI QIAN, CHAOSENHONG HU, YANAN BAI, ZHILIE HUANG, YA YANG, JUN CHEN • 12 MAR 2025

A magnetoelectric intelligent keyboard utilizes personalized keystroke dynamics.

ABSTRACT

Enhanced activity and self-regeneration in dynamic cross-linked enzyme nanoaggregates

BY RUI WANG, SHANG WANG, JINGHUA CHEN, YAN XU, XIAOWEI YU, MIHAIL BARBOIU, YAN ZHANG • 12 MAR 2025

Dynamic polymers offer a promising platform for promoting and for restoring the activity of enzymes.

ABSTRACT

Strong interaction between plasmon and topological surface state in Bi₂Se₃/Cu_{2-x}S nanowires for solar-driven photothermal applications

BY YANG LIU, SHENFENG PAN, WENDI XIA, PINGLI QIN, WEI WANG, QINGBO LIU, XIANGBAI CHEN, LIANG MA, BLIND DING, QIQUAN WANG • 12 MAR 2025

Photothermal performance improved by strong interaction between plasmon resonance and topological surface state was demonstrated.

ABSTRACT

Oxygen-excluded nanoimaging of polymer blend films

BY DONGMIN LEE, UDON JEONG, DOORY KIM • 12 MAR 2025

An oxygen-excluded nanoimaging method enables nanoscale visualization of polymer by selectively labeling non-oxygen domains.

ABSTRACT

Liquid-bodied antibiofilm robot with switchable viscoelastic response for biofilm eradication on complex surface topographies

BY BONAN SUN, JUNJIA GUO, BO HAO, YANFEI CAO, TONY K. F. CHAN, MENGJING SUN, JOSEPH J. Y. SUNG, LI ZHANG • 12 MAR 2025

A liquid-like soft robot moves on medical meshes and stents to remove pathogenic biofilms and kill the bacteria within.

ABSTRACT

Counterions influence the isothermal self-assembly of DNA nanostructures

BY ARJUN RODRIGUEZ, BHARATH RAJ MADHANAGOPAL, KAHNI SARKAR, ZOHREH NOWZARI, JOHNSI MATHIVANAN, HANNAH TALBOT, AKUL PATEL, VINOD MORRYA, KEN HALVORSEN, SWETA YANDAVETI, [...] ARJUN RICHARD CHANDRASEKHARAN • +1 authors • 12 MAR 2025

Choice of counterions and the assembly temperature influence the isothermal assembly of DNA nanostructures.

ABSTRACT

BIOMEDICINE AND LIFE SCIENCES

Spatial 3D genome organization reveals intratumor heterogeneity in primary glioblastoma samples

BY QIQUAN WANG, JUAN WANG, BAOHUA MATHUR, MARK W. YOUNGBLOOD, GUOSHU JIN, YE HOU, LENA ANN STASAK, YU LUAN, HENGQIANG ZHAO, STEPHANIE HILZ, [...] FENG YUE • +5 authors • 12 MAR 2025

Comprehensive profiling of spatial 3D genome in GBM identifies GBM-specific features and their intratumoral heterogeneity.

ABSTRACT

Targeting the NPY/NPY1R signaling axis in mutant p53-dependent pancreatic cancer impairs metastasis

BY CECILIA R. CHAMBERS, SUPITHAYA WATAKUL, PETER SCHOFIELD, ANNA E. HOWELL, JESSIE ZHU, ALICE M. H. TRAN, NADIA KUEPPER, DANIEL A. REED, KENDALLE J. MURPHY, LUY M. CHANNON, [...] DAVID HERMANN • +55 authors • 12 MAR 2025

Targeting NPY1R reduces mutant p53-dependent pancreatic cancer metastasis.

ABSTRACT

Indoloquinoline alkaloid neocryptolepine derivative inhibits *Botrytis cinerea* by targeting thiamine thiazole synthase

BY WEI-BIN ZHAO, JUN-XIA AN, YA-RUI JIN, CHEN-XIN JING, SHAO-YONG ZHANG, HONG-JIE LIANG, TIAN-LI DAI, XIONG-FEI LUO, BAO-QI ZHANG, ZHUN ZHANG, YING-QIAN LIU • 12 MAR 2025

Thiazole synthase (BctH4) was identified as a target protein of Z24 by drug affinity responsive target stability (DARTS).

ABSTRACT

Spleen red pulp macrophages eliminate the liver-resistant *Streptococcus pneumoniae* from the blood circulation of mice

BY HAORAN AN, YULIA HUANG, ZHIFENG ZHAO, KUNFENG LI, JINGJING MENG, XUETING HUANG, XIANGBIN TIAN, HONGYU ZHOU, JIAMIN WU, QIONGHA DAI, JINGREN ZHANG • 12 MAR 2025

Spleen red pulp macrophages eliminate *Streptococcus pneumoniae* by using anti-phosphocholine natural antibodies and complement C3.

ABSTRACT

Enhanced packaging of U6 small nuclear RNA and splicing-related proteins into extracellular vesicles during HIV infection

BY YINAO HUANG, AHMED ABDELBARAD, OLESIA SOLODOBOVA, ZHAOHAO LIAO, XINYU CONG, MONA BATISH, LEI ZHENG, KENNETH W. WITWER • 12 MAR 2025

In HIV infection, U6 snRNA leaves the nucleus and is packaged into extracellular vesicles to aid in intercellular communication.

ABSTRACT

Active microgel particle swarms for intrabronchial targeted delivery

BY HUI CHEN, JIUNHUI LAKE, YIBIN WANG, ZHENGO CHEN, JINGZHOU DU, KAIYEN FANG, ZHE WANG, FENG DUAN, YU SUN, JIANGFAN YU • 12 MAR 2025

Microgel microgel particle swarms enable targeted delivery in tortuous bronchial trees.

ABSTRACT

Shear flow patterns antimicrobial gradients across bacterial populations

BY ALEXANDER M. SHUPPRA, OLIVIERO C. PADRON, ANURADHA SHARMA, ZIL MODI, MATTHIAS D. KOCH, JOSEPH E. SANFILIPPO • 12 MAR 2025

Flow overcomes antibiotic resistance.

ABSTRACT

Ndr3 is a critical regulator of peripheral T cell maturation and homeostasis

BY JULIA A. KOMOROWSKA, CHRISTIANE GRAMMER, MIRELA BALAN, JEREMY B. SWAN • 12 MAR 2025

Ndr3 maintains naïve T cells in a quiescent and viable state in secondary lymphoid organs.

ABSTRACT

Y chromosome-linked UTY modulates sex differences in valvular fibroblast methylation in response to nanoscale extracellular matrix cues

BY SHIELA ELI, GORASHI, TALIA BADOOR, SARAH J. CHITTE, NICOLE E. FÉLIX VÉLEZ, MICHAELA A. WENNING, KRISTI S. ANIETH, LUISA MESTRONI, BRISA PEÑA, PENG GUO, BRIAN A. AQUINO • 12 MAR 2025

The Y chromosome modulates sex differences in valve cells during ZENK valve calcification.

ABSTRACT

Structure of coxsackievirus cloverleaf RNA and 3C^{pro} dimer establishes the RNA-binding mechanism of enterovirus protease 3C^{pro}

BY DIMAGI DIAS-SOLANGE, MY TRAI LE, KEERTHI GOTTIPATI, KYUNG H. CHOI • 12 MAR 2025

Enterovirus protease 3C recognizes the cloverleaf RNA of the viral genome by symmetrically interacting with dsRNA stem as a dimer.

ABSTRACT

Lipoylation inhibition enhances radiation control of lung cancer by suppressing homologous recombination DNA damage repair

BY JIA-CHANG CHANG, ZENFU SHANG, TRACY ROSALES, LING CAI, WEI-MIN CHEN, FENG CAI, HUI WU, JOHN D. MINNA, MIN NI, ANTHONY J. DAVIS, [...] YUANLIAN

Genetic screen finds lipoylation as a target to improve radiation success in lung cancer by blocking DNA damage repair.

ABSTRACT

MLX phosphorylation stabilizes the ChREBP-MLX heterotetramer on tandem E-boxes to control carbohydrate and lipid metabolism

BY CARLA E. CADENA DEL CASTILLO, OMAR DENIS, FEMKE VAN GELST, LORE ROOSEELS, INGRID STOOMMANS, MARIUS ROBUIC, SEBASTIEN CARPENTIER, BETTINA K. WÖLNER-HANSEN, ANNE CHRISTIN MEYER-GERSPACH, RALPH PETERLI, [...] MITSUO SHIMOBAYASHI • +1 authors • 12 MAR 2025

CK2-mediated MLX phosphorylation is an evolutionarily conserved signaling pathway that controls sugar and lipid metabolism.

ABSTRACT

Collaborative role of two distinct cilium-specific cytoskeletal systems in driving Hedgehog-responsive transcription factor expression

BY PEI-JI XU, JAMUNA S. SREEJA, ABHISHEK CHADHA, DAVID B. WILLIAMS, MARTIN F. ENGELKE, RADHAKA SUBRAMANIAN • 12 MAR 2025

Single-particle imaging reveals the mechanism of GII transcription factor transport in the primary cilium for Hedgehog signaling.

ABSTRACT

FAP-catalyzed in situ self-assembly of magnetic resonance imaging probe for early and precise staging of liver fibrosis

BY ZHAOYAO WU, WEIWEI ZENG, WEITAO YANG, JINYAN YI, DINGHUA LIU, YAN XU, CHANG LIU, KEXIN BIAN, HUI WANG, BINGBO ZHANG • 12 MAR 2025

An MRI probe detects early liver fibrosis by imaging FAP, enabling disease monitoring and treatment assessment.

ABSTRACT

EBAX-1/ZSWIM8 destabilizes miRNAs, resulting in transgenerational inheritance of a predatory trait

BY SHELIA PEARL, QUOCB, ATA KALIRAD, WALTERAID ROBELER, HANH WITTE, YINAN WANG, CHRISTIAN RISTENSPERGER, RALF J. SOMMER • 12 MAR 2025

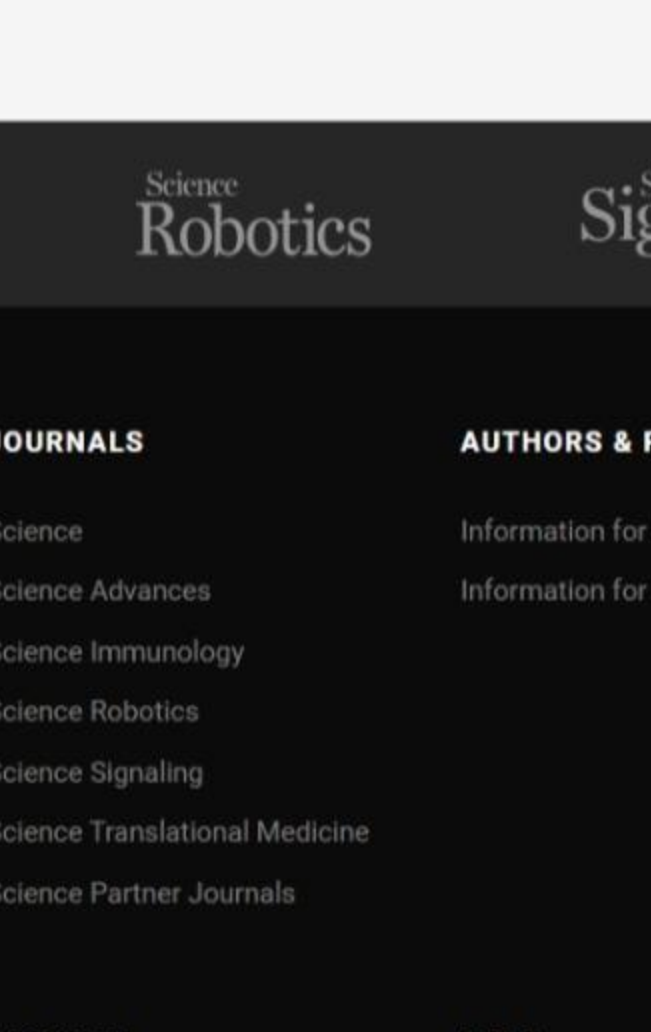
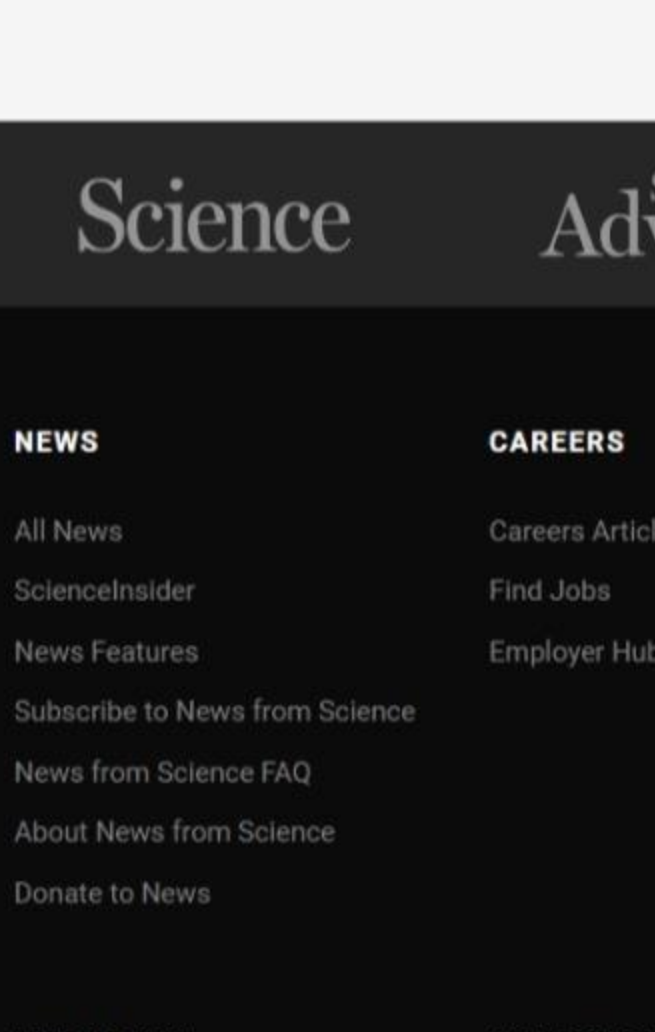
A large microRNA cluster represses transgenerational epigenetic inheritance of a nematode predatory trait.

ABSTRACT

< PREVIOUS ISSUE

NEXT ISSUE >

RECENT ISSUES

[VIEW ARCHIVE >](#)