ADVERTISEMENT
Science Webinars AAAS | The future of multispecific antibodies | 16 June 2026 11 a.m. Eastern, 8 a.m. Pacific, 4 p.m. UK, 5 p.m. CET | Sponsored by Sartorius | REGISTER NOW

SCIENCE ADVANCES

VOLUME 12 | ISSUE 19 | 8 MAY 2026

ONLINE COVER: Illustration of a futuristic urban coastline enhanced by ecosystem technology, or ecotech. biotechnology has benefited health care, business, and agricultural spheres through the development of organisms' inner processes. Ecotech broadens the sphere of biotechnology by expanding the search for in
VIEW MORE

SOCIAL AND INTERDISCIPLINARY SCIENCES AND PUBLIC HEALTH

Ousiometrics: The essence of meaning aligns with a power-danger-structure framework instead of valence-arousal-dominance
BY PETER SHERIDAN DODDS, THAYER ALSHAABI, MIKAELA IRENE FUDOLIG, JULIA WITTE ZIMMERMAN, JUNIPER LOVATO, SHAWN BEAULIEU, JOSHUA R. MINOT, MICHAEL V. ARNOLD, ANDREW J. REAGAN, CHRISTOPHER M. DANFORTH • 06 MAY 2026
The three orthogonal axes of essential meaning are weak-powerful, safe-dangerous, and structured-unstructured.

NEUROSCIENCE

The anterior cingulate cortex modulates pupil-linked arousal
BY NITHIK CHINTALACHERUVU, ANAGHA KALELKAR, HECTOR ALATRISTE-LEÓN, JOËL BOUTIN, VINCENT BRETON-PROVENCHER, RAFIQ HUDA • 08 MAY 2026
The anterior cingulate cortex modulates pupil-linked arousal in real time.

***SHANK3* mutations disrupt olfactory valence coding across species, with cortical amygdala mechanisms identified in mice**
BY YU HU, YULI WU, MINGYU WEI, JINGCHAO MA, JIANBANG LIN, GAOWEI CHEN, QI LI, JIANQING ZHANG, RUIQI WANG, YINGJIE ZHU, [...] ZHONGHUA LU +5 authors • 06 MAY 2026
SHANK3 mutations disrupt odor valence via cortical amygdala dysfunction, revealing a circuit basis for sensory deficits in ASD.

Hierarchical brain dynamics supporting visual perceptual transitions
BY MAX LEVINSON, ALICE E. WAITT, KATHARINA DUECKER, SYANAH C. WYNN, OLE JENSEN, SYLVAIN BAILLET • 08 MAY 2026
Illusory transitions in conscious visual perception involve both early visual cortex and higher-order motor cortices.

Spatial reorganization of object representations in high-level visual cortex distinguishes working memory from perception
BY WANRU LI, JIA YANG, PINGLEI BAO • 08 MAY 2026
Remembering objects spreads representation across both brain hemispheres, while perception stays spatially local.

Natural noncoding *pumilio* variants retune value-coding interneurons to bias *Drosophila* oviposition decisions
BY DORSA MOTEVALLI, ROBERT ALFREDSON, SYDNEY FOGLEMAN, EMMANUEL MEDRANO, YANG CHEN, WILLIAM I. SILANDER, TOSHIHIDE HIGE, ULRICH STERN, CHUNG-HUI YANG • 08 MAY 2026
Natural genetic variation fine-tunes circuit properties to shift value-based egg-laying decisions in fruit flies.

EARTH, ENVIRONMENTAL, ECOLOGICAL, AND SPACE SCIENCES

A southward differentiated impactor forms the tapered shape of the South Pole–Aitken impact basin on the Moon
BY SHIGERU WAKITA, BRANDON C. JOHNSON, JEFFREY C. ANDREWS-HANNA, GABRIEL GOWMAN, THOMAS M. DAVISON, GARETH S. COLLINS, CARYS A. BILL, SIMONE MARCHI, AMANDA M. ALEXANDER, WILLIAM F. BOTTKE, ALEXANDER J. EVANS • 06 MAY 2026
A differentiated impactor striking the ancient Moon with a southward trajectory produced the largest lunar impact basin.

Formation of calcium silicate perovskite above the core-mantle boundary during solidification of Earth's magma ocean
BY TIANHUA WANG, JAMES BADRO, RAZVAN CARACAS, HÉLOÏSE GENDRE, CÉCILE HÉBERT • 06 MAY 2026
Computational and experimental studies reveal the enrichment of $CaSiO_3$ perovskite and key trace elements in the deep mantle.

Compound drivers of Antarctic sea ice loss and Southern Ocean destratification
BY ADITYA NARAYANAN, HOLLY AYRES, MATTHEW H. ENGLAND, F. ALEXANDER HAUMANN, MATTHEW R. MAZLOFF, ALESSANDRO SILVANO, THEO SPIRA, SHENJIE ZHOU, ALBERTO C. NAVEIRA GARABATO • 08 MAY 2026
Recent sea ice loss was initiated by ocean upwelling in East Antarctica and by radiative flux anomalies in West Antarctica.

HONO emission from marine algae
BY HENGQING SHEN, XUELIAN ZHONG, YUJIAO ZHU, YANQIU NIE, MIN ZHAO, QINYI LI, YUQIANG ZHANG, LIUBIN HUANG, ZHENG ZONG, QI YUAN, [...] LIKUN XUE +3 authors • 06 MAY 2026
Abiotic photodecomposition of marine algae emits nitrous acid, fueling daytime oxidation capacity in coastal atmospheres.

Hydrogen-carbon doubly superionic conduits of carbonic acids in planetary ices
BY JUN DENG, HUIYANG GOU, QINGYANG HU • 08 MAY 2026
Hydrogen-carbon double superionicity of carbonic acids may drive nonaxisymmetric magnetic fields and volatile cycling.

Symmetric instability drives exchange between surface and bottom waters in a coastal front
BY MAREIKE KÖRNER, JESSE M. CUSACK, JONATHAN NASH, R. KIPP SHEARMAN, LEIF N. THOMAS, JENNIFER MACKINNON, FUCENT HSUAN WEI HSU, JOHN TAYLOR, JINLIANG LIU, JAMES P. HILDITCH • 08 MAY 2026
Observations reveal the spatial structure of symmetric instability and its role in vertical exchange of oxygen and temperature.

Paleoarchean deep crustal hydration and oxidation induced by subduction-driven water recycling
BY DI ZHOU, RONGFENG GE, SIMON A. WILDE, WILLIAM J. COLLINS, ANTHONY I. S. KEMP, DONGYANG LIAN, PENGJIE CAI, XIAOLEI WANG • 08 MAY 2026
Zircon compositions reveal Paleoarchean deep crustal hydration and oxidation induced by subduction in the Pilbara Craton.

Generation of carbonated peridotite melts via biogenic sediment recycling in modern subduction zones
BY CARLOS ERRÁZURIZ-HENAO, ARTURO GÓMEZ-TUENA, MARION WEBER, MATTIA PAROLARI, BERENGERE MOUGEL, MARINE PAQUET, ERIC HELLEBRAND, OLIVER PLÜMPER, PAUL MASON, FRÉDÉRIC MOYNIER • 06 MAY 2026
Volcanoes reveal how subducted marine carbonates transfer Earth's surface biogeochemical signatures to the convecting mantle.

Cis-regulatory evolution shapes facial diversity in birds and mammals
BY STELLA KYOMEN, LOUK W. G. SETON, LAURA E. COOK, ELIO ESCAMILLA-VEGA, ANDREA P. MURILLO-RINCÓN, ALEXANDER JACOBSEN, AMOR DAMATAC II, CARSTEN FORTMANN-GROTE, JANINA FUSS, AXEL VISEL, MARKÉTA KAUCKÁ • 06 MAY 2026
Facial shape diversity in birds and mammals arises from conserved developmental programs tuned by divergent regulatory landscapes.

Integrated climate effects on nitrogen cycles in global grasslands
BY MIAO ZHENG, JINGLAN CUI, LUXI CHENG, SITONG WANG, XIAOXI WANG, XIN XU, XIUMING ZHANG, CHEN WANG, CHENCHEN REN, BAOJING GU • 06 MAY 2026
Grasslands respond to integrated climate effects, influencing nitrogen cycles under future climate change.

Powering Ganymede's dynamo with protracted core formation
BY KEVIN T. TRINH, FLAVIO PETRICCA, DOUGLAS J. HEMINGWAY, STEVEN D. VANCE • 06 MAY 2026
Jupiter's moon Ganymede might still be forming its metal core today, which no other planetary body is known to do.

Decadal East Asian monsoon anomalies and implications for societal conflicts
BY KAN ZHAO, YIJIA LIANG, CHANGCHUN HUANG, YONGJIN WANG, WEIYI SUN, HAI CHENG, JIANJUN YIN, DI HU, MI YAN, LIANG NING, [...] R. LAWRENCE EDWARDS +1 authors • 06 MAY 2026
Extreme flood-drought swings triggered crop shortage and overpopulation, fueling the rise of the Taiping Rebellion.

PHYSICAL AND MATERIALS SCIENCES

Machine learning–driven discovery of optimal designs for water electrolysis devices
BY ZIRUI ZHANG, ZHIHAO WANG, YIWEN LIAO, YU CHANG, LI DING, GUANGSHENG LUO, XIAONAN WANG, HAIHUI WANG • 06 MAY 2026
Artificial intelligence–optimized electrolyzer channels boost current density ~23% and improve scalable green hydrogen production.

Activating the Mn^{2+}/Mn^{7+} redox for a neutral Zn||Mn-compound battery with 2.2-V discharge plateau
BY CHUAN LI, XIU HU, RONG ZHANG, SHAOCE ZHANG, HUILIN CUI, QINSHUN NIAN, YUWEI ZHAO, CHUNYI ZHI • 06 MAY 2026
The achieved reversible Mn^{2+}/MnO_4^- redox offers a 2.2-V discharge plateau in a zinc battery.

Electronics-free soft robotic minitablet for on-demand gastric molecular sensing and diagnostics in vivo
BY CHEN WANG, RUI SHI, ANATOLII ABALYMOV, HAO BAO, THOMAS KA-YAM LAM, ZIHAN WANG, YONGFENG MEI, ZONGWEI CAI, XIANG-ZHONG CHEN, SARTHAK MISRA, VENKATASUBRAMANIAN K. VENKITESWARAN • 08 MAY 2026
SeroTab is an ingestible soft robotic tablet that senses gastric pH in real time and samples stomach fluid on demand.

Ultrafast decoherence in solid-state high-harmonic generation induced by nuclear-electronic entanglement
BY SHIQI HU, QING CHEN, RUIJI ZHAO, QIUHAO XU, QUNFANG GU, EN WANG, SHENG MENG • 08 MAY 2026
Nuclear quantum effects reshape solid high-harmonic generation mechanism via attosecond decoherence, enabling new quantum probes.

Uniaxial spin texture in a superconducting electron gas revealed by exchange interactions
BY JUNYI YANG, CHANGJIANG LIU, XIANJING ZHOU, HANYU HOU, KAIJUN YIN, JIANGUO WEN, JOHN PEARSON, ALEXEY SUSLOV, DAFEI JIN, JIDONG S. JIANG, [...] ANAND BHATTACHARYA +3 authors • 08 MAY 2026
Exchange interaction with rare-earth ions reveals a hidden in-plane uniaxial spin texture in superconducting $KTaO_3$ 2DEGs.

3D mapping of defects and moiré corrugations via electron ptychography atomic coordinate retrieval
BY JEFFREY HUANG, YICHAO ZHANG, SANG HYUN BAE, BALLAL AHAMMED, ELIF ERTEKIN, PINSHANE Y. HUANG • 06 MAY 2026
3D atomic coordinates from single-orientation electron ptychography reveal disordered corrugations in a 2D twisted bilayer.

Electroactive microneedle augmented stem cell therapy in myocardial infarction
BY WENTAO ZHANG, YIQI SHEN, SHUANGXU JIA, YINGXIN CHEN, RUISI CAI, YUNLONG JIAO, QUANQUAN HAN, JIAHUAN YOU, SHIQI WANG, XINGYI WAN, [...] YUQI ZHANG +3 authors • 06 MAY 2026
Microneedle-generated electrical stimulation potentiates stem cells and promotes cardiac regeneration.

Curvature-programmed nitrate electroreduction via single-atom protrusions on quantum dots
BY DONG CHEN, SHAOCE ZHANG, DONGCHANG HE, HAIFAN LI, XINRU YANG, DI YIN, MENGXUE CHEN, QUAN QUAN, YUXUAN ZHANG, BOXIANG GAO, [...] JOHNNY C. HO +7 authors • 08 MAY 2026
FeCu single-atom protrusions on curved quantum dots efficiently convert wastewater nitrate into valuable ammonia.

Dynamic drives allow independent control of material bits for targeted memory
BY EDUARDO GUTIERREZ-PRIETO, COLIN M. MEULBLOK, MARTIN VAN HECKE, PEDRO M. REIS • 06 MAY 2026
Dynamic driving permits writing of any possible state into rationally designed mechanical memory composed of uncoupled elements.

Ecosystem technology (ecotech): Harnessing natural processes to address global challenges
BY BRIAN R. SILLIMAN, MARC J. S. HENSEL, RALPH J. M. TEMMINK, AVERY B. PAXTON, DANIEL J. WIECZYNSKI, JEAN P. GIBERT, DAVID W. JOHNSTON, DEVON NOONAN, WILLIAM N. FERRIS, MARK E. HAY, [...] SHILA K. NORDONE +31 authors • 06 MAY 2026
Ecotech harnesses nature's processes to build scalable technologies powerful enough to address environmental and societal threats.

Super-stable two-dimensional radical conjugated metal-organic frameworks for efficient NIR-II photothermal conversion
BY SHANZHI LYU, YANG LU, SHIYI FENG, NAN ZHANG, YANJI CHU, YUGE YAO, CHAO SUN, YONGLIN HE, XINLIANG FENG, YAPEI WANG • 06 MAY 2026
Stable radical 2D c-MOFs with side-chain engineering achieve ultrabroad NIR-II absorption for deep photothermal therapy.

Universality in peristaltic locomotion: Linking biology, theory, and simulation
BY ROBERTA SANTORIELLO, FRANCESCO VIOLA, VINCENZO CITRO • 08 MAY 2026
Peristaltic swimming features universality across scales and flow regimes.

Light-switchable swarming of biohybrid microrobots
BY VÍCTOR DE LA ASUNCIÓN-NADAL, CASPER NISULA, CARMEN CUNTÍN-ABAL, ROBERT KOBRIN, GLORIA MENDIS, JACK LATELLA, CHUANRUI CHEN, BEATRIZ JURADO-SÁNCHEZ, LIANGFANG ZHANG, ALBERTO ESCARPA, [...] JOSEPH WANG +1 authors • 08 MAY 2026
Swarms of biohybrid microrobots, with diverse shapes, can be formed and actuated using different light patterns and colors.

Internally promoted reactivity of carbonized butadiene and amines enables a recyclable polymer composite
BY KEATON M. TURNEY, ABDOL HADI MOKARIZADEH, MESFIN TSIGE, JAMES M. EAGAN • 06 MAY 2026
Carbon dioxide is combined with abundant chemicals to produce recyclable polymers and carbon fiber composites.

Elastic rod origami (RodOri) for programming static and dynamic mechanical properties
BY SOPHIE LEANZA, JESEUNG LEE, LU LU, RUIKE RENEE ZHAO • 06 MAY 2026
Curved rods assemble into prestressed structures with exceptional multistability for adaptive metamaterials.

Reconfigurable second-harmonic generation via plasmonic nanoslits counteracting strain-induced suppression in monolayer MoS_2
BY SOBHAGYAM SHARMA, SATYABRAT BEHERA, BYUNG HEE SON, GANGSEON JI, DAEHWAN PARK, ARUNKUMAR ALAGURASU, MAHSA HADDADI MOGHADDAM, DAI-SIK KIM, SEON NAMGUNG, YEONG HWAN AHN, HYEONG-RYEOL PARK • 08 MAY 2026
Plasmonic nanoslits enable reconfigurable SHG in MoS_2 by counteracting the strain-induced suppression on flexible substrates.

Ampere-level furfurylamine electrosynthesis enabled by high-density atomic copper sites and a well-engineered electrolysis reactor
BY WEILIANG ZHOU, QIHUA HUO, SHUAI QI, TAIYU LIANG, JIAO YOU, CHUNYAN SHANG, HENGPAN YANG, XUE ZHANG, LELE PENG, QI HU, CHUANXIN HE • 08 MAY 2026
High-density atomic copper sites and an engineered reactor enable ampere-level electrosynthesis of furfurylamine.

Optical corner detection with azimuthal Hilbert transform metasurfaces
BY CHEN CHEN, JUNYI WANG, RONG LIN, JIACHENG SUN, WANGE SONG, SHINING ZHU, TAO LI, DIN PING TSAI • 06 MAY 2026
A general optical approach to corner-detection imaging was developed, showing notable data-compression capabilities.

Ambient one-step synthesis and direct coating of highly crystalline covalent organic frameworks on arbitrary surfaces
BY JAVAD KHOSRAVI FARSANI, JUAN PABLO CAVALIERI, OMID MAZAHERI, FRED JUNGHANS, JORGE ALBALAD, BILLY J. MURDOCH, CAIDEN J. PARKER, RAVICHANDAR BABARAO, DANIEL MASPOCH, AMGAD R. REZK, [...] LESLIE Y. YEO +1 authors • 06 MAY 2026
A rapid, facile process enables room temperature crystallization and coating of porous polymers on diverse surfaces.

Chemical stimulation sustains bioluminescence of living light materials
BY GIULIA BRACHI, JESSICA MCKEAN, CHENG PAU LEE, JOY EDWIN-EZEH, WIL V. SRUBAR III • 06 MAY 2026
Chemical stimulation programs sustained bioluminescence in dinoflagellate living materials.

Enantio- and regioselective nickel/photoredox-catalyzed cross-electrophile coupling of benzylic aziridines with alkynyl bromides
BY HONGYAN LAN, ZHAO-DONG XU, ZHUANGZHI SHI, LUTZ ACKERMANN, DINGYI WANG • 08 MAY 2026
Cross-electrophile coupling of aryl aziridines and alkynyl bromides yields chiral β-alkynylethylamines.

BIOMEDICINE AND LIFE SCIENCES

TCF3::HLF orchestrates an enhancer-promoter network with activation of MEF2C to promote immature HSC gene expression in leukemia
BY VALDEMAR PRIEBE, BARTIMÉE GALVAN, ANETA DRAKUL, NICOLA MARGELISCH, JÚLIA AGUADÉ-GORGORIÓ, KAIVALYA WALAVALKAR, YUN HUANG, HANNA K. A. MIKKOLA, BEAT BORNHAUSER, RAFFAELLA SANTORO, JEAN-PIERRE BOURQUIN • 06 MAY 2026
TCF3::HLF fusion protein mediates 3D genomic interactions in t(17;19)-positive acute lymphoblastic leukemia

PARP2 deficiency impairs pancreatic cancer progression by promoting genomic instability and antitumor immunity
BY NEUS MARTÍNEZ-BOSCH, NOEMÍ MANERO-RUPÉREZ, NÚRIA VÁZQUEZ-BELLÓN, BENNETT NICKELL-HERNÁNDEZ, CRISTINA VENTURA-BLANCH, NURA LUTFI, CARMEN G. LECHUGA, CARLOS MARTÍNEZ, MIREIA MORENO, CORAL AMPURDANÉS, [...] PILAR NAVARRO +8 authors • 08 MAY 2026
PARP2 deficiency hampers pancreatic cancer progression by increasing replicative stress and unleashing antitumor immunity.

Contrasting temporal dynamics of fluorescence and photoacoustic signals from Cetuximab-IRDye800 conjugate in EGFR-overexpressing tumors
BY MOHAMMAD A. SAAD, DEREK ALLEN, ALLISON SWEENEY, MARVIN XAVIERSELVAN, SRIVALLEESHA MALLIDI, TAYYABA HASAN • 06 MAY 2026
An optimized imaging window enables capturing maximal photoacoustic contrast from Cetuximab-IRDye800 conjugates.

HSPCs and T_{reg} cells cooperate to preserve extramedullary hematopoiesis under chronic inflammation
BY MARIA KUZMINA, SRDJAN GRUSANOVIC, JIRI BREZINA, FLAVIAN THELEN, KAROLINA VANICKOVA, MIRKO MILOSEVIC, IRINA RIBEIRO BAS, NATALIIA PAVLIUCHENKO, SARKA RUZICKOVA, JAKUB ROHLENA, [...] MERITXELL ALBERICH-JORDA +4 authors • 06 MAY 2026
HSPCs and T_{reg} cells located at extramedullary sites establish a mutually beneficial relationship during chronic inflammation.

RAB5c orchestrates LC3-associated phagocytosis to promote microbicidal function of macrophages
BY EDISMAURO GARCIA FREITAS-FILHO, ISABELLA ZAIDAN, DANIEL LEONARDO ALZAMORA-TERREL, CAROLINA BIFANO, MARLON FORTES-ROCHA, PATRÍCIA ALVES DE CASTRO, RENAN EUGÊNIO ARAUJO PIRAINE, CAMILA FIGUEIREDO PINZAN, CAROLINE PATINI DE REZENDE, EMILIO BOADA-ROMERO, [...] LARISSA DIAS CUNHA +4 authors • 08 MAY 2026
Early endosome trafficking can be selectively modulated to enable LC3 lipidation on phagosomes.

Glutathione induces trap closure for carnivory in Cape sundew
BY RUI LI, YONGFANG YANG, WEICHENG WANG, HAO LOU, RAN DU, HAIDONG CHEN, FENG LI, XIAOKANG LIU, XIAOYI SHAN, JIANBIN YAN, DAOXIN XIE • 06 MAY 2026
The identification of GSH as an important mediator in sundew carnivory unlocks the key mechanism of this captivating behavior.

Antigen spreading mediates heterogeneous solid tumor eradication by DNA demethylating agent–programmed CAR T cells
BY YELEI GUO, CHUAN TONG, JIANSHU WEI, ZHIQIANG WU, YUTING LU, FUXIN HAN, YIPENG ZHANG, CHUNMENG WANG, JINHONG SHI, FENGXIA SHI, [...] WEIDONG HAN +1 authors • 08 MAY 2026
DNA demethylating agent–primed CAR T cells induce antigen spreading, eradicating heterogeneous solid tumors.

Hooked hairs: A cellular key adaptation aiding seedling survival in nutrient-limited and drought conditions
BY SERGIO ALAN CERVANTES-PÉREZ, ANKITA ROY, ADDISON BRALICK, PETER PIETRZYK, SANDRA THIBIVILLIERS, MARC LIBAULT, ALEXANDER BUCKSCH • 06 MAY 2026
The hooked hair is a cell type, found in common beans, with the potential to combat seedling mortality in marginal environments.

DLP-bioprinted ultrabiomimetic trachea with spatiotemporal angiogenesis regulation for segmental airway reconstruction
BY JINGMING GAO, BOHUI LI, ZHENG CI, XINGQI SONG, JIE ZHU, LIANG DUAN, XIAOYUN WANG, YU LIU, DONG LEI, GUANGDONG ZHOU • 08 MAY 2026
Prevascularized ultrabiomimetic tracheal grafts by DLP bioprinting notably improve the airway regeneration effect.

A balance between nucleating and elongating actin filaments controls deformation of protein condensates
BY CALEB WALKER, DANIEL MANSOUR, UNYIME M. EFFIONG, DOMINIQUE JORDAN, LIPING WANG, EILEEN M. LAFER, JOSÉ ALVARADO, BRIAN BELARDI, PADMINI RANGAMANI, JEANNE C. STACHOWIAK • 08 MAY 2026
Adding regulators of actin assembly reveals how balancing assembly kinetics controls actin architectures in protein condensates.

Loss of the autoimmune risk gene TREX1 reveals a convergence of mechanisms promoting immune tolerance loss and antitumor immunity
BY JUNGHYUN LIM, KATHERINE WILLIAMS, STEPHANIE MITTMAN, PATRICIA PACHECO SANCHEZ, RYAN RODRIGUEZ, ANNIE OGASAWARA, GRACE BARNETT, MAYRA CRUZ TLEUGABULOVA, BARZIN Y. NABET, JEFFREY HUNG, [...] KLAUS HEGER +27 authors • 06 MAY 2026
Loss of the cytosolic DNA exonuclease TREX1 predisposes mice to autoimmunity while promoting robust antitumor immunity.

Three cryo-EM structures of complement C3d-bound $\alpha_M\beta_2$ reveal an unexpected layer of dynamics for αI-containing integrin receptors
BY JOSEFINE LORENTZEN, MARLENE UGLEBJERG FRUERGAARD, SZILVIA LUKÁCSI, MARTIN HØGHOLM JØRGENSEN, TIMO LAMBERTUS GERARDUS VAN VEGHEL, RASMUS KJELDSEN JENSEN, KRZYSZTOF JAKUB PIETRZAK-LICHWA, ZSUZSA BAJTAY, VÁCLAV HOŘEJŠÍ, RASMUS KOCK FLYGAARD, [...] GREGERS ROM ANDERSEN +2 authors • 08 MAY 2026
Cryo-EM structures of an $\alpha_M\beta_2$-ligand complex reveal unexpected properties of the integrin α-subunit ligand binding domain.

Biogenesis and downstream effects of 3',5' and 2',3' cAMP isomers in plants
BY MINGYUE LI, MONIKA CHODASIEWICZ, MALAVIKA MURALEEDHARAN, ISRAEL M. LOPEZ, MICHAL GORKA, OLGA KERBER, SAQER S. ALOTAIBI, ANDREW D.L. NELSON, RENE LENOBEL, JAROSLAVA FRIEDECKÁ, [...] JIŘÍ FRIML +1 authors • 08 MAY 2026
2',3'-cAMP and 3',5'-cAMP act as distinct but partially overlapping regulators of plant development and physiology.

A redox-sensitive phosphatase regulates glycolysis as a metabolic switch in the bacterial inner membrane
BY LEI ZHENG, WEI NIU, XIANFA XIE, TRUNG VU, GUANGWEI DU • 06 MAY 2026
Redox-sensitive phosphatase PgpA couples glycolysis and redox balance to control metabolic adaptation in *E. coli*.

SnRK2.6 phosphorylates sucrose transporter ZmSUT1 to enhance yield by modulating leaf senescence in maize
BY TAO YANG, YUNQIN HUANG, ZAN WU, ZHENGLAN LONG, HONGWEI ZHU, SHANSHAN WANG, LEI TANG, RUIRUI LI, ZHENGCHEN LIANG, HAOYU ZHANG, [...] YONGRUI WU +3 authors • 06 MAY 2026
SnRK2.6-phosphorylated ZmSUT1 enhances maize kernel yield and nutrient quality with delayed leaf senescence progress.

The pleuroparenchymal fibroelastosis atlas reveals aberrant cell states and their zonation as an alternate roadmap to lung fibrosis
BY JANNIK RUWISCH, AURÉLIE CAZES, LENA M. LEIBER, RAPHAËL BORIE, LAVINIA NEUBERT, LEONARD CHRISTIAN, VINCENT THOMAS DE MONTPRÉVILLE, ADAM SZMUL, FARAH MOUSSA, STIJN E. VERLEDEN, [...] JONAS C. SCHUPP +36 authors • 08 MAY 2026
Zonated inflammatory programmed mesenchymal niches drive elastotic and fibrotic remodeling in pleuroparenchymal fibroelastosis.

Reconstituted nascent adhesion condensates drive actin polymerization on supported lipid bilayers
BY ARSENII HORDEICHYK, KRISTIAN A. T. PAJANONOT, CHIAO-PENG HSU, TIMON NAST-KOLB, LUKAS J. NEUMANN, REINHARD FÄSSLER, ANDREAS R. BAUSCH • 08 MAY 2026
Adhesion protein condensates with distinct properties differentially shape actin organization.

The genetic landscape of antibiotic sensitivity in *Staphylococcus aureus*
BY WAN LI, MENGHAN LIU, PANOS OIKONOMOU, SYDNEY BLATTMAN, MIRELA BERISA, FALGUNI PAUL, JULIA HETTLEMAN, JOSEPH GONZALEZ, QIAOYU HU, HOWE CHEN, [...] WENYAN JIANG +1 authors • 08 MAY 2026
CRISPRi profiling defines genome-scale vulnerability landscapes under antibiotics in *S. aureus*.

Drp1 regulates mitochondrial health and controls skeletal muscle mass through the Erk1/2-Nur77 pathway
BY ALICE M. MA, PETER H. TRAN, NICOLE L. YANG, JENNIFER NGO, HIROTAKA IWASAKI, WENJUAN REN, SIMONE LIVIT, LINSEY STILES, SARAH WANG, TRINITY HO, [...] ZHENQI ZHOU +12 authors • 08 MAY 2026
Drp1 regulates skeletal muscle mass through an Erk1/2-Nur77 pathway that offers a therapeutic target.

Whole-body in vivo MPI cytometry reveals injection route-, dose-, cell size–, and disease-dependent differences in organ distribution
BY ALI SHAKERI-ZADEH, SHREYAS KUDDANNAYA, CHENGYAN CHU, KRITIKA SOOD, ASIF ITOO, CRISTINA ZIVKO, ALINE M. THOMAS, VASILIKI MAHAIRAKI, PIOTR WALCZAK, JEFF W. M. BULTE • 06 MAY 2026
Whole-body in vivo cytometry using MPI is able to dynamically track and quantify tissue cell distribution.

Targeting cGAS-STING signaling to overcome antibiotic-resistant bacterial infections: Challenges and opportunities
BY YU SEONG HAM, MINSEO JEONG, CHUL-SU YANG • 08 MAY 2026
Antibiotic-resistant bacteria hijack cGAS-STING signaling, revealingalternative host-directed therapeutic strategies.

A cross-tissue physicochemical causal chain underlying vertebrate mandibular morphogenesis
BY KAZUTAKA HOSODA, DAISUKE OHTSUKA, SANG-WOO LEE, NAOFUMI KAWAHIRA, TORU KAWANISHI, YOSHIHIRO MORISHITA • 08 MAY 2026
Folding of oral ectoderm acts as a driver that coordinates mesenchymal dynamics in vertebrate jaw formation.

Tunable TriPcides suppress virulence factor secretion during *Staphylococcus aureus* infection and kill dormant cells
BY HASAN TÜKENMEZ, TAYLOR M. NYE, PARDEEP SINGH, AARON MYCHACK, MARI BONDE, SUZANNE HICKERSON, CHLOE L. P. OBERNUEFEMANN, JEROME S. PINKNER, SHAOCHUN ZHU, SOUVIK SARKAR, [...] SCOTT J. HULTGREN +13 authors • 06 MAY 2026
TriPcides offer a promising strategy against MRSA infections by targeting both dormant bacteria and their virulence machinery.

CKS1B is a tumor-intrinsic factor driving $CD8^+$ T cell exhaustion via maintaining persistent tumor-antigen stimulation
BY SIQI YU, PUJIE WU, XIAOTING XIE, LIANG ZHU, LIPING CHEN, YIBO YU, WEN TAN, SHAOSEN ZHANG, CHEN WU, DONGXIN LIN • 06 MAY 2026
Tumor-intrinsic CKS1B promotes chronic $CD8^+$ T cell exhaustion through IRF3 degradation.

Integrated analysis of insulin resistance reveals metabolic remodeling following diet switch–triggered calorie reduction
BY XIAOWEN DUAN, LUCY M. DAVIS, SATISH PATEL, GUILLAUME BIDAULT, LU LONG, BENJAMIN JENKINS, YAO YI, PUSHPA PUSHPA, JULIA R. WESSELING, ALBERT KOULMAN, [...] DAVID B. SAVAGE +2 authors • 06 MAY 2026
Integrated insights into mechanisms driving acute reversal of insulin resistance enhance understanding of the condition.

Mammary and respiratory infection of sheep with H5Nx clade 2.3.4.4b viruses with milk-mediated transmission to lambs
BY TAMIRU N. ALKIE, CARISSA EMBURY-HYATT, ANTHONY V. SIGNORE, ESTELLA MOFFAT, DARWIN RAMOS, SUGANDHA RAJ, TAMIKO HISANAGA, IFEOLUWA AYILARA, DANIEL S. SULLIVAN, PATRICK LLOYD, [...] YOHANNES BERHANE +8 authors • 08 MAY 2026
In nonlactating sheep, aerosolized H5Nx caused transient respiratory infection, while intramammary inoculation caused mastitis.

Protein language models accurately predict polymorphic peptide–modulated NK cell receptor–HLA class I interaction strengths
BY ABDALLAH ALSHAFEY, MADELINE NELSON, MUBASHER HASSAN, ANDRZEJ KLOCZKOWSKI, WILLIAM RAY, SALIM I. KHAKOO, JAYAJIT DAS • 08 MAY 2026
ML model decodes immune recognition; KIRLinguist predicts KIR-HLA interactions, guiding personalized infection and cancer therapy.

A chromatin-associated pool of Aurora A controls kinetochore-microtubule attachments to ensure chromosome biorientation
BY JOHNATHAN L. MEADERS, ALYSSA A. RODRIGUEZ, SMRITI VARIYAR, SUNGWOO PARK, ALESSANDRO E. CIRULLI, KAREN OEGEMA, KEVIN D. CORBETT, ARSHAD DESAI • 06 MAY 2026
Spatially distinct pools of Aurora A act on kinetochores to ensure chromosome biorientation and control spindle length.

ATRA improves megakaryopoiesis in immune thrombocytopenia through up-regulating the HIF-1α/SPHK2/S1P pathway
BY QIU-SHA HUANG, JING XUE, FENG-QI LIU, QI CHEN, GAOCHAO ZHANG, XUE-YAN SUN, CHENCONG WANG, LIPING YANG, YU HOU, YUEYING LI, [...] XIAO-HUI ZHANG +8 authors • 06 MAY 2026
A vitamin A derivative fixes faulty platelet factories by activating a hidden oxygen-sensing pathway.

A unified mechanism for tubulin cofactors catalyzing α/β-tubulin biogenesis and degradation
BY ARYAN TAHERI, MD ASHADUZZAMAN, VISHV GILL, JULIAN A. ESKIN, JAWDAT AL-BASSAM • 08 MAY 2026
Tubulin cofactor assemblies catalyze α- and β-tubulin assembly into dimers critical for microtubule cytoskeleton scaffolding.

A multiomics atlas of the *Arabidopsis* nuclear envelope
BY HEEJAE NAM, DOOGIE KIM, YU TANG, YILING FANG, MARYAM HAGHANI, KRISHNA V. DHULIPALLA, MARVIN CHEN, SONG LI, YANGNAN GU • 08 MAY 2026
Plant nuclear membrane multiomics atlas shows nuclear pore complexes mainly form in dividing cells and persist as long-lived structures.

ERRATA

Erratum for the Research Article "A splenic-targeted versatile antigen courier: iPSC wrapped in coalescent erythrocyte-liposome as tumor nanovaccine" by Y. Zhai *et al*.
08 MAY 2026

RELATED RESEARCH ARTICLE
A splenic-targeted versatile antigen courier: iPSC wrapped in coalescent erythrocyte-liposome as tumor nanovaccine
BY YUEWEN ZHAI, XIAORONG HE, ET AL. • SCIENCE ADVANCES • 25 AUG 2021

< PREVIOUS ISSUE NEXT ISSUE >

RECENT ISSUES

Vol. 12 No. 22 | Vol. 12 No. 21 | Vol. 12 No. 20 | Vol. 12