Advertisement

Volume 638 Issue 8051, 20 February 2025

← Previous issue | Volume 638

nature
INSIDE AFRICA
Genomic resource unpicks gut microbiomes from across the continent

Subscribe

Inside Africa

Studying large populations can shed light on how factors such as genetics, environment and lifestyle influence the composition of the gut microbiome. But despite being home to nearly 85% of the world's population, low- and middle-income countries are relatively poorly represented in such research. In this week's issue, Ami Bhatt, Scott Hazelhurst and colleagues go some way to redress the balance, presenting a gut microbiome study that sampled 1,801 women from Burkina Faso, Ghana, Kenya and South Africa. The researchers were able to assemble around 1,000 bacterial genomes, linking variations in some species to geographical and lifestyle factors. The study is the largest population-representative survey of gut metagenomes in African individuals to date. The cover artwork shows a translation of the findings into hand-woven mats. Made from telephone wire, these are contemporary extensions of traditional Zulu baskets. — show less

Cover image: Artist: Florence Mhlongo in collaboration with ZenZulu, Durban; Concept: Dylan Maghini & Joni Brenner.

Table of Contents

This Week
News in Focus
Books & Arts
Opinion
Work
Research
Amendments & Corrections

This Week

Editorial

Editorial
19 Feb 2025

Why retractions data could be a powerful tool for cleaning up science

A *Nature* analysis of retractions hotspots around the world suggests institutions should pay close attention to retractions data.

nature water
Nature Water Talks webinar series

Advertisement

Editorial
19 Feb 2025

Women need platforms to celebrate excellence in research and technology

Nature is proud to be associated with a new award for women in technology. The world needs more prizes for exceptional researchers and innovators.

Research Highlights

Research Highlight
13 Feb 2025

From farm to pharmacy: gene-edited plants produce a popular supplement

Widely grown crops can be bioengineered to make a form of coenzyme Q taken by people seeking a health boost.

Research Highlight
13 Feb 2025

Bullseye! Galaxy hosts a record-breaking nine starry rings

Astronomers trace the striking pattern to an encounter between a big galaxy and a much smaller one some 50 million years ago.

Research Highlight
12 Feb 2025

Transylvanian diaries reveal centuries-old climate extremes

Droughts, extreme heat and destructive flooding plagued the region in the sixteenth century, historical documents show.

Research Highlight
12 Feb 2025

Gourmet cockatoos like to fancy up their food

Make mine blueberry: Goffin's cockatoos add flair to plain vegetables with a dip into fruity soya yogurt.

Top of page ↑

News in Focus

News

News
06 Feb 2025

These Gaza scientists are keeping research alive amid war, destruction and uncertainty

Researchers in Gaza tell *Nature* of 'unwavering commitment to education and knowledge' as most universities lie damaged or destroyed.

Michele Catanzaro

Collection: Cancer at Nature Portfolio

News
07 Feb 2025

DeepMind AI crushes tough maths problems on par with top human solvers

The company's AlphaGeometry 2 reaches the level of gold-medal students in the International Mathematical Olympiad.

Davide Castelvecchi

News
07 Feb 2025

Scientists globally are racing to save vital health databases taken down amid Trump chaos

The mass-archiving effort is in response to the US Centers for Disease Control and Prevention removing some of its web pages.

Smriti Mallapaty

News
12 Feb 2025

How centuries of isolation shaped Greenlanders' unique genetics

Centuries of isolation have given Greenlanders a genetic profile that includes Arctic-specific variants.

Freda Kreier

News
06 Feb 2025

The weight-loss drugs being tested in 2025: will they beat Ozempic?

Drug companies are trialling a host of medications that they hope will offer benefits beyond weight loss.

Giorgia Guglielmi

News
13 Feb 2025

Are PhDs losing their lustre? Why fewer students are enrolling in doctoral degrees

High living costs paired with stagnant stipends are being blamed for a drop in PhD enrolments in several countries.

Diana Kwon

News
10 Feb 2025

Earth's mysterious inner core really is changing shape

Earthquakes ringing through the planet illuminate how its heart is transforming.

Alexandra Witze

News
10 Feb 2025

A man was destined for early Alzheimer's — these genes might explain his escape

Scientists identify nine genetic variants that could have helped a man to avoid dementia for at least two decades longer than expected.

Sara Reardon

Features

News Feature
19 Feb 2025

Exclusive: These universities have the most retracted scientific articles

A first-of-its-kind analysis by *Nature* reveals which institutions are retraction hotspots.

Richard Van Noorden

News Feature
18 Feb 2025

Migraine is more than a headache — a radical rethink offers hope to one billion people

Drugs that can prevent or relieve migraine attacks are only effective for some people. Research is starting to untangle the reasons why.

Fred Schwaller

Top of page ⤴

Books & Arts

Essay

Essay
17 Feb 2025

Money and murder: the dark side of the Asilomar meeting on recombinant DNA

The famed 1975 conference about a controversial genetic technology is feted as an example of how scientific self-regulation works. But more significant is what wasn't discussed.

Matthew Cobb

Essay
18 Feb 2025

China made waves with Deepseek, but its real ambition is AI-driven industrial innovation

The country is betting on AI to develop practical, cost-effective business tools for global markets, especially lower-income countries.

Jacob Dreyer

Book Review

Book Review
17 Feb 2025

Researchers overlooked airborne diseases for centuries — then COVID-19 changed everything

A fascinating exploration of microbes that can travel through the air reveals how the pandemic marked a turning point for a crucial research field.

Linsey C. Marr

Book Review
07 Feb 2025

Poetry on Mars and robots on Earth: Books in brief

Andrew Robinson reviews five of the best science picks.

Andrew Robinson

Top of page ⤴

Opinion

Obituary

Obituary
11 Feb 2025

Federico Mayor Zaragoza obituary: former UNESCO chief who championed neonatal screening

The biochemist introduced the first heel-prick tests for newborn babies in Spain, protecting infants from life-changing metabolic conditions.

Jesús Avila, Federico Mayor Jr & Paola Bovolenta

Correspondence

Correspondence
18 Feb 2025

A giant leap for machine translation could be even bigger

Chao Su

Correspondence
18 Feb 2025

Don’t overlook the mental-health costs of California’s wildfires

Shir Mor-Ben-Ishai, Yafit Levin & Menachem Ben-Ezra

Correspondence
18 Feb 2025

Charles Darwin saw the importance of development in evolution

Yongsheng Liu

Correspondence
18 Feb 2025

A sustainable ocean needs thriving ocean societies

Joachim Claudet, Jessica Blythe & David Gill

Top of page ⤴

Work

Feature

Career Feature
17 Feb 2025

Here’s how to bag a hefty research prize to turbocharge innovation

‘Challenge’ prizes are growing in popularity, but stimulating creativity takes more than financial incentives.

Rachel Brazil

Technology Feature

Technology Feature
18 Feb 2025

Why is it so hard to rewrite a genome?

Synthetic biologists have the know-how and ambition to retool whole genomes. But the hidden complexity of biological systems continues to surprise them.

Michael Eisenstein

Where I Work

Where I Work
17 Feb 2025

‘Talking won’t save the planet’: uniting efforts to save Panama’s parks

Juan Carlos Navarro shares his hopes and frustrations as he works to protect his country’s biodiversity and fight climate change.

Esme Hedley

Top of page ⤴

Research

News & Views

News & Views
29 Jan 2025

Conservation strategies aided by assessment of global genetic diversity

An analysis of published data reveals how genetic diversity has been changing in populations of 622 terrestrial and marine species and the effectiveness of different types of intervention to boost genetic diversity.

David Nogués-Bravo & Carsten Rahbek

News & Views
19 Feb 2025

The secrets of static electricity are finally being revealed

The mechanism that causes static electricity to build up is a mystery. Experiments now reveal that materials 'remember' past contacts with each other — and this determines how electric charge is transferred in future contacts.

Daniel J. Lacks & Mamadou Sow

News & Views
18 Feb 2025

The 1925 debate about adopting the word 'scientist' heats up

The pros and cons of a word gaining popularity, and publication of an updated edition of a book by Charles Darwin in this week's pick from the *Nature* archive.

News & Views
07 Jan 2025

The structure of bad cholesterol comes into focus

Insights into how cholesterol-carrying low-density lipoproteins are structured, and how they interact with receptors to enter cells, could help to clarify the role of these particles in cardiovascular disease.

W. Sean Davidson

News & Views
28 Jan 2025

Ancient human genomes offer clues about the earliest migrations out of Africa

Analyses of 45,000-year-old bones from Europe allow scientists to pin down when modern humans interbred with Neanderthals, shedding light on the histories of populations with no present-day descendants.

María Martinón-Torres & Carles Lalueza-Fox

Perspective

Perspective
19 Feb 2025

Artificial intelligence for modelling infectious disease epidemics

This Perspective considers the application to infectious disease modelling of AI systems that combine machine learning, computational statistics, information retrieval and data science.

Moritz U. G. Kraemer, Joseph L.-H. Tsui ... Samir Bhatt

Articles

Article
12 Feb 2025

Hydrogen escaping from a pair of exoplanets smaller than Neptune

Ongoing hydrogen loss from two sibling exoplanets provides support for the role of such hydrogen loss in the evolution of close-orbiting sub-Neptunes.

R. O. Parke Loyd, Ethan Schreyer ... David R. Ardila

Article
Open Access
12 Feb 2025

Direct experimental constraints on the spatial extent of a neutrino wavepacket

An innovative method using superconducting sensors precisely measures the recoil energy of lithium-7 nuclei, setting a lower limit on the spatial extent of neutrino wavepackets, advancing understanding of neutrino properties and weak nuclear decays.

Joseph Smolsky, Kyle G. Leach ... William K. Warburton

Article
12 Feb 2025

Manipulation of the altermagnetic order in CrSb via crystal symmetry

The altermagnetic order in CrSb films can be manipulated via crystal symmetry; the reconstructed altermagnetic order generates a room-temperature spontaneous anomalous Hall effect and designable switching modes as field-assisted and field-free modes.

Zhiyuan Zhou, Xingkai Cheng ... Cheng Song

Article
Open Access
19 Feb 2025

Interferometric single-shot parity measurement in InAs–Al hybrid devices

A device architecture based on indium arsenide–aluminium heterostructures with a gate-defined superconducting nanowire allows single-shot interferometric measurement of fermion parity and demonstrates an assignment error probability of 1%.

Morteza Aghaee, Alejandro Alcaraz Ramirez ... Justin Zilke

Article
Open Access
19 Feb 2025

World and Human Action Models towards gameplay ideation

A state-of-the-art generative artificial intelligence model of a video game is introduced to allow the support of human creative ideation, with the analysis of user study data highlighting three necessary capabilities, namely, consistency, diversity and persistency.

Anssi Kanervisto, Dave Bignell ... Katja Hofmann

Article
Open Access
19 Feb 2025

Spontaneous ordering of identical materials into a triboelectric series

Nominally identical materials are found to spontaneously order into triboelectric series over repeated processes, which is found to be driven by the act of contact itself using experiments as well as numerical simulations.

Juan Carlos Sobarzo, Felix Pertl ... Scott Waitukaitis

Article
Open Access
12 Feb 2025

Aqueous-based recycling of perovskite photovoltaics

A recycling strategy based predominantly on the use of water to restore and reuse valuable components from perovskite photovoltaic waste is described, with recycled devices showing similar efficiency and stability compared with fresh devices.

Xun Xiao, Niansheng Xu ... Feng Gao

Article
12 Feb 2025

External Li supply reshapes Li deficiency and lifetime limit of batteries

A strategy is reported that improves the performance and lifetime of lithium-ion batteries by adding organic Li salt after assembly, which decomposes during cell formation, liberating Li ions and expelling organic ligands as gases.

Shu Chen, Guanbin Wu ... Yue Gao

Article
12 Feb 2025

Stronger and coarser-grained biodegradable zinc alloys

Extruded zinc alloys of dilute compositions can achieve ultrahigh strength and excellent durability when their micron-scale grain size is increased.

Chengcheng Wu, Fengxiang Lin ... Jian-Feng Nie

Article
12 Feb 2025

Shielding Pt/γ-Mo_2N by inert nano-overlays enables stable H_2 production

Atomically dispersed inert oxide nano-overlays on a highly active Pt/γ-Mo_2N catalyst can block the redundant surface sites of γ-Mo_2N responsible for surface oxidation of this reactive support and the resulting deactivation, without compromising the intrinsic activity of active Pt@Mo2N interface.

Zirui Gao, Aowen Li ... Ding Ma

Article
Open Access
11 Dec 2024

Aromatic ring-opening metathesis

Aromatic ring-opening metathesis using Schrock–Hoveyda molybdenum catalysts enables the efficient cleavage of stable aromatic compounds such as tetraphene and naphthalene, offering controlled transformations without reagents or photoexcitation and overcoming previous challenges in aromatic bond cleavage.

Valeriia Hutskalova & Christof Sparr

Article
Open Access
29 Jan 2025

Global meta-analysis shows action is needed to halt genetic diversity loss

A comprehensive meta-analysis of global terrestrial and marine genetic diversity covering more than three decades of research demonstrates rapid loss of genetic diversity and identifies conservation interventions that could mitigate this process.

Robyn E. Shaw, Katherine A. Farquharson ... Catherine E. Grueber

---

Article
Open Access
12 Dec 2024

Earliest modern human genomes constrain timing of Neanderthal admixture

High-coverage and low-coverage genomic data for some of the earliest modern humans in Europe provide insights into recent admixture with Neanderthals and familial relationship links with distant communities approximately 45,000 years ago.

Arev P. Sümer, Hélène Rougier ... Johannes Krause

Article
Open Access
29 Jan 2025

Expanding the human gut microbiome atlas of Africa

A cross-sectional study from four African countries shows the importance of investigating the gut microbiome in previously under-represented populations and provides a framework for equitable microbiome research.

Dylan G. Maghini, Ovokeraye H. Oduaran ... Scott Hazelhurst

Article
Open Access
15 Jan 2025

Prolonged persistence of mutagenic DNA lesions in somatic cells

Persistent DNA lesions can occur throughout the human lifespan and can remain in the genome of affected cells for several years and generate a substantial proportion of the mutational burden.

Michael Spencer Chapman, Emily Mitchell ... Peter J. Campbell

---

Article
15 Jan 2025

Episodic and associative memory from spatial scaffolds in the hippocampus

A neocortical–entorhinal–hippocampal network model based on grid cell states recapitulates experimental results and reconciles the spatial, associative and episodic memory roles of the hippocampus.

Sarthak Chandra, Sugandha Sharma ... Ila Fiete

Article
Open Access
15 Jan 2025

Autoactive CNGC15 enhances root endosymbiosis in legume and wheat

Nuclear calcium oscillations initiate plant–arbuscular mycorrhiza and nitrogen-fixing bacteria symbioses for nutrient acquisition, with a newly discovered autoactive CNGC15 mutant enhancing these partnerships, potentially improving crop nutrition and reducing inorganic fertilizer dependence.

Nicola M. Cook, Giulia Gobbato ... Myriam Charpentier

Article
22 Jan 2025

RELMβ sets the threshold for microbiome-dependent oral tolerance

RELMβ mediates a gut immune–epithelial circuit regulating tolerance to food antigens, offering targetable candidates for the prevention and treatment of food allergies.

Emmanuel Stephen-Victor, Gavin A. Kuziel ... Talal A. Chatila

---

Article
08 Jan 2025

A vision–language foundation model for precision oncology

Trained on unlabelled, unpaired image and text data, the Multimodal transformer with Unified maSKed modeling excelled in outcome prediction, image-to-text retrieval and visual question answering, potentially improving cancer diagnosis and therapy precision.

Jinxi Xiang, Xiyue Wang ... Ruijiang Li

Article
Open Access
22 Jan 2025

Multiscale footprints reveal the organization of *cis*-regulatory elements

We developed PRINT, a computational method that identifies footprints of DNA–protein interactions from bulk and single-cell chromatin accessibility data across multiple scales of protein size.

Yan Hu, Max A. Horlbeck ... Jason D. Buenrostro

Article
25 Sept 2024

Transferrin receptor targeting chimeras for membrane protein degradation

Transferrin receptor targeting chimeras have been developed that enable targeting of drug resistance in epidermal growth factor receptor-driven lung cancer and reversible control of human primary chimeric antigen receptor T cells, representing a promising new family of bifunctional antibodies for targeted cancer therapy.

Dingpeng Zhang, Jhoely Duque-Jimenez ... Xin Zhou

Article
Open Access
25 Sept 2024

Designed endocytosis-inducing proteins degrade targets and amplify signals

Computationally designed genetically encoded proteins can be used to target surface proteins, thereby triggering endocytosis and subsequent intracellular degradation, activating signalling or increasing cellular uptake in specific tissues.

Buwei Huang, Mohamad Abedi ... David Baker

Article
Open Access
14 Nov 2024

Engineered receptors for soluble cellular communication and disease sensing

A synthetic receptor platform that enables mammalian cells to respond to soluble factors allows specific signalling networks to be precisely controlled, with a variety of therapeutic applications.

Dan I. Piraner, Mohamad H. Abedi ... Kole T. Roybal

Article
08 Jan 2025

Satellite DNA shapes dictate pericentromere packaging in female meiosis

Divergent satellite DNA shapes influence architectural protein binding and chromatin organization in two mouse species so that the satellites can be packaged and centromere function maintained, mitigating the evolutionary cost of satellite DNA expansion.

Damian Dudka, Jennine M. Dawicki-McKenna ... Ben E. Black

Article
Open Access
22 Jan 2025

A map of the rubisco biochemical landscape

A massively parallel assay developed to map the essential photosynthetic enzyme rubisco showed that non-trivial biochemical changes and improvements in CO_2 affinity are possible, signposting further enzyme engineering efforts to increase crop yields.

Noam Prywes, Naiya R. Phillips ... David F. Savage

Article
11 Dec 2024

Structure of apolipoprotein B100 bound to the low-density lipoprotein receptor

Cryo-electron microscopy structures of apolipoprotein B100 (apoB100) in complex with the LDL receptor (LDLR) provide insight into binding interfaces and explain how mutations in apoB100 or in LDLR can give rise to familial hypercholesterolaemia.

Mart Reimund, Altaira D. Dearborn ... Joseph Marcotrigiano

Article
Open Access
11 Dec 2024

The structure of apolipoprotein B100 from human low-density lipoprotein

The structure of apolipoprotein B100 provides insights into how the various domains of apoB100 act in concert to maintain low-density lipoprotein shape and cohesion across a range of particle sizes.

Zachary T. Berndsen & C. Keith Cassidy

Matters Arising

Matters Arising
19 Feb 2025

Sequence clustering confounds AlphaFold2

Joseph W. Schafer, Myeongsang Lee ... Lauren L. Porter

Matters Arising
19 Feb 2025

Atlantic oceanic droughts do not threaten Asian water tower

Yutong Zhao, Chaoyi Xu ... Xinhui Ji

Matters Arising
19 Feb 2025

Reply to: Atlantic oceanic droughts do not threaten Asian water tower

Qiang Zhang, Zexi Shen ... Gang Wang

Matters Arising
19 Feb 2025

Insufficient evidence for natural selection associated with the Black Death

Alison R. Barton, Cindy G. Santander ... Iain Mathieson

Matters Arising
19 Feb 2025

Reply to: Insufficient evidence for natural selection associated with the Black Death

Tauras P. Vilgalys, Jennifer Klunk ... Luis B. Barreiro

Top of page ⤴

Amendments & Corrections

Author Correction
31 Jan 2025

Author Correction: FBP1 controls liver cancer evolution from senescent MASH hepatocytes

Li Gu, Yahui Zhu ... Michael Karin

Author Correction
31 Jan 2025

Author Correction: Stromal changes in the aged lung induce an emergence from melanoma dormancy

Mitchell E. Fane, Yash Chhabra ... Ashani T. Weeraratna

Author Correction
Open Access
03 Feb 2025

Author Correction: Joint speech and text machine translation for up to 100 languages

Loïc Barrault, Yu-An Chung ... Skyler Wang

Publisher Correction
03 Feb 2025

Publisher Correction: Placenta-tropic VEGF mRNA lipid nanoparticles ameliorate murine pre-eclampsia

Kelsey L. Swingle, Alex G. Hamilton ... Michael J. Mitchell

Retraction
27 Jan 2025

Retraction Note: A mechanism for the suppression of homologous recombination in G1 cells

Alexandre Orthwein, Sylvie M. Noordermeer ... Daniel Durocher

Editorial Expression of Concern
29 Jan 2025

Editorial Expression of Concern: 53BP1 is a reader of the DNA-damage-induced H2A Lys 15 ubiquitin mark

Amélie Fradet-Turcotte, Marella D. Canny ... Daniel Durocher

Top of page ⤴

Nature (*Nature*) | ISSN 1476-4687 (online) | ISSN 0028-0836 (print)

About Nature Portfolio
About us
Press releases
Press office
Contact us

Discover content
Journals A-Z
Articles by subject
protocols.io
Nature Index

Publishing policies
Nature portfolio policies
Open access

Author & Researcher services
Reprints & permissions
Research data
Language editing
Scientific editing
Nature Masterclasses
Research Solutions

Libraries & institutions
Librarian service & tools
Librarian portal
Open research
Recommend to library

Advertising & partnerships
Advertising
Partnerships & Services
Media kits
Branded content

Professional development
Nature Careers
Nature Conferences

Regional websites
Nature Africa
Nature China
Nature India
Nature Italy
Nature Japan
Nature Middle East

Privacy Policy
Use of cookies
Your privacy choices/Manage cookies
Legal notice
Accessibility statement
Terms & Conditions
Your US state privacy rights

SPRINGER NATURE

© 2025 Springer Nature Limited