518 & 583
Structure of a membrane oxidase

CONTENTS
29 APRIL 2016 • VOLUME 352 • ISSUE 6285

NEWS

IN BRIEF
498 News at a glance

IN DEPTH
501 HOW EUROPE EXPORTED THE BLACK DEATH
DNA suggests that the Asia-born pathogen lingered in Europe, then spread eastward By A. Lawler

502 CRITICS COMPLAIN AS U.S. SHOPS IN IRAN’S NUCLEAR BAZAAR
Heavy water purchase will benefit science, industry By R. Stone

503 SAYING NO TO HARASSMENT
Roiled by high-profile cases in the field and at conferences, anthropology works to change its culture By A. Gibbons and E. Culotta

504 KEPLER ENLISTS RELATIVITY TO FIND PLANETS
Exotic search technique promises a small but rich harvest of extrasolar worlds By D. Clery

506 SCANDAL CLOUDS CHINA’S GLOBAL VACCINE AMBITIONS
Porous regulation of private preparations threatens to undermine vaccinmakers’ bid to boost exports By K. McLaughlin

507 MEXICO STRUGGLES TO WOO EXPAT GENOME JOCKS
Young guns flocking back to their homeland face a daunting bureaucracy By L. Wade

FEATURES

508 WHO’S DOWNLOADING PIRATED PAPERS? EVERYONE
Data from the controversial website Sci-Hub reveal that the whole world turns to it for journal articles By J. Bohnannon

511 The frustrated science student behind Sci-Hub By J. Bohnannon
▶ EDITORIAL P. 497

514 A FRESH EYE ON NONEQUILIBRIUM SYSTEMS
A noninvasive probe reveals nonequilibrium behavior in systems at steady state By J.-F. Rupprecht and J. Prost
▶ REPORT P. 604

516 LIQUIDITY IN IMMUNE CELL SIGNALING
Phase separation of proteins into liquid-like microclusters promotes T cell receptor signaling By M. L. Dustin and J. Muller
▶ REPORT P. 595

517 IONIC CONTROL OF SLEEP AND WAKEFULNESS
The ionic composition of brain fluid is linked to neuronal activity and sleep By H.-P. Landolt and S. C. Holst
▶ RESEARCH ARTICLE P. 550

518 A BACTERIAL OXIDASE LIKE NO OTHER?
The structure of an oxidase found in many pathogens will help in drug development By G. M. Cook and R. K. Poole
▶ REPORT P. 583

INSIGHTS

PERSPECTIVES

520 LIGHT FLIPS A MEMBRANE-EMBEDDED HELIX
A folded helical chain can switch its handedness even in a viscous membrane environment By C. M. Thiele and A. S. Ulrich
▶ REPORT P. 575

521 THE GROWING PROBLEM OF PATENT TROLLING
Cash-hungry patent trolls are squelching innovation—and should be screened out By L. Cohen et al.
▶ PODCAST

BOOKS ET AL.

524 PANDEMIC
By S. Shah, reviewed by C. Kemp

525 ARE WE SMART ENOUGH TO KNOW HOW SMART ANIMALS ARE?
By F. de Waal, reviewed by N. Clayton

525 IT’S ALL IN YOUR HEAD
By S. O’Sullivan

LETTERS

526 WOLBACHIA MOSQUITO CONTROL: TESTED
By S. L. O’Neill

526 WOLBACHIA MOSQUITO CONTROL: REGULATED
By S. L. Dobson et al.

527 TECHNICAL COMMENT ABSTRACTS

DEPARTMENTS

497 EDITORIAL
My love-hate of Sci-Hub By Marcia McNutt
▶ NEWS STORY P. 508

622 WORKING LIFE
The hidden perks of grad school By Nathan Johnson

Science Staff ............................................. 496
AAAS News & Notes ..................................529
New Products ............................................. 617
Science Careers ......................................... 618

Published by AAAS
560 MICROBIOME
Population-level analysis of gut microbiome variation G. Falony et al.
▶ MICROBIOME SECTION P. 530; REPORT P. 565

555 REPRODUCTIVE BIOLOGY
Unconventional endocannabinoid signaling governs sperm activation via the sex hormone progesterone M. R. Miller et al.

560 MICROBIOME
Population-level analysis of gut microbiome variation G. Falony et al.
▶ MICROBIOME SECTION P. 530; REPORT P. 565

565 MICROBIOME
Population-based metagenomics analysis reveals markers for gut microbiome composition and diversity A. Zhernakova et al.
▶ MICROBIOME SECTION P. 530; RESEARCH ARTICLE P. 560

569 ORGANIC CHEMISTRY
Kinetically controlled E-selective catalytic olefin metathesis T. T. Nguyen et al.

575 CHEMISTRY
Conformational photoswitching of a synthetic peptide foldamer bound within a phospholipid bilayer M. De Poli et al.
▶ PERSPECTIVE P. 520

580 GEOCHEMISTRY
Pressure-dependent isotopic composition of iron alloys A. Shahar et al.

583 STRUCTURAL BIOLOGY
Structure of a bd oxidase indicates similar mechanisms for membrane-integrated oxygen reductases S. Safarian et al.
▶ PERSPECTIVE P. 518

586 MICROBIOME
Durable coexistence of donor and recipient strains after fecal microbiota transplantation S. S. Li et al.
▶ MICROBIOME SECTION P. 530

590 REPTILE SLEEP
Slow waves, sharp waves, ripples, and REM in sleeping dragons M. Shein-Idelson et al.

595 SIGNAL TRANSDUCTION
Phase separation of signaling molecules promotes T cell receptor signal transduction X. Su et al.
▶ PERSPECTIVE P. 516

600 HUMAN GENETICS
RNA splicing is a primary link between genetic variation and disease Y. I. Li et al.

604 BIOPHYSICS
Broken detailed balance at mesoscopic scales in active biological systems C. Battle et al.
▶ PERSPECTIVE P. 514

608 MICROBIOTA
Helminth infection promotes colonization resistance via type 2 immunity D. Ramanan et al.
▶ MICROBIOLOGY SECTION P. 530

SPECIAL SECTION
Microbiome
INTRODUCTION
530 Manipulating the microbiota

REVIEWS
532 Cross-species comparisons of host genetic associations with the microbiome J. K. Goodrich et al.
535 Resurrecting the intestinal microbiota to combat antibiotic-resistant pathogens E. G. Pamer
539 How colonization by microbiota in early life shapes the immune system T. Gensollen et al.

PERSPECTIVE
544 Antibiotic use and its consequences for the normal microbiome M. J. Blaser

SEE ALSO
▶ RESEARCH ARTICLE P. 560
▶ REPORT P. 565
▶ REPORT P. 566
▶ REPORT P. 568

ON THE COVER
Artist’s interpretation of a person’s gut microbiota. Many factors contribute to the overall health of the microbiota: the bacteria themselves (depicted as either “good” or “bad” in blue and red, respectively), parasitic worms, viruses, food, medications, and our genetics, among other factors. Recent research on the microbiota and how it may be manipulated for better health is highlighted in a special section beginning on page 530. Illustration: Nigel Susman
Science 352 (6285), 497-622.