CONTENTS

4 NOVEMBER 2016 • VOLUME 354 • ISSUE 6312

SPECIAL SECTION

Pain research

INTRODUCTION
564 The future of pain research

NEWS
566 Pot and pain By G. Miller
569 Primed for pain By K. Servick

REVIEWS
572 Pain regulation by non-neuronal cells and inflammation R.-R. Ji et al.
578 Neural circuits for pain: Recent advances and current views C. Peirs and R. P. Seal
584 Deconstructing the sensation of pain: The influence of cognitive processes on pain perception K. Wiech
588 Exploring pain pathophysiology in patients C. Sommer

SEE ALSO
▶ EDITORIAL P. 529 ▶ PODCAST ▶ VIDEO

ON THE COVER
A woman holds her hand in ice water, one of several techniques used to measure pain tolerance. Typically, healthy people can submerge their hands for up to 5 minutes. However, for some of those taking opioids, 10 to 15 seconds is the limit, suggesting opioid-induced hypersensitivity to pain. For more on recent developments in pain research, see the special section beginning on page 564. Photo: Matthew Rakola

NEWS

IN BRIEF
530 News at a glance

IN DEPTH
533 SEA ICE SHRINKS IN STEP WITH CARBON EMISSIONS
Models may underestimate the pace of ice loss because they are missing Arctic warming By W. Cornwall
▶ REPORT BY D. NOTZ ET AL. 10.1126/science.aag2345

534 AMBITIOUS WEB FUNDRAISING STARTUP FAILS TO MEET BIG GOALS
Hundreds of scientists paid fees to have their work featured on Benefunder, but very few received donations By M. Harris

535 CONTROVERSIAL HIV VACCINE STRATEGY GETS A SECOND CHANCE
Modest success in Thailand inspires South Africa trial By J. Cohen

536 ‘FOUR-LEGGED SNAKE’ MAY BE ANCIENT LIZARD INSTEAD
Controversy swirls around fossil, which is no longer accessible By C. Gramling

537 DATA CHECK: CALIFORNIA RULES U.S. CORPORATE RESEARCH
Survey shows California has widened its lead in state-by-state analysis of what companies spend on research By J. Mervis

FEATURES
538 MICE MADE EASY
The genome-editing tool CRISPR upends the vital business of creating mutant mice By J. Cohen

541 A reporter does CRISPR
By J. Cohen
▶ VIDEO

INSIGHTS

PERSPECTIVES
544 BUILDING BRIDGES TO REGENERATE AXONS
A secreted factor stimulates glia to mend spinal cord injury By P. R. Williams and Z. He
▶ REPORT P. 630

546 A TESTING TIME FOR ANTIMATTER
Precision measurement of antiprotonic helium provides a test of physical laws By W. Ubachs
▶ REPORT P. 610

547 MIGRATORY BIRDS UNDER THREAT
Habitat degradation and loss, illegal killings, and climate change threaten European migratory bird populations By F. Bairlein

549 HOW TOBACCO SMOKE CHANGES THE (EPI)GENOME
Distinct mutation types are found in diverse cancers associated with smoking By G. P. Pfeifer
▶ REPORT P. 618

550 DEEP-SEA CORALS FEEL THE FLOW
Uranium isotope data from deep-water corals help to resolve conflicting results from shallow-water corals By Y. Yokoyama and T. M. Esat
▶ REPORT P. 626

552 TIPS FOR BATTLING BILLION-DOLLAR BEETLES
Tiny insecticidal proteins (Tips) kill pests that evolved resistance to engineered corn By B. E. Tabashnik
▶ REPORT P. 634

553 A RADICAL APPROACH TO POSTTRANSLATIONAL MUTAGENESIS
▶ RESEARCH ARTICLE P. 597; REPORT P. 623

POLICY FORUM
555 WATER STRATEGIES FOR THE NEXT ADMINISTRATION
Water policy offers opportunity for nonpartisan agreement By P. H. Gleick

Downloaded from http://science.sciencemag.org/ on May 25, 2017