Liste erstellt am 2012-06-30

Literatur

Afrika

Dunne 2012

Julie Dunne et al., *First dairying in green Saharan Africa in the fifth millennium BC*. nature **486** (2012), 390–394.

n486-0390-Supplement.pdf

Julie Dunne, Richard P. Evershed, Mélanie Salque, Lucy Cramp, Silvia Bruni, Kathleen Ryan, Stefano Biagetti & Savino di Lernia

In the prehistoric green Sahara of Holocene North Africa-in contrast to the Neolithic of Europe and Eurasia-a reliance on cattle, sheep and goats emerged as a stable and widespread way of life, long before the first evidence for domesticated plants or settled village farming communities1-3. The remarkable rock art found widely across the region depicts cattle herding among early Saharan pastoral groups, and includes rare scenes of milking; however, these images can rarely be reliably dated4. Although the faunal evidence provides further confirmation of the importance of cattle and other domesticates5, the scarcity of cattle bones makes it impossible to ascertain herd structures via kill-off patterns, thereby precluding interpretations of whether dairying was practiced. Because pottery production begins early in northern Africa6 the potential exists to investigate diet and subsistence practices using molecular and isotopic analyses of absorbed food residues7. This approach has been successful in determining the chronology of dairying beginning in the 'Fertile Crescent' of the Near East and its spread across Europe8-11. Here we report the first unequivocal chemical evidence, based on the d13C and D13C values of the major alkanoic acids of milk fat, for the adoption of dairying practices by prehistoric Saharan African people in the fifth millennium BC. Interpretations are supported by a new database of modern ruminant animal fats collected from Africa. These findings confirm the importance of 'lifetime products', such as milk, in early Saharan pastoralism, and provide an evolutionary context for the emergence of lactase persistence in Africa.

Aktuell

Abt 2012

Michael C. Abt et al., *Commensal Bacteria Calibrate the Activation Threshold of Innate Antiviral Immunity*. Immunity (2012) preprint, 1–13. DOI:10.1016/j.immuni.2012.04.011.

Immun2012-preprint-Supplement.pdf

Michael C. Abt, Lisa C. Osborne, Laurel A. Monticelli, Travis A. Doering, Theresa Alenghat, Gregory F. Sonnenberg, Michael A. Paley, Marcelo Antenus, Katie L. Williams, Jan Erikson, E. John Wherry and David Artis

Signals from commensal bacteria can influence immune cell development and susceptibility to infectious or inflammatory diseases. However, the mechanisms by which commensal bacteria regulate protective immunity after exposure to systemic pathogens remain poorly understood. Here, we demonstrate that antibiotic-treated (ABX) mice exhibit impaired innate and adaptive antiviral immune responses and substantially delayed viral clearance after exposure to systemic LCMV or mucosal influenza virus. Furthermore, ABX mice exhibited severe bronchiole epithelial degeneration and increased host mortality after influenza virus infection. Genome-wide transcriptional profiling of macrophages isolated

from ABX mice revealed decreased expression of genes associated with antiviral immunity. Moreover, macrophages from ABX mice exhibited defective responses to type I and type II IFNs and impaired capacity to limit viral replication. Collectively, these data indicate that commensal-derived signals provide tonic immune stimulation that establishes the activation threshold of the innate immune system required for optimal antiviral immunity.

Bazin 2012

Daniel Bazin, *Symmetrical tin*. nature **486** (2012), 330–331.

The tin isotope 100Sn is the heaviest 'doubly magic nucleus' that has an equal number of protons and neutrons. It is now finally starting to give up its secrets, thanks to the persistent efforts of nuclear physicists.

Cockrill 2012

Antje Cockrill, *Does an iPod make you happy? An exploration of the effects of iPod ownership on life satisfaction*. Journal of Consumer Behaviour (2012) preprint, 1–9. DOI:10.1002/cb.1385.

The Apple iPod is currently the undisputed leading product in the global MP3 player market. This competitive advantage is due to the design, high functionality, and perhaps most importantly, the 'cool factor' which Apple has managed to obtain with its products. This study explores if owning an iPod (as opposed to another brand of MP3 player) makes a difference in the perception of general life satisfaction. Using Diener et al.'s generic satisfaction with life scale (SWLS) to measure the dependent variable life satisfaction, a model with the key concepts usage, benefits, peer influence, design, iPod phenomenon, and iPod bubble has been developed and tested in a variety of ways, including regression analysis. The sample consisted of a multinational sample of 240+ young adults, aged 18-35 years. The demographic profiles of iPod and non-iPod owners were very similar, but for iPod owners, 23 per cent of the variance in overall life satisfaction is explained by the key concepts used in this research. Key influencing variables for iPod owners are peer influence and design. For non-iPod owners, the amount of variance explained by the independent variables was negligible. iPod owners also considered their MP3 players to be much 'cooler' than did non-iPod owners. This article considers the managerial implications of these findings for Apple and for competing brands. The social implications of these findings and their significance are also discussed, and several potential areas for further research are highlighted.

Denrell 2012

Jerker Denrell & Chengwei Liu, *Top performers are not the most impressive when extreme performance indicates unreliability*. PNAS **109** (2012), 9331–9336.

The relationship between performance and ability is a central concern in the social sciences: Are the most successful much more able than others, and are failures unskilled? Prior research has shown that noise and self-reinforcing dynamics make performance unpredictable and lead to a weak association between ability and performance. Here we show that the same mechanisms that generate unpredictability imply that extreme performances can be relatively uninformative about ability. As a result, the highest performers may not have the highest expected ability and should not be imitated or praised. We show that whether higher performance indicates higher ability depends on whether extreme performance could be achieved by skill or requires luck.

regression to the mean | randomness | social learning | performance evaluation | ecological rationality

Goebel 2012

Rainer Goebel, *Position coding in the visual word form area.* PNAS **109** (2012), 9226–9227.

It should be noted that position invariance is only one aspect of the general problem of recognizing varying word representations. Besides position, size, and rotation, the largest challenge lies in achieving invariance for the letters that make up words (10). The same letter "a", for example, can appear in many different shapes depending on the font used to print the letter. It is far more economical to reach invariance for 26 letters than for tens of thousands of different words. Reading, however, does not only involve invariance to isolated letter shapes but requires the analysis of the order in which letters appear within a word. It would be interesting to learn whether the VWFA, although not (fully) invariant to position, contributes to solve these more difficult letter shape and letter string invariance problems.

Hatori 2012

Megumi Hatori et al., *Time-Restricted Feeding without Reducing Caloric Intake Prevents Metabolic Diseases in Mice Fed a High-Fat Diet.* Cell Metabolism **15** (2012), 848–860.

CellMetab15-848-Supplement1.pdf, CellMetab15-848-Supplement2.xls

Megumi Hatori, Christopher Vollmers, Amir Zarrinpar, Luciano DiTacchio, Eric A. Bushong, Shubhroz Gill, Mathias Leblanc, Amandine Chaix, Matthew Joens, James A. J. Fitzpatrick, Mark H. Ellisman and Satchidananda Panda

While diet-induced obesity has been exclusively attributed to increased caloric intake from fat, animals fed a high-fat diet (HFD) ad libitum (ad lib) eat frequently throughout day and night, disrupting the normal feeding cycle. To test whether obesity and metabolic diseases result from HFD or disruption of metabolic cycles, we subjected mice to either ad lib or time-restricted feeding (tRF) of a HFD for 8 hr per day. Mice under tRF consume equivalent calories from HFD as those with ad lib access yet are protected against obesity, hyperinsulinemia, hepatic steatosis, and inflammation and have improved motor coordination. The tRF regimen improved CREB, mTOR, and AMPK pathway function and oscillations of the circadian clock and their target genes' expression. These changes in catabolic and anabolic pathways altered liver metabolome and improved nutrient utilization and energy expenditure. We demonstrate in mice that tRF regimen is a nonpharmacological strategy against obesity and associated diseases.

Hinke 2012

C. B. Hinke et al., *Superallowed Gamow-Teller decay of the doubly magic nucleus* ^{100}Sn. nature **486** (2012), 341–345.

n486-0341-Supplement.pdf

C. B. Hinke, M. Böhmer, P. Boutachkov, T. Faestermann, H. Geissel, J. Gerl, R. Gernhäuser, M. Górska, A. Gottardo, H. Grawe, J. L. Grębosz, R. Krücken, N. Kurz, Z. Liu, L. Maier, F. Nowacki, S. Pietri, Zs. Podolyák, K. Sieja, K. Steiger, K. Straub, H. Weick, H.-J. Wollersheim, P. J. Woods, N. Al-Dahan, N. Alkhomashi, A. Ataç, A. Blazhev, N. F. Braun, I. T. Čeliković, T. Davinson, I. Dillmann, C. Domingo-Pardo, P. C. Doornenbal, G. de France, G. F. Farrelly, F. Farinon, N. Goel, T. C. Habermann, R. Hoischen, R. Janik, M. Karny, A. Kaşkaş, I. M. Kojouharov, Th. Kröll, Y. Litvinov, S. Myalski, F. Nebel, S. Nishimura, C. Nociforo, J. Nyberg, A. R. Parikh, A. Procházka, P. H. Regan, C. Rigollet, H. Schaffner, C. Scheidenberger, S. Schwertel, P.-A. Söderström, S. J. Steer, A. Stolz & P. Strmeň

The shell structure of atomic nuclei is associated with 'magic numbers' and originates in the nearly independent motion of neutrons and protons in a mean potential generated by all nucleons. During b1-decay, a proton transforms into a neutron in a previously not

fully occupied orbital, emitting a positron-neutrino pair with either parallel or antiparallel spins, in a Gamow-Teller or Fermi transition, respectively. The transition probability, or strength, of a Gamow-Teller transition depends sensitively on the underlying shell structure and is usually distributed among many states in the neighbouring nucleus. Here we report measurements of the half-life and decay energy for the decay of 100Sn, the heaviest doubly magic nucleus with equal numbers of protons and neutrons. In the b-decay of 100Sn, a large fraction of the strength is observable because of the large decay energy. We determine the largest Gamow-Teller strength so far measured in allowed nuclear b-decay, establishing the 'superallowed' nature of this Gamow-Teller transition. The large strength and the low-energy states in the daughter nucleus, 100In, are well reproduced by modern, large-scale shell model calculations.

Negishi 2012

Hideo Negishi et al., *Cross-interference of RLR and TLR signaling pathways modulates antibacterial T cell responses.* Nature Immunology **13** (2012), 659–666.

NatImmu13-0659-Supplement.pdf

Hideo Negishi, Hideyuki Yanai, Akira Nakajima, Ryuji Koshiba, Koji Atarashi, Atsushi Matsuda, Kosuke Matsuki, Shoji Miki, Takahiro Doi, Alan Aderem, Junko Nishio, Stephen T Smale, Kenya Honda & Tadatsugu Taniguchi

Although the mechanisms by which innate pathogen-recognition receptors enhance adaptive immune responses are increasingly well understood, whether signaling events from distinct classes of receptors affect each other in modulating adaptive immunity remains unclear. We found here that the activation of cytosolic RIG-I-like receptors (RLRs) resulted in the selective suppression of transcription of the gene encoding the p40 subunit of interleukin 12 (Il12b) that was effectively induced by the activation of Toll-like receptors (TLRs). The RLR-activated transcription factor IRF3 bound dominantly, relative to IRF5, to the Il12b promoter, where it interfered with the TLR-induced assembly of a productive transcription-factor complex. The activation of RLRs in mice attenuated TLR-induced responses of the T helper type 1 cell (TH1 cell) and interleukin 17-producing helper T cell (TH17 cell) subset types and, consequently, viral infection of mice caused death at sublethal doses of bacterial infection. The innate immune receptor cross-interference we describe may have implications for infection-associated clinical episodes.

Rauschecker 2012

Andreas M. Rauschecker, Reno F. Bowen, Josef Parvizi & Brian A. Wandell, *Position sensitivity in the visual word form area.* PNAS **109** (2012), 9244–9245.

pnas109-09244-Fulltext.pdf

Seeing words involves the activity of neural circuitry within a small region in human ventral temporal cortex known as the visual word formarea (VWFA). It is widely asserted that VWFA responses, which are essential for skilled reading, do not depend on the visual field position of the writing (position invariant). Such position invariance supports the hypothesis that the VWFA analyzes word forms at an abstract level, far removed from specific stimulus features. Using functional MRI pattern-classification techniques, we show that position information is encoded in the spatial pattern of VWFA responses. A right-hemisphere homolog (rVWFA) shows similarly position-sensitive responses. Furthermore, electrophysiological recordings in the human brain show position-sensitive VWFA response latencies. These findings show that position-sensitive information is present in the neural circuitry that conveys visual word form information to language areas. The presence of position sensitivity in the VWFA has implications for how word forms might be learned and stored within the reading circuitry.

tolerance | retinotopy | perception | vision | functional MRI

Amerika

McMichael 2012

C. H. McMichael et al., *Sparse Pre-Columbian Human Habitation in Western Amazonia*. science **336** (2012), 1429–1431.

s336-1429-Supplement.pdf

C. H. McMichael, D. R. Piperno, M. B. Bush, M. R. Silman, A. R. Zimmerman, M. F. Raczka, L. C. Lobato

Locally extensive pre-Columbian human occupation and modification occurred in the forests of the central and eastern Amazon Basin, but whether comparable impacts extend westward and into the vast terra firme (interfluvial) zones, remains unclear. We analyzed soils from 55 sites across central and western Amazonia to assess the history of human occupation. Sparse occurrences of charcoal and the lack of phytoliths from agricultural and disturbance species in the soils during pre-Columbian times indicated that human impacts on interfluvial forests were small, infrequent, and highly localized. No human artifacts or modified soils were found at any site surveyed. Riverine bluff areas also appeared less heavily occupied and disturbed than similar settings elsewhere. Our data indicate that human impacts on Amazonian forests were heterogeneous across this vast landscape.

Datierung

Hellstrom 2012

John Hellstrom, *Absolute Dating of Cave Art*. science **336** (2012), 1387–1388.

Use of uranium-thorium dating shows that cave art in Spain is older than expected.

Pike 2012

Alistair W. G. Pike, *U-Series Dating of Paleolithic Art in 11 Caves in Spain*. science **336** (2012), 1409–1413.

s336-1409-Supplement.pdf

A. W. G. Pike, D. L. Hoffmann, M. García-Diez, P. B. Pettitt, J. Alcolea, R. De Balbín, C. González-Sainz, C. de las Heras, J. A. Lasheras, R. Montes, J. Zilhão

Paleolithic cave art is an exceptional archive of early human symbolic behavior, but because obtaining reliable dates has been difficult, its chronology is still poorly understood after more than a century of study. We present uranium-series disequilibrium dates of calcite deposits overlying or underlying art found in 11 caves, including the United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage sites of Altamira, El Castillo, and Tito Bustillo, Spain. The results demonstrate that the tradition of decorating caves extends back at least to the Early Aurignacian period, with minimum ages of 40.8 thousand years for a red disk, 37.3 thousand years for a hand stencil, and 35.6 thousand years for a claviform-like symbol. These minimum ages reveal either that cave art was a part of the cultural repertoire of the first anatomically modern humans in Europe or that perhaps Neandertals also engaged in painting caves.

Isotope

Bentley 2012

R. Alexander Bentley et al., *Community differentiation and kinship among Europe's first farmers*. PNAS **109** (2012), 9326–9330.

pnas109-09326-Supplement.docx

R. Alexander Bentley, Penny Bickle, Linda Fibiger, Geoff M. Nowell, Christopher W. Dale, Robert E. M. Hedges, Julie Hamilton, Joachim Wahl, Michael Francken, Gisela Grupe, Eva Lenneis, Maria Teschler-Nicola, Rose-Marie Arbogast, Daniela Hofmann and Alasdair Whittle

Community differentiation is a fundamental topic of the social sciences, and its prehistoric origins in Europe are typically assumed to lie among the complex, densely populated societies that developed millennia after their Neolithic predecessors. Here we present the earliest, statistically significant evidence for such differentiation among the first farmers of Neolithic Europe. By using strontium isotopic data from more than 300 early Neolithic human skeletons, we find significantly less variance in geographic signatures among males than we find among females, and less variance among burials with ground stone adzes than burials without such adzes. From this, in context with other available evidence, we infer differential land use in early Neolithic central Europe within a patrilocal kinship system.

Jaouen 2012

Klervia Jaouen, Vincent Balter, Estelle Herrscher, Aline Lamboux, Philippe Telouk & Francis Albarède, *Fe and Cu Stable Isotopes in Archeological Human Bones and Their Relationship to Sex*. American Journal of Physical Anthropology **148** (2012), 334–340.

Accurate sex assignment of ancient human remains usually relies on the availability of coxal bones or well-preserved DNA. Iron (Fe) and copper (Cu) stable isotope compositions (56Fe/54Fe and 65Cu/63Cu, respectively) were recently measured in modern human blood, and an unexpected result was the discovery of a 56Fe-depletion and a 65Cu-enrichment in men's blood compared to women's blood. Bones, being pervasively irrigated by blood, are expected to retain the 56Fe/54Fe and 65Cu/63Cu signature of blood, which in turn is useful for determining the sex of ancient bones. Here, we report the 56Fe/54Fe, 65Cu/63Cu, and 66Zn/64Zn ratios from a suite of well-preserved phalanxes (n = 43) belonging to individuals buried in the 17th and 18th centuries at the necropolis of Saint-Laurent de Grenoble, France, and for which the sex was independently estimated from pelvic bone morphology. The metals were purified from the bone matrix by liquid chromatography on ion exchange resin and the isotope compositions were measured by multiple-collector inductively coupled plasma mass spectrometry. The results show that, as expected from literature data on blood, male bone iron is depleted in 56Fe and enriched in 65Cu relative to female. No sex difference is found in the 66Zn/64Zn ratios of bone. The concentration and isotopic data show no evidence of soil contamination. Four samples of five (77 %) can be assigned their correct sex, a result comparable to sex assignment using Fe and Cu isotopes in blood (81 %). Isotopic analysis of metals may therefore represent a valid method of sex assignment applicable to incomplete human remains.

KEY WORDS: metal stable isotopes; iron; copper; zinc; sex determination

Klima

Kurita 2012

Naoyuki Kurita, *Dancing to the Tune of the Glacial Cycles*. science **336** (2012), 1242–1243.

An oxygen isotopic record from Borneo shows how the tropical water cycle responded to deglaciations and interglacials in the past half-million years.

To understand these different responses of tropical climate to high-latitude climate change, it is crucial to consider what oxygen isotopic variations in stalagmites represent. Stalagmites build up from groundwater precipitate recharged by meteoric water

(that is, water in the ground that originates from precipitation). Stalagmite records therefore reflect the isotopic composition of past tropical precipitation. The main driver of the isotope ratio of tropical precipitation is precipitation amount (7). However, in northern Borneo, isotopic seasonality in modern precipitation is linked not to local precipitation but to seasonal migration of the tropical convective rainfall band, called the intertropical convergence zone (ITCZ) (8). Relatively lower isotopic values correspond to periods when moisture propagates from the ITCZ region to Meckler et al.'s study site during the boreal fall; relatively higher isotopic values correspond to periods when the ITCZ moves southward and northeasterly monsoon winds transport relatively dry air from the western Pacific region during boreal winter. Thus, a shift in the 18O/16O ratio to lower (higher) values may indicate a relative increase (decrease) in the contribution of convective rainfall associated with the ITCZ.

Meckler 2012

A. N. Meckler, M. O. Clarkson, K. M. Cobb, H. Sodemann & J. F. Adkins, *Interglacial Hydroclimate in the Tropical West Pacific Through the Late Pleistocene*. science **336** (2012), 1301–1304.

s336-1301-Supplement.pdf

Records of atmospheric carbon dioxide concentration (PCO2) and Antarctic temperature have revealed an intriguing change in the magnitude of interglacial warmth and PCO2 at around 430,000 years ago (430 ka), but the global climate repercussions of this change remain elusive. Here, we present a stalagmite-based reconstruction of tropical West Pacific hydroclimate from 570 to 210 ka. The results suggest similar regional precipitation amounts across the four interglacials contained in the record, implying that tropical hydroclimate was insensitive to interglacial differences in PCO2 and high-latitude temperature. In contrast, during glacial terminations, drying in the tropical West Pacific accompanied cooling events in northern high latitudes. Therefore, the tropical convective heat engine can either stabilize or amplify global climate change, depending on the nature of the climate forcing.

Mesolithikum

Sánchez-Quinto 2012

Federico Sánchez-Quinto et al., *Genomic Affinities of Two 7,000-Year-Old Iberian Hunter-Gatherers*. Current Biology (2012) preprint, 1–6. DOI:10.1016/j.cub.2012.06.005.

CurrBiol2012-preprint-Supplement.pdf

Federico Sánchez-Quinto, Hannes Schroeder, Oscar Ramirez, María C. IJvila-Arcos, Marc Pybus, Iñigo Olalde, Amhed M. V. Velazquez, María Encina Prada Marcos, Julio Manuel Vidal Encinas, Jaume Bertranpetit, Ludovic Orlando, M. Thomas P. Gilbert and Carles Lalueza-Fox

The genetic background of the European Mesolithic and the extent of population replacement during the Neolithic [1-10] is poorly understood, both due to the scarcity of human remains from that period [11-18] and the inherent methodological difficulties of ancient DNA research. However, advances in sequencing technologies are both increasing data yields and providing supporting evidence for data authenticity, such as nucleotide misincorporation patterns [19-22]. We use these methods to characterize both the mitochondrial DNA genome and generate shotgun genomic data from two exceptionally well-preserved 7,000-year-old Mesolithic individuals from La Braña-Arintero site in León (Northwestern Spain) [23]. The mitochondria of both individuals are assigned to U5b2c1, a haplotype common among the small number of other previously studied Mesolithic

individuals from Northern and Central Europe. This suggests a remarkable genetic uniformity and little phylogeographic structure over a large geographic area of the pre-Neolithic populations. Using Approximate Bayesian Computation, a model of genetic continuity from Mesolithic to Neolithic populations is poorly supported. Furthermore, analyses of 1.34 % and 0.53 % of their nuclear genomes, containing about 50,000 and 20,000 ancestry informative SNPs, respectively, show that these two Mesolithic individuals are not related to current populations from either the Iberian Peninsula or Southern Europe.

Physik

Menzel 2012

Ralf Menzel, Dirk Puhlmann, Axel Heuer & Wolfgang P. Schleich, *Wave-particle dualism and complementarity unraveled by a different mode*. PNAS **109** (2012), 9314–9319.

The precise knowledge of one of two complementary experimental outcomes prevents us from obtaining complete information about the other one. This formulation of Niels Bohr's principle of complementarity when applied to the paradigm of wave-particle dualism-that is, to Young's double-slit experiment-implies that the information about the slit through which a quantum particle has passed erases interference. In the present paper we report a double-slit experiment using two photons created by spontaneous parametric down-conversion where we observe interference in the signal photon despite the fact that we have located it in one of the slits due to its entanglement with the idler photon. This surprising aspect of complementarity comes to light by our special choice of the TEM01 pump mode. According to quantum field theory the signal photon is then in a coherent superposition of two distinct wave vectors giving rise to interference fringes analogous to two mechanical slits.

Story or Book

Book 2012

Super-Fuel: Thorium, the Green Energy Source for the Future. nature **486** (2012), 319.

Super-Fuel: Thorium, the Green Energy Source for the Future. Richard Martin Palgrave. Macmillan 272 pp. £18.99 (2012)

Post-Fukushima, uranium-powered plants face being phased out in many countries. But there is a nuclear alternative, argues cleanenergyresearch analyst Richard Martin: thorium. Less volatile than uranium, four times as abundant, energy-dense and efficient, thorium has major potential, not least because liquid fluoride thorium reactors create no nuclear waste. Martin's investigation reveals how the technology, developed at Oak Ridge National Laboratory in Tennessee, was dropped by President Richard Nixon in 1972—and how interest is now picking up in China, India and elsewhere.

Tchaikovsky 2012

Adrian Tchaikovsky, *21st-Century Girl, A child out of time*. nature **486** (2012), 434.