

Quem somos, de onde vimos e para onde vamos

**Escola de Verão de Física
Porto, 3 de Setembro de 2015**

Manuel Sobrinho Simões

Quem somos?

Somos seres vivos, produto da interacção genético-ambiental



SER VIVO UNICELULAR



CÉLULAS & SERES VIVOS UNICELULARES

PROLIFERAR

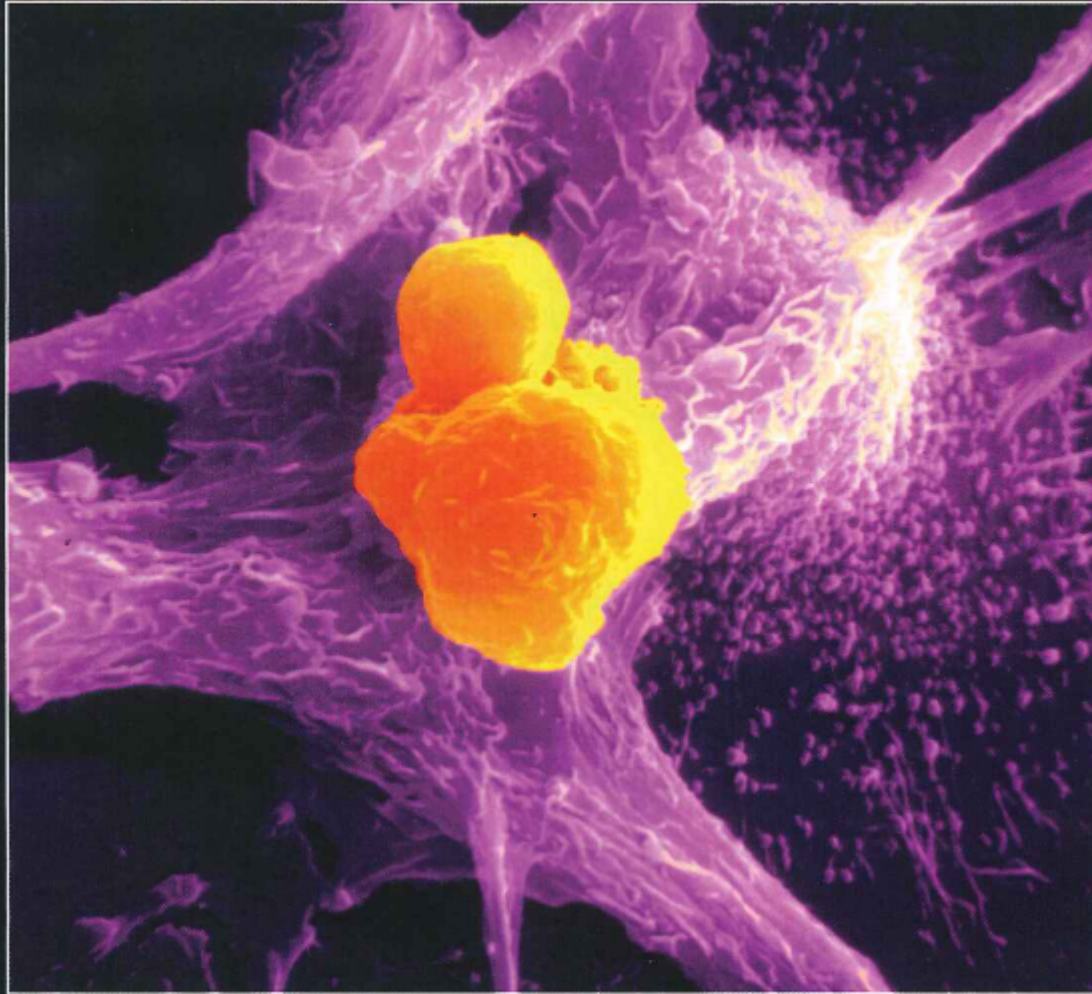
DIFERENCIAR

SOBREVIVIR

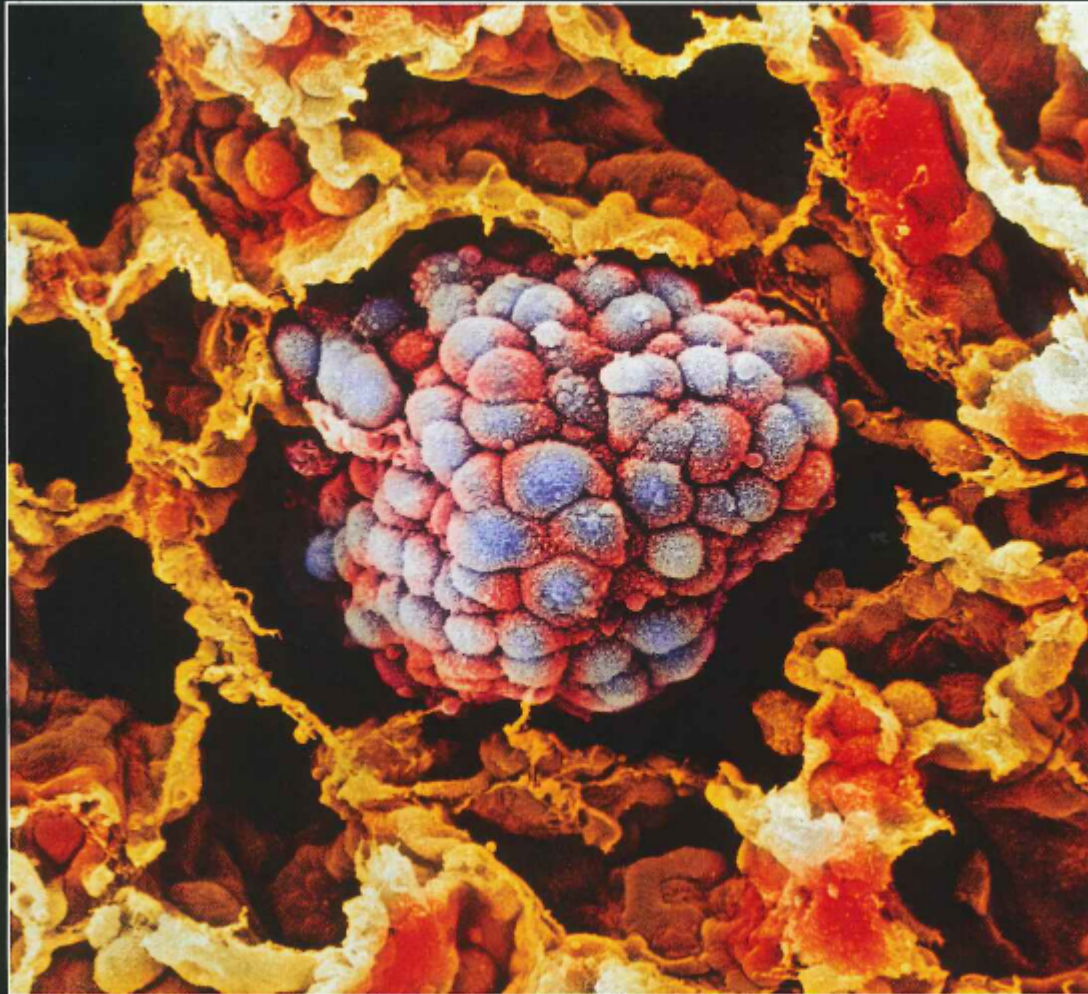
MORRER

BREAST CANCER CELL SEM/ALAMY



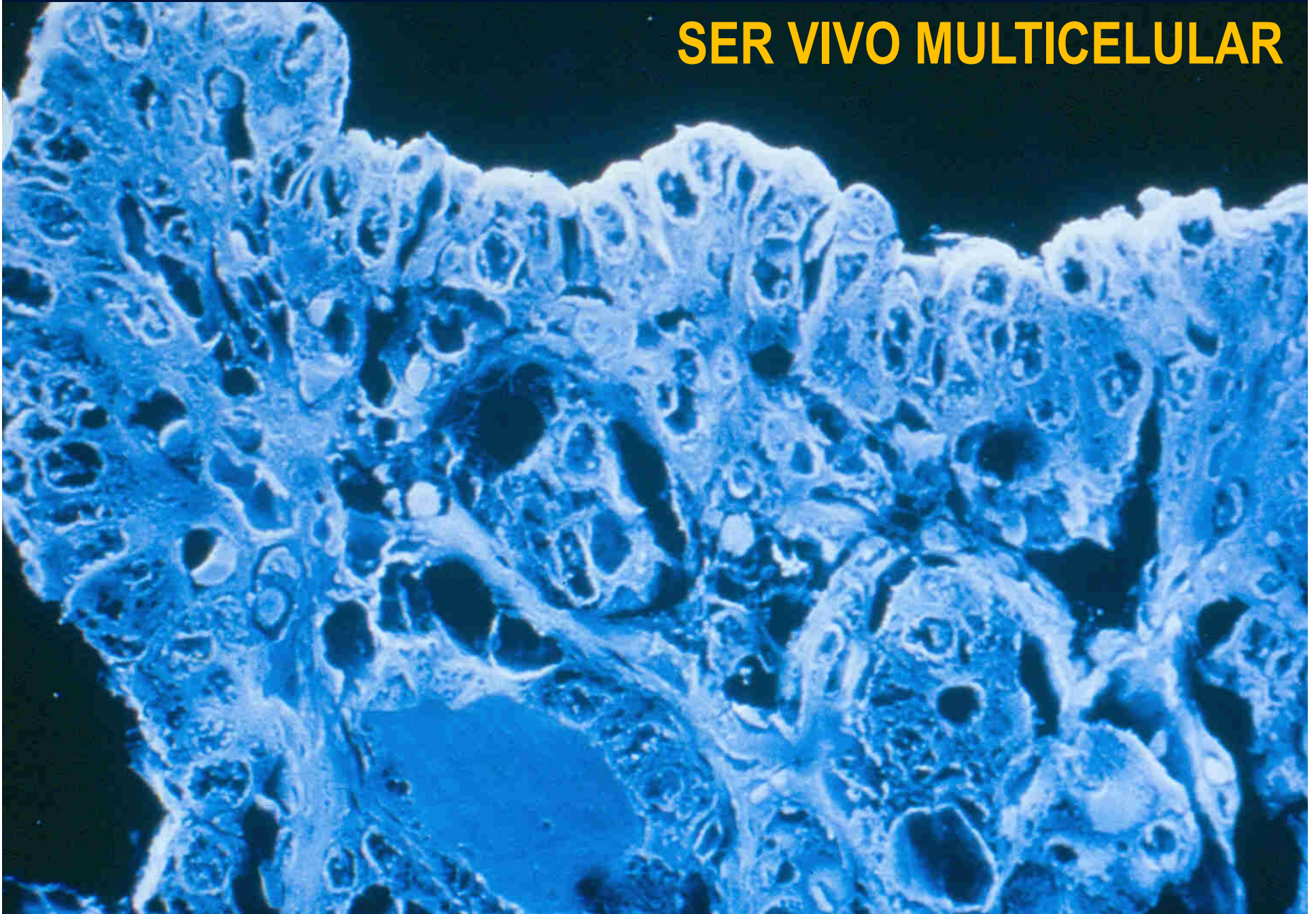


MACROPHAGE ATTRACTING CANCER CELL SEM/ALAMY



LUNG CANCER TUMOR SEM/ALAMY

SER VIVO MULTICELULAR



SERES VIVOS MULTICELULARES

**PROLIFERAR
DIFERENCIAR**

(MORRER)

**REGENERAR
&
REPRODUCIR**

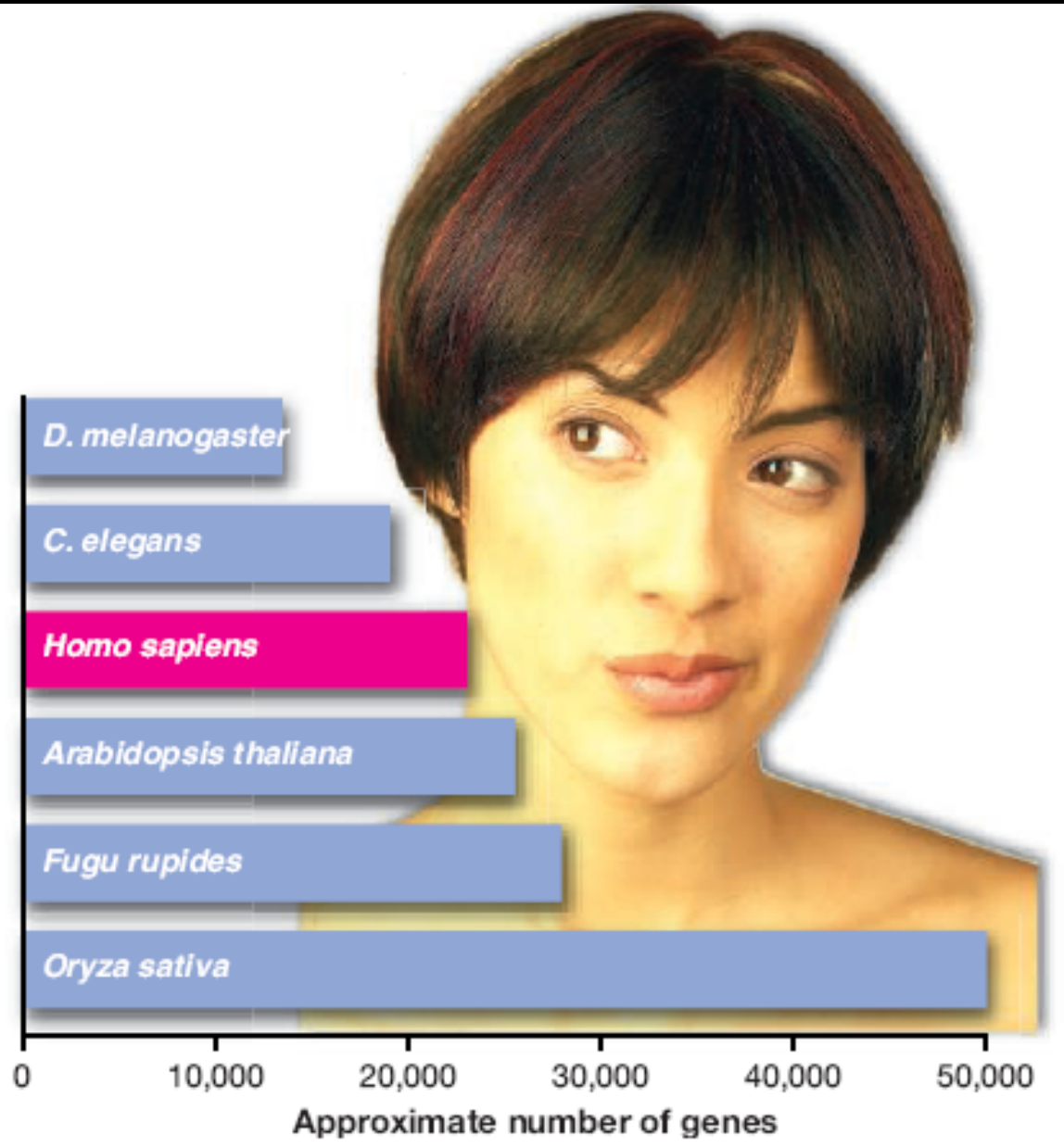
SERES VIVOS



MATÉRIA

ENERGIA
(luz, oxigénio,
alimentos,...)

INFORMAÇÃO
(ADN, ARN, proteínas...)



Science, Vol 309, July 1st, 2005





Seringas do mar



Criaturas que comem o seu próprio cérebro quando se imobilizam

“What are the most basic behaviours that every animal has to solve? Hunger, fear and reproduction.”

FOME, MEDO E REPRODUÇÃO

NEWS FEATURE

As the worm turns

With the help of a tiny worm, Cornelia Bargmann is unpicking the neural circuits that drive eating, socializing and sex.

BY STEPHEN S. HALL



21 FEBRUARY 2013 | VOL 494 | NATURE | 297
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O ADN humano pode ter apenas 19 mil genes e talvez só mais dez do que o do ratinho



Ana Gerschenfeld, jornal Público, 10/07/2014.

GENÉTICA

GENÓMICA

TRANSCRIPTÓMICA

PROTEÓMICA

ADN

ARNm

PROTEÍNA

22 000

100 000

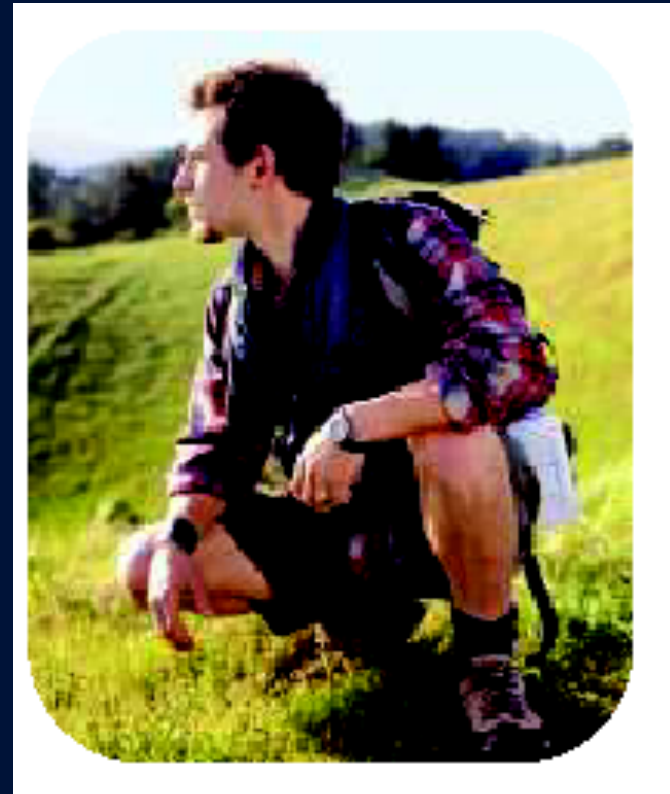
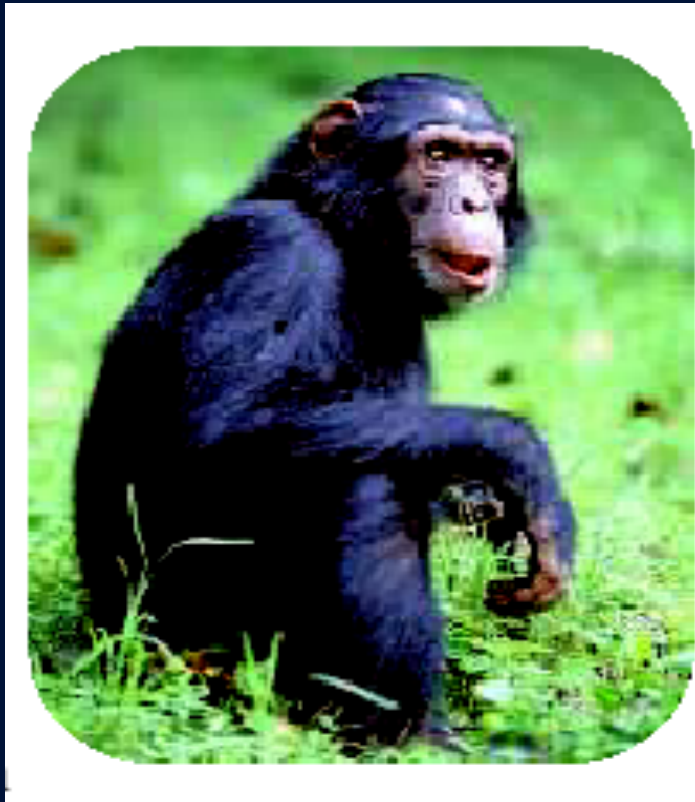
2 000 000

EPIGENÉTICA

EPIGENÓMICA
PÓSGENÓMICA
METAGENÓMICA

Nature, Agosto de 2012

QUE CARACTERÍSTICAS GENÉTICAS NOS TORNARAM HUMANOS?



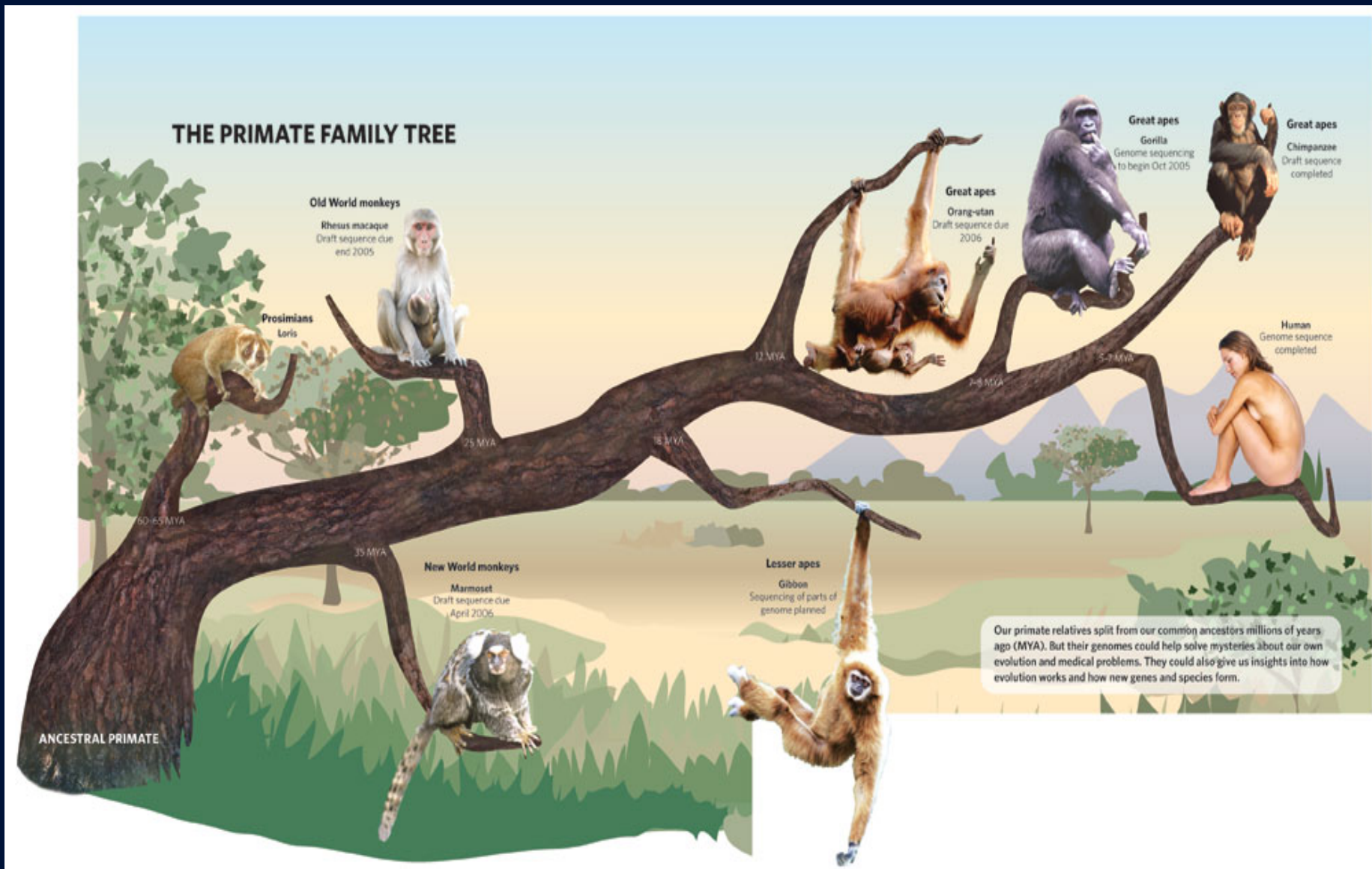
Science, Vol 309, 1 de Julho de 2005

***Microcephalin*, a Gene Regulating
Brain Size, Continues to Evolve
Adaptively in Humans**

Patrick D. Evans,^{1,2} Sandra L. Gilbert,¹ Nitzan Makel-Bobrov,^{1,2}
Eric J. Vallender,^{1,2} Jeffrey R. Anderson,¹ Leila M. Vaaz-Azizi,¹
Sarah A. Tishkoff,⁴ Richard R. Hudson,² Bruce T. Lahn^{1*}

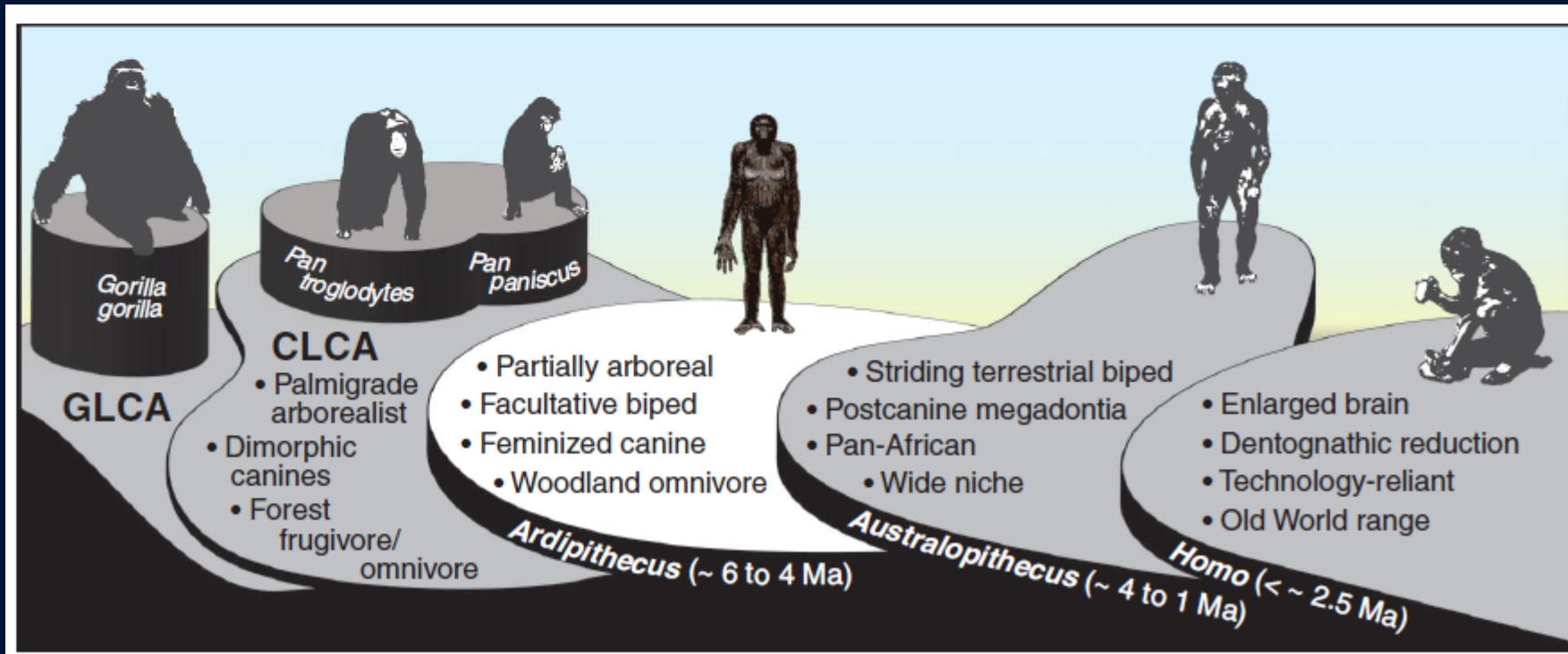
9 SEPTEMBER 2005 VOL 309 SCIENCE





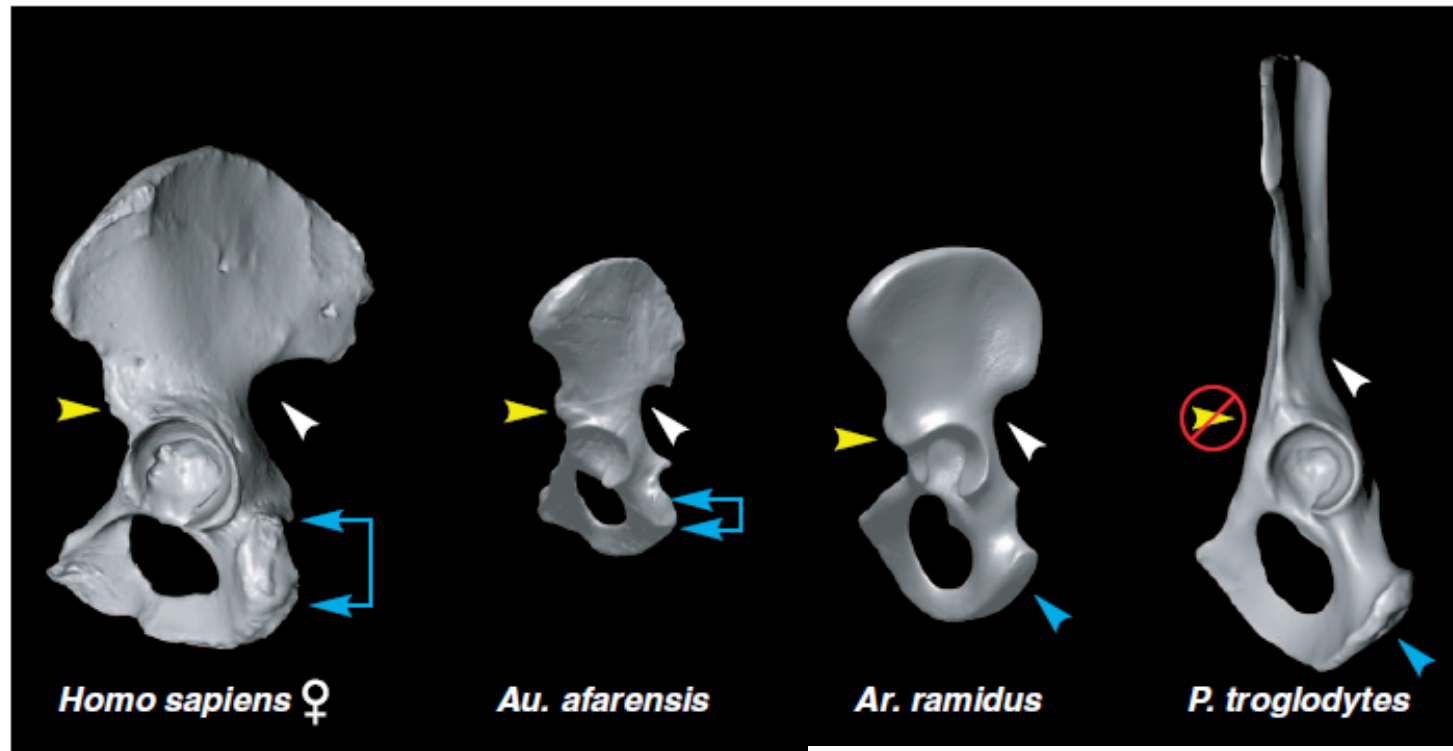
Ardipithecus ramidus and the Paleobiology of Early Hominids

Tim D. White, Berhane Asfaw, Yonas Beyene, Yohannes Haile-Selassie, C. Owen Lovejoy, Gen Suwa, Giday WoldeGabriel



The Pelvis and Femur of *Ardipithecus ramidus*: The Emergence of Upright Walking

C. Owen Lovejoy, Gen Suwa, Linda Spurlock, Berhane Asfaw, Tim D. White



Lucy



New *Homo erectus*



Modern Human



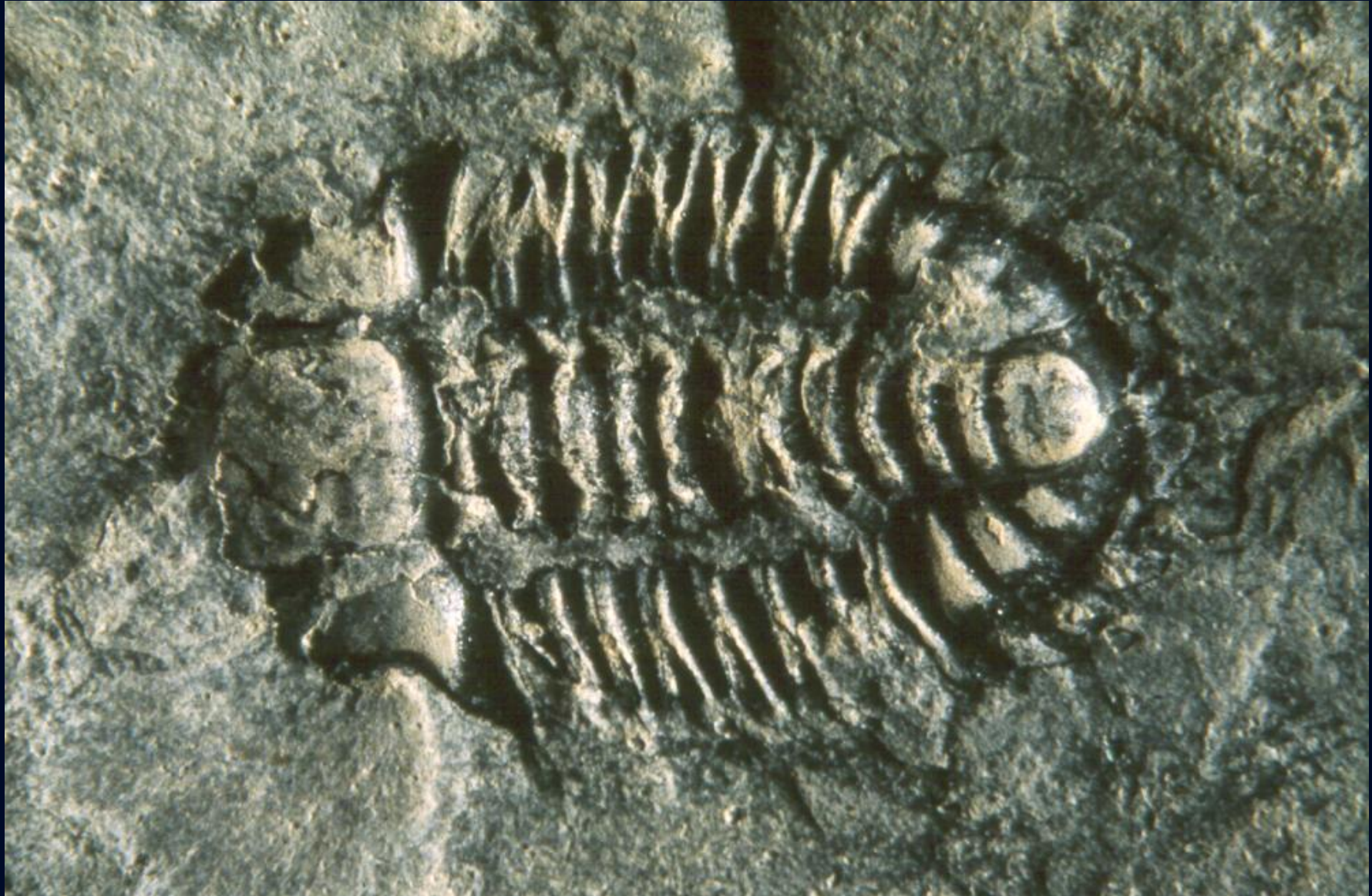
Ancient hipsters. A fossil female pelvis from *Homo erectus* (middle) shows that the species could birth babies with bigger heads than Lucy's species (top) but smaller than a modern human's.

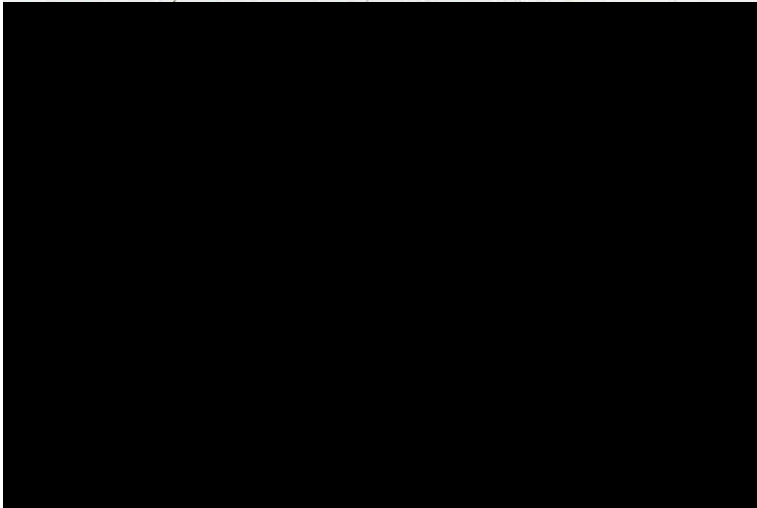
A Female *Homo erectus* Pelvis from Gona, Ethiopia

Scott W. Simpson,^{1,2} Jay Quade,³ Naomi E. Levin,^{4,5} Robert Butler,⁶ Guillaume Dupont-Nivet,⁷ Melanie Everett,^{8,9,10} Sileshi Semaw^{9,10*}

14 NOVEMBER 2008 VOL 322 SCIENCE

DE ONDE VIMOS?







Sandra Beleza e Jorge Rocha, Molecular Biology and Evolution, 2012

NEWS OF THE WEEK

GENETICS

Zebrafish Researchers Hook Gene for Human Skin Color



Human rainbow. A newly discovered gene partly explains the light skin of Europeans, but not East Asians, as compared to Africans.

Science 310: 1754, 2005



Um bonito produto da interacção genético-ambiental semelhante em caucasianos, africanos e asiáticos

Para onde vamos?

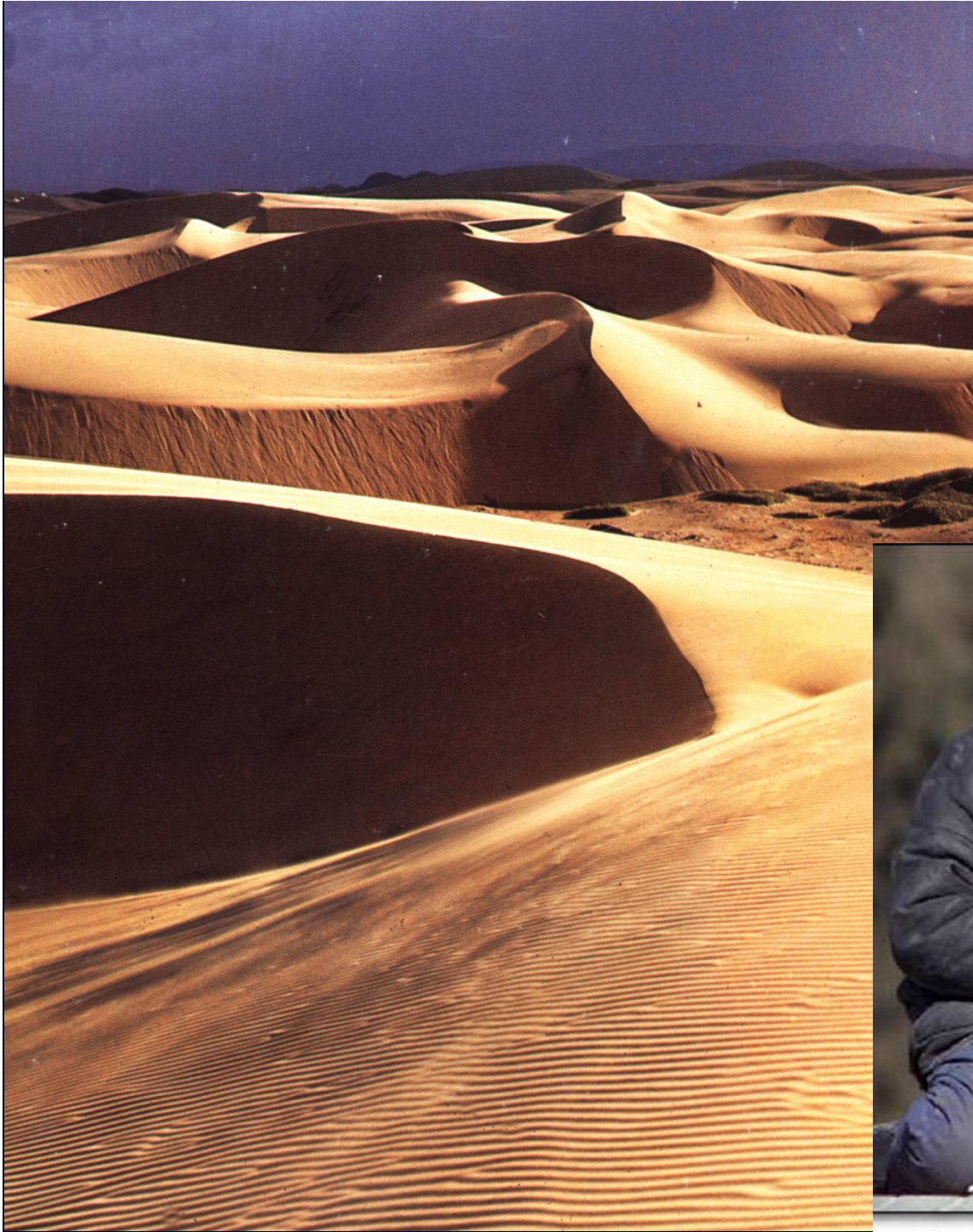


Megacity, mega mess...

The creaking infrastructure of Indonesia's capital is overwhelmed by people, vehicles and pollution. As urbanization gathers pace across the developing world, **Jessica Marshall** visits its stomach-churning consequences.



Cidade Europeia, 2013



Stephen Shaver / A

Para onde vamos?

**AUMENTO DA LONGEVIDADE &
DOENÇAS CIVILIZACIONAIS**

OBESIDADE

DIABETES

S.I.D.A.

TUBERCULOSE

CANCRO

DEPRESSÃO

PATOLOGIA GERIÁTRICA

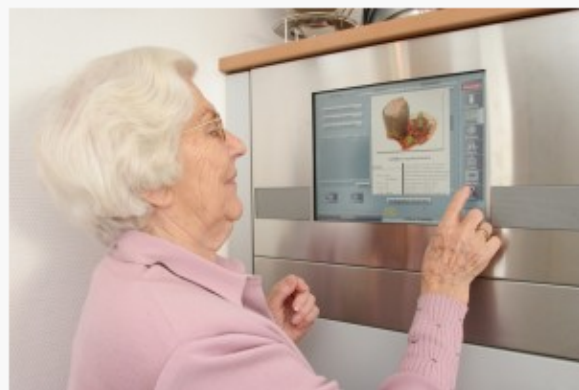
.....



Feb
15
2012

FP7 ICT: Ambient Assisted Living Call Pre-Announcement and Info Day

Posted in [EU](#) by [Corrina Dickson](#)



The Ambient Assisted Living (AAL) Association has [announced](#) that it expects the fifth Call for proposals of the AAL Joint Programme to open at the end of February. The fifth Call for proposals of the AAL Joint Programme: ICT-based Solutions for (Self) Management of Daily Life Activities of Older Adults at Home is expected to open at the end of February with a submission deadline of the end of May. AAL JP Call 5 aims to support development of ICT-based solutions which enable and sustain older

News from the PVC

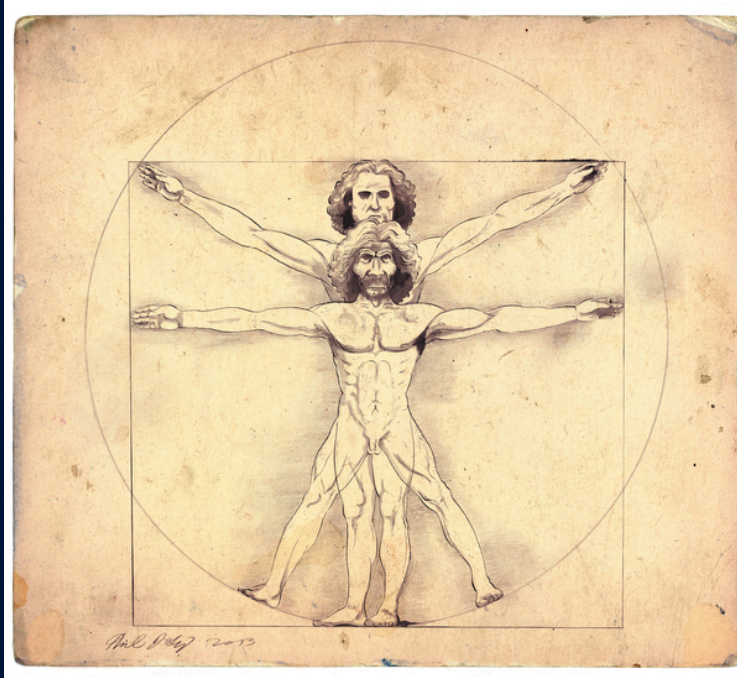


Click here to read all the latest News from Prof Matthew Bennett, PVC (*Research, Enterprise & Internationalisation*)

Other services



Human evolution: Us and them



... why *Homo sapiens* now constitutes eight times the biomass of all other wild terrestrial vertebrates combined.

Tim Radford contemplates three fascinating studies on what it means to be human:

The Story of the Human Body: Evolution, Health and Disease

Daniel E. Lieberman

The Gap: The Science of What Separates Us from Other Animals

Thomas Suddendorf

The Accidental Species: Misunderstandings of Human Evolution

Henry Gee

Tim Radford. *Nature* 503: 34-35, 2014

Como vamos caber no mundo?

E, se coubermos, como vamos conseguir viver decentemente?

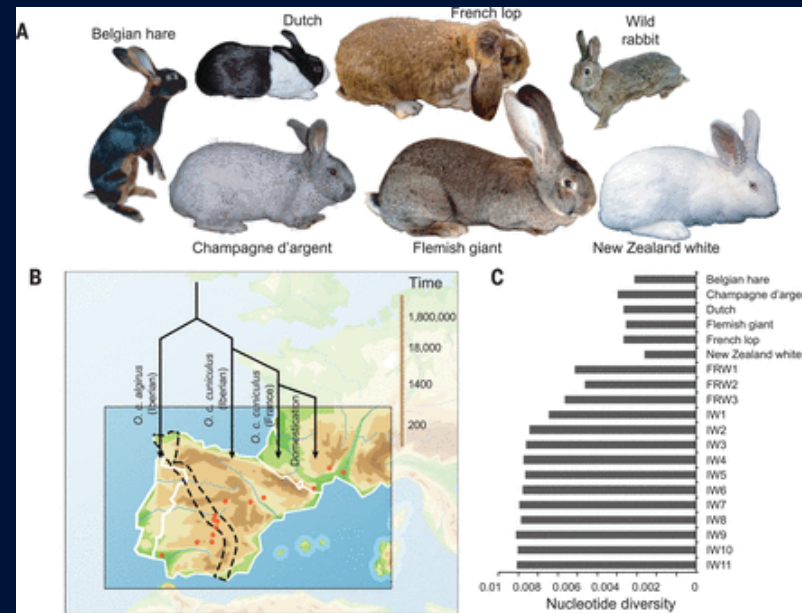
Será desejável/possível intensificar a domesticação do homem?

Animal domestication. The genes that turned wildcats into kitty cats.

Grimm D. Science 346:799, 2014

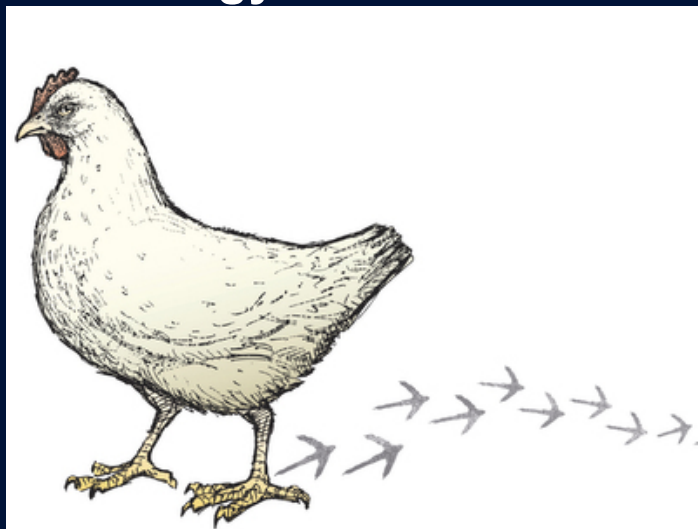


Rabbit genome analysis reveals a polygenic basis for phenotypic change during domestication.



Carneiro M, ...Ferrand N, Lindblad-Toh K, Andersson L
Science 345:1074-9, 2014

Ornithology: Fowl domination



Ewen Callaway. Nature 515: 490-491, 2014



Mundo

Homem

Genoma



Será de fazer melhoria humana através da manipulação genética?

Escassez de espaços, água, solos aráveis, energia, ambiente respirável, ...

Melhoria humana – Muito para além da genética...



**EDUCAÇÃO
CULTURA
EXEMPLO**