

La Scienza negata e il ruolo dei mass-media

Sabato 11 marzo 2017 – ore 9.30

c/o l'Aula Magna del Penna

Istituto Istruzione Secondaria Superiore “G. Penna”

Località Viatosto, 54 - 14100 ASTI

Carlo Alberto Redi

Accademico dei Lincei

Laboratorio di Biologia dello Sviluppo

Università degli Studi di Pavia

E-mail: carloalberto.redi@unipv.it

The Worm

(*Caenorhabditis elegans*)

“You have made your way from worm to man,
and much in you is still worm.”
—Friedrich Nietzsche (1844–1900)

C. elegans is a nematode, a smooth-skinned worm with a long, unsegmented, cylindrical body tapered at both ends. Comprising about 1,000 cells, it is the most primitive animal to exhibit characteristics that are important in the study of human biology and disease. Though tiny and transparent, *C. elegans* contains a full set of differentiated tissues, including a nervous system with a “brain,” which allows the study of behavior in a worm that is capable of learning. It is found worldwide in soil and rotting vegetation.

‘Omics

Genome size: 97 Mb
(96,893,008 bp)

Chromosomes: 5 autosomes,
plus X

Number of genes:
20,000 predicted

Average gene: 5 kb,
5 exons per gene

Proteins: 1,341 characterized;
8,012 have unknown function

Development: 3 days,
from egg to maturity

Web Sites

WormBase: www.wormbase.org

Worm Atlas: www.wormatlas.org

Caenorhabditis Genetics Center: biosci.umn.edu/CGC/CGChomepage.htm

C. elegans Web Server: elegans.swmed.edu

elegansNet: members.tripod.com/C.elegans/index.htm

Stats

Size: 1 mm

Diet: Bacteria

Lifespan: 2–3 weeks

Reproduction: Male and
self-fertilizing hermaphrodite

Cell lineage: Invariant
between individuals

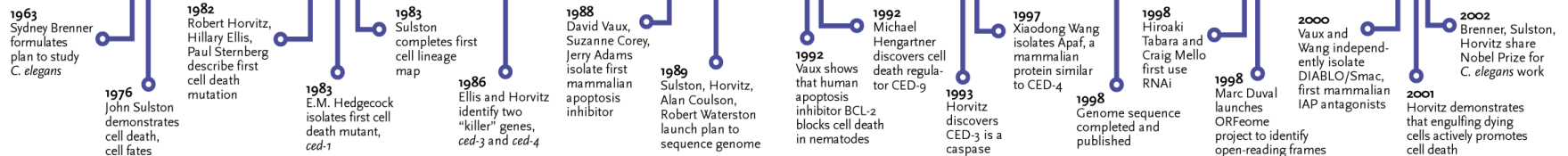
Feature Technology

RNAi: *C. elegans* is ideal for the study of functional genomics: The genome sequence is complete and well-annotated, and systematic gene function can be studied by RNA interference-mediated knockdown. RNA interference (RNAi) is a gene-silencing technique that uses double-stranded RNA to degrade the corresponding messenger RNA, leading to protein depletion and a loss-of-function phenotype.

Nobel Moment

The 2002 Nobel Prize in medicine was awarded for key discoveries concerning the genetic regulation of organ development and programmed cell death in *C. elegans*. Sydney Brenner established the nematode as a novel experimental model organism; John Sulston mapped a cell lineage in which every cell division and differentiation could be followed; and Robert Horvitz discovered and characterized key genes controlling cell death.

Illustration: Tammy Irvine, Rear View Illustration



The Fly

(*Drosophila melanogaster*)

Drosophila melanogaster, the diminutive and ubiquitous fruit fly, is the classic organism for the study of animal genetics. It was introduced to the lab early in the 20th century by Thomas Hunt Morgan, for good practical reasons: short life cycle, ease of culture, and high fecundity. Mutant flies, with defects in any of several thousand genes, are now used for the study of genetics, development, behavior, and other topics.

'Omics

Genome size: 180 Mb

Chromosomes: 3 autosomes, plus X and Y

Number of genes: 13,639 predicted

Average gene: 3 kb, 4 exons per gene

Proteins: 23% have no match with other organisms

Web Sites

Drosophila Virtual Library: www.ceolas.org/fly/index.html

FlyBase: flybase.bio.indiana.edu

Drosophila DNA Microarray Homepage: cmgm.stanford.edu/~kpwhite/index.html

"Why has not man a microscopic eye?
For this plain reason—man is not a fly."
—Alexander Pope (1688–1744)

Stats

Size: Adults 3 mm; eggs 0.5 mm

Diet: Rotten fruit

Life cycle: 2 weeks

Reproduction: Females can lay up to 100 eggs in one day

Development: 9 days from fertilization to adult

Feature Technology

P-transposable Elements: A massive gene disruption project aims to induce mutagenesis through the use of P-transposable elements. So far, 85 known and eight novel families of "jumping genes" have been identified. A total of 1,572 full and partial transposable elements have been mapped, comprising 3.86% of the sequence. Only 436 of those transposable elements are contained within the 61.4 Mb of sequence that contains genes.

Nobel Moment

The 1995 Nobel Prize in medicine was awarded for "the genetic control of early embryonic development" to Christiane Nüsslein-Volhard, Eric F. Wieschaus, and Edward B. Lewis. Nüsslein-Volhard and Wieschaus identified a number of *Drosophila* genes that control the body plan and formation of body segments. Lewis investigated how genes control the further development of these body segments into specialized organs.

Illustration: Tammy Irvine, Rear View Illustration



The Mouse

(*Mus musculus*)

*"Thou wilt be as valiant as the wrathful dove
or most magnanimous mouse."*

—William Shakespeare (1564–1616), *Henry IV*

Naturally comfortable in fields and in kitchens, *M. musculus*, for the last century, has been virtually indispensable in the research lab. This animal now appears in all shapes and sizes, as researchers consistently produce new strains. Mouse production is a \$200 million-a-year business, with transgenics accounting for a third of the new mice created.

Stats

Weight: 20 g

Life span: 1.3–3 years

Diet: Anything not in the mousetrap

Body temperature: 36.9° C

Sexual maturity: After 4 weeks of age

Estrus cycle: Every 4–5 days

Gestation: Averages 19–21 days; 1–10 pups

'Omics

Genome size: ~2,600 Mb

Chromosomes: 19 autosomes, plus X and Y

Number of genes: ~30,000; 96% of euchromatic chromatin is sequenced

Average gene: 40 kb; 8.3 exons per gene

Human homologs: Less than 1% have no detectable homolog in humans

Diverged from human lineage: Estimated 75 million years ago

Web Sites

Mouse genome server: www.ensembl.org/Mus_musculus

Jax Mice: (describing 2500+ strains) jaxmice.jax.org

EMBL Mouse Biology Programme: www.embl-monterotondo.it

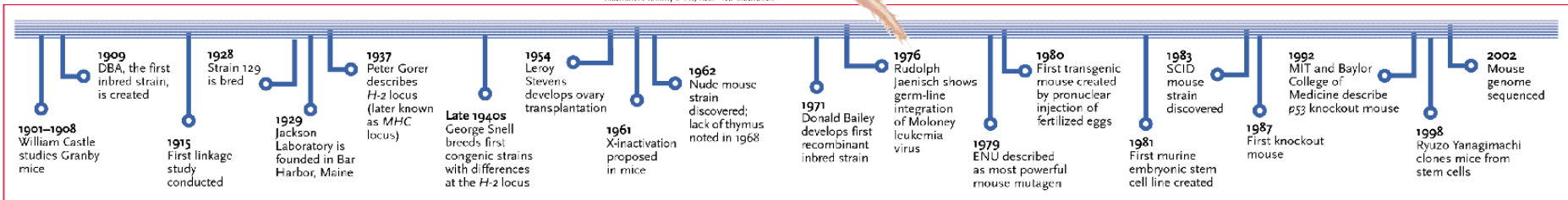
Feature Technology

Conditional Transgenics: A suite of approaches exists to manipulate gene expression, including conditional transgenics, which provide an in vivo method of controlling spatial and temporal gene regulation. Employing tissue-specific or developmentally restricted promoters to drive expression of the transgene or Cre recombinase, conditional transgenics provide greater precision than conventional knockouts, allowing researchers to see the effects of loss of a gene in a particular tissue.

Nobel Moment

Max Theiler, in 1930, discovered that yellow fever can be transmitted to white mice. In the following year, Theiler demonstrated that these animals, inoculated with serum from previously infected humans or monkeys, are protected against infection. Theiler received the Nobel Prize in medicine in 1951.

Illustration: Jeremy Irving, Real View Illustrations



nature



STAR FORMATION
A massive protostar unveiled

CANCER IMMUNOLOGY
How tumours dupe T cells

AIR POLLUTION
China's AQI, build-up
seen from space

NATUREJOBS
Must-have PhDs

THE CHIMPANZEE GENOME

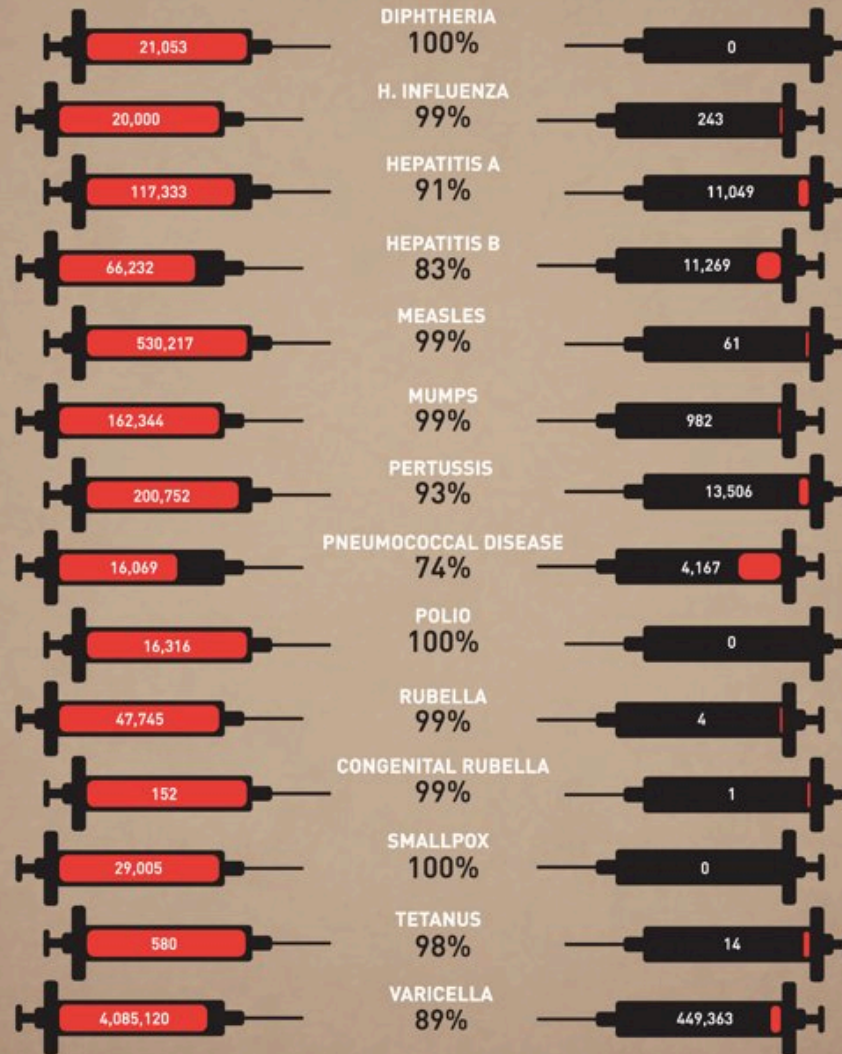


PRE-VACCINE ERA
ESTIMATED ANNUAL
MORBIDITY IN THE U.S.

%

MOST RECENT
REPORTS OF
CASES IN THE U.S.

DECREASE




The Lancet, [Volume 351, Issue 9103](#), Pages 637 - 641, 28 February 1998
doi:10.1016/S0140-6736(97)11096-0 [Cite or Link Using DOI](#)

[< Previous Article](#) | [Next Article >](#)

This article was retracted

Copyright © 1998 Elsevier Ltd All rights reserved.

RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

Dr [AJ Wakefield](#) FRCS ^a , [SH Murch](#) MB ^b, [A Anthony](#) MB ^a, [J Linnell](#) PhD ^a, [DM Casson](#) MRCP ^b, [M Malik](#) MRCP ^b, [M Berelowitz](#) FRCPsych ^c, [AP Dhillon](#) MRCPsych ^a, [MA Thomson](#) FRCP ^b, [P Harvey](#) FRCP ^d, [A Valentine](#) FRCP ^e, [SE Davies](#) MRCPsych ^a, [JA Walker-Smith](#) FRCP ^a

Summary

Background

We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods

12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible. Biochemical, haematological, and immunological profiles were examined.

Findings

Onset of behavioural symptoms was associated, by the parents, with measles, mumps, and rubella vaccination in eight of the 12

ANIMALISTI CONTRO RICERCATORI: CONTRAPPOSIZIONE INSANABILE?



È ANCHE QUESTIONE DI TERMINI

Sperimentazione animale

Sperimentazione

(in ambito biomedico, farmacologico, fisiologico, fisiopatologico e biologico)

a scopo di studio e ricerca su animali da laboratorio

ATTENZIONE !

**Vivisezione
crimine**

I MODELLI DELLA RICERCA

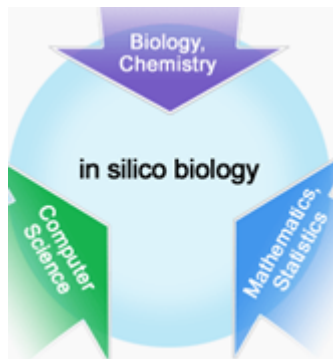
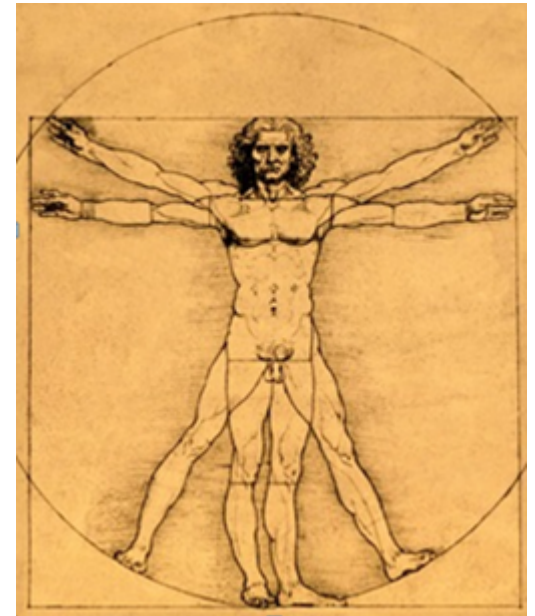
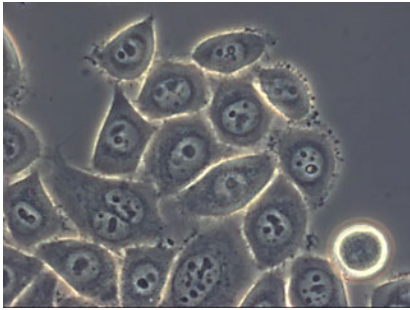
In vitro / in silico



in vivo



in clinica



ANIMALI UTILIZZATI NELLA RICERCA BIOMEDICA IN ITALIA

	1998	2009	
Totale	1.099.491 (100%)	830.453 (100%)	-24%
Topi/Ratti	1,040.731 (95%)	767.637 (92%)	-26%
Cani	876 (0,08%)	607 (0,07%)	-31%
Scimmie	427 (0,04%)	416 (0,05%)	-3%
Gatti	89 (0,01%)	0 (0%)	-100%
Conigli	22,920 (1,04%)	8,657 (1,0%)	-62%
Pesci	2.066 (0,19%)	14.958 (1,8%)	+624%

principio delle
tre R

W. M. Russel e R. L.
Burch (1959)

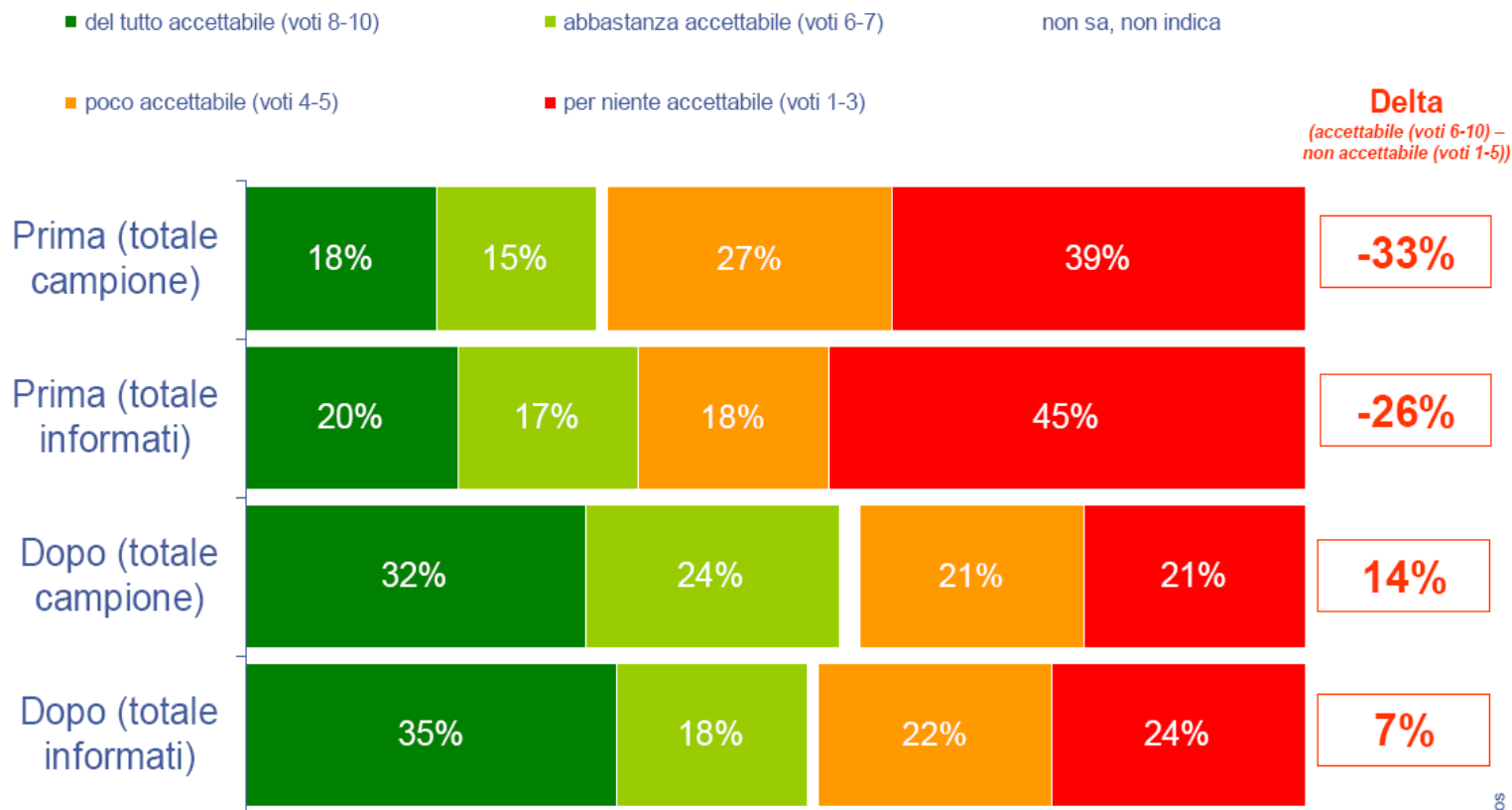
Replacement
Refinement
Reduction

Fonte Ministero della Salute, ultimi dati disponibili

IL LIVELLO DI INFORMAZIONE CAMBIA L' OPINIONE DELLE PERSONE

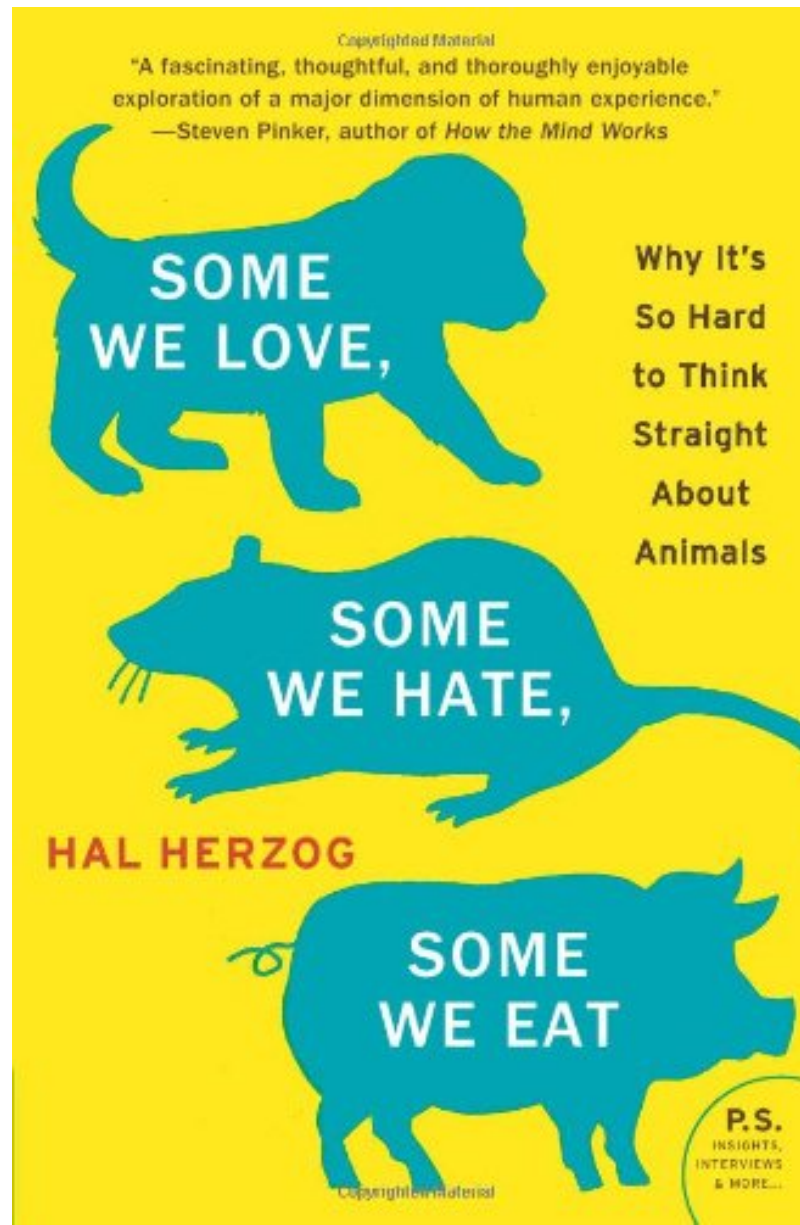


La sperimentazione scientifica sugli animali. Quanto è accettabile prima e dopo alcune informazioni?



Una volta informati, gli intervistati cambiano decisamente opinione riguardo al livello di accettabilità della sperimentazione scientifica sugli animali. Se prima era il 33% degli italiani a ritenerla accettabile, dopo è il 56% del campione ad essere di questa opinione.

ANTRO-ZOOLOGIA: LE CAVIE SIAMO (ANCHE) NOI !



Timeline: The Three Revolutions



1953: Discovery of DNA

1976: Biotech sector emerges with founding of Genentech

mid-2000s: Academic sectors start exploring convergence

2009: NAS releases A New Biology report



Molecular Biology Revolution

Genomics Revolution

Convergence Revolution

1950 1960 1970 1980 1990 2000 2010

1969: Salvador Luria, theorist of molecular biology, awarded Nobel Prize



2001: Human Genome Project, Celera publish working draft of human genome



Image and info credits (clockwise from top-left): DNAmazing.com, Gene.com, BioX.stanford.edu, qb3.org, mit.edu/ki, nap.edu, sciencemag.org, nature.com, nlm.nih.gov

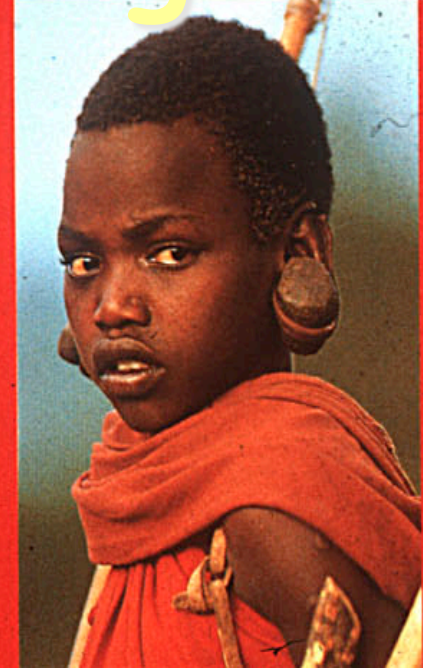
Fisica ('900)

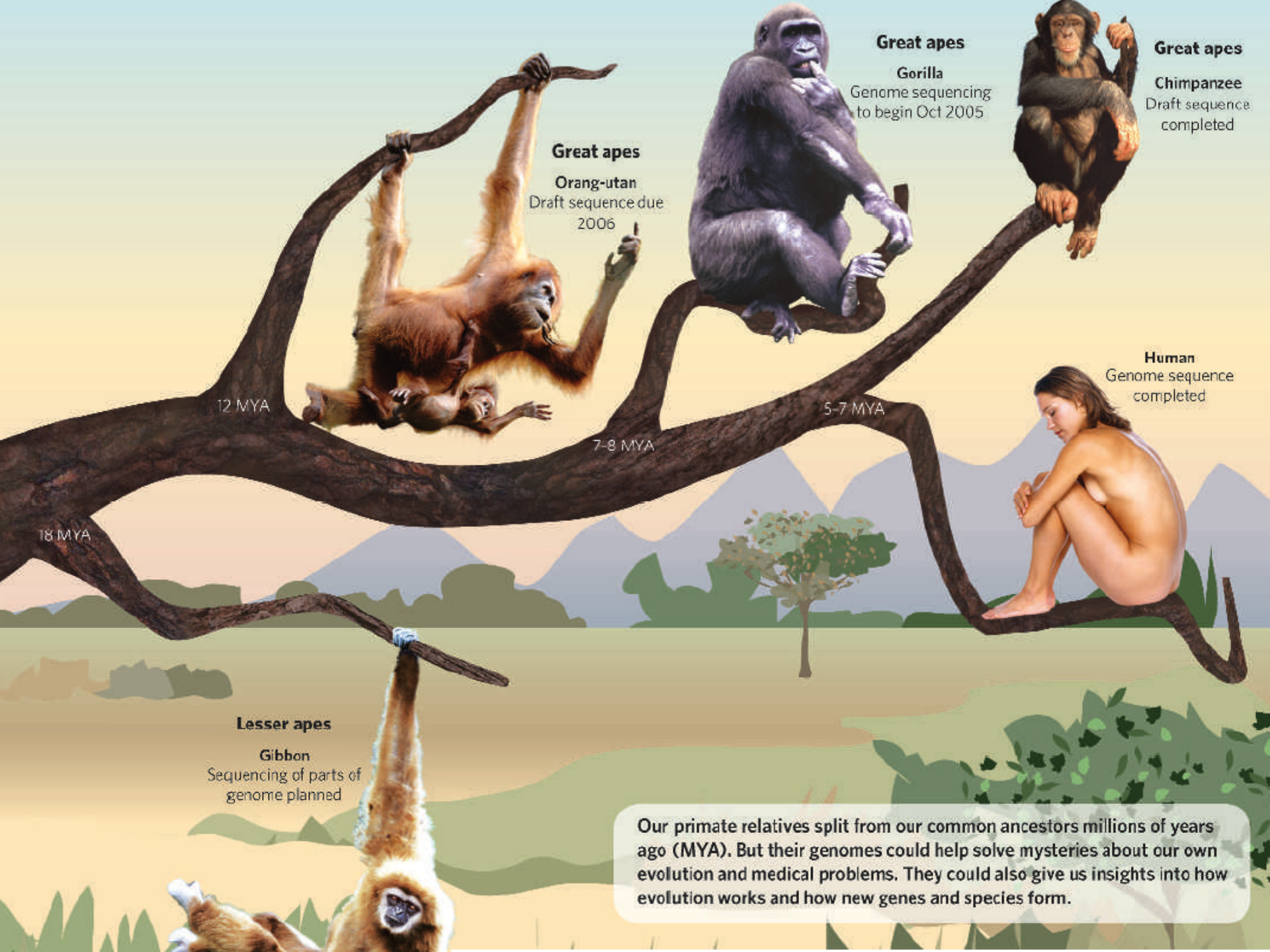
The diagram illustrates the exponential growth of the human population over time. The curve starts at point A (c. 3,000,000 BC) and passes through points B, C, and D (c. 1930). The curve then rises sharply, passing through point E (2025) and ending at point F (2025). The diagram is divided into 'Pre-Industrial' and 'Ind.' (Industrial) periods. The 'Ind.' period is marked with a red 'X' and a red arrow pointing to the right. The 'Ind.' period is also labeled 'Ind.' and 'X'.





Tante etnie ...lo stesso genoma





Our primate relatives split from our common ancestors millions of years ago (MYA). But their genomes could help solve mysteries about our own evolution and medical problems. They could also give us insights into how evolution works and how new genes and species form.

NOVEMBER 13, 2006

TIME

INSIDE THIS ISSUE:
A 48-PAGE
SPECIAL SECTION

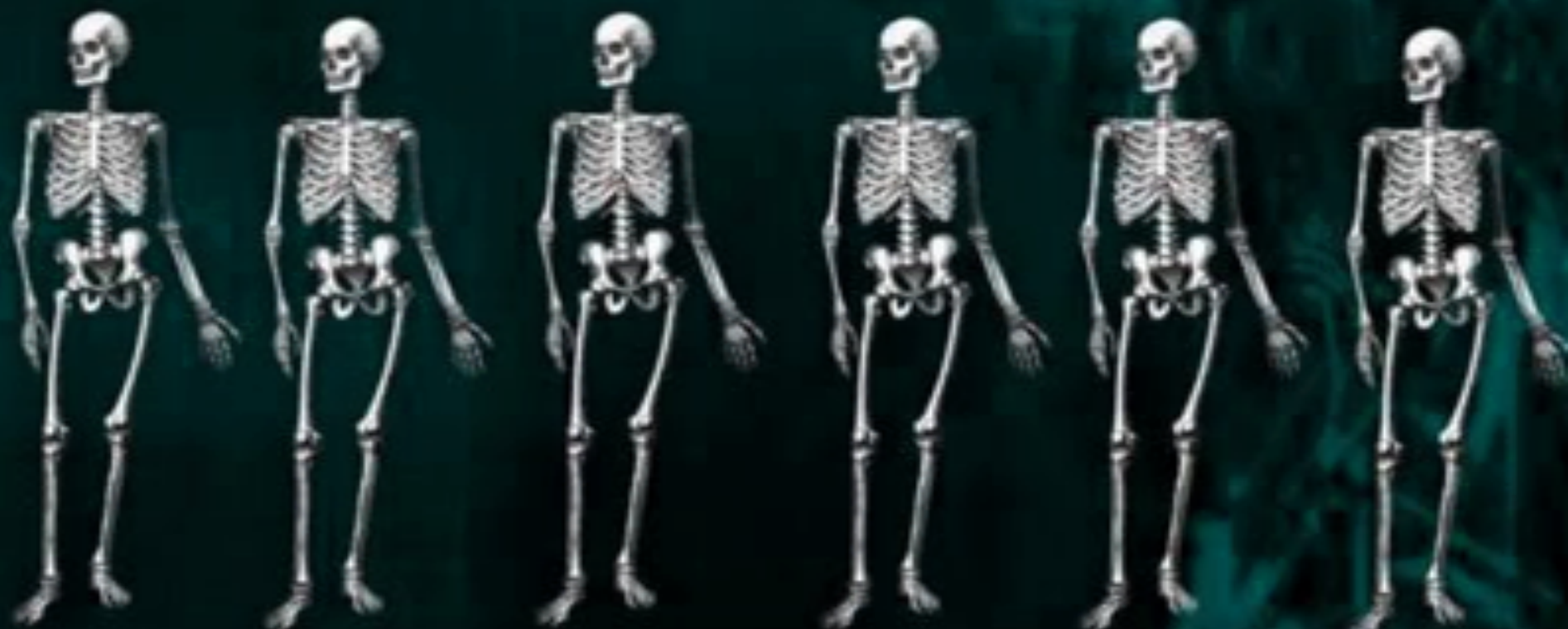
**THE BEST
INVENTIONS
OF 2006**

GOD VS. SCIENCE

A spirited debate between
atheist biologist **Richard Dawkins**
and Christian geneticist **Francis Collins**



DIFFERENZE



Bianco Nero Omosessuale Ateo Religioso Tu

Il che medesimo si può considerare ne le cose artificiali, in tanto che chi vede la statua, non vede il scultore; chi vede il ritratto di Elena, non vede Apelle, ma vede lo effetto de l'operazione che proviene da la bontà de l'ingegno d'Apelle; il che tutto è uno effetto de gli accidenti e circostanze de la sustanza di quell'uomo il quale, quanto al suo essere assoluto, non è conosciuto punto.¹⁴

Giordano Bruno

DE LA CAUSA, PRINCIPIO E UNO

opera nella quale anticipa anche il “**principio cosmologico**” di Einstein !

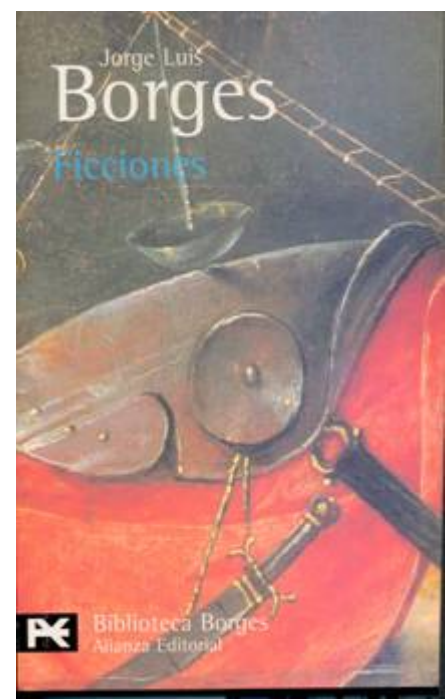
...l' universo appare nello stesso modo da qualunque punto ed in qualunque direzione lo si osservi...

La Biblioteca de Babel

*By this art you may contemplate the
variation of the 23 letters...*

*The Anatomy of Melancholy, part. 2,
sect. II, mem. IV.*

El universo (que otros llaman la Biblioteca) se compone de un número indefinido, y tal vez infinito, de galerías hexagonales, con vastos pozos de ventilación en el medio, cercados por barandas bajísimas. Desde cualquier hexágono, se ven







The
Neanderthal
in the family

JANUARY 19, 2010

Joe Klein:
The CIA's
Afghan Disaster

Yemen: The
New Center
Of Terror

Why the Recession
Hasn't Been Cool
To Teens

TIME

WHY YOUR DNA ISN'T YOUR DESTINY

The new science of epigenetics
reveals how the choices you
make can change your genes
—and those of your kids

BY JOHN CLOUD



genotype
and
phenotype

