



FAST

Federazione delle associazioni
scientifiche e tecniche
fondata nel 1897



2014

I GIOVANI E LE SCIENZE

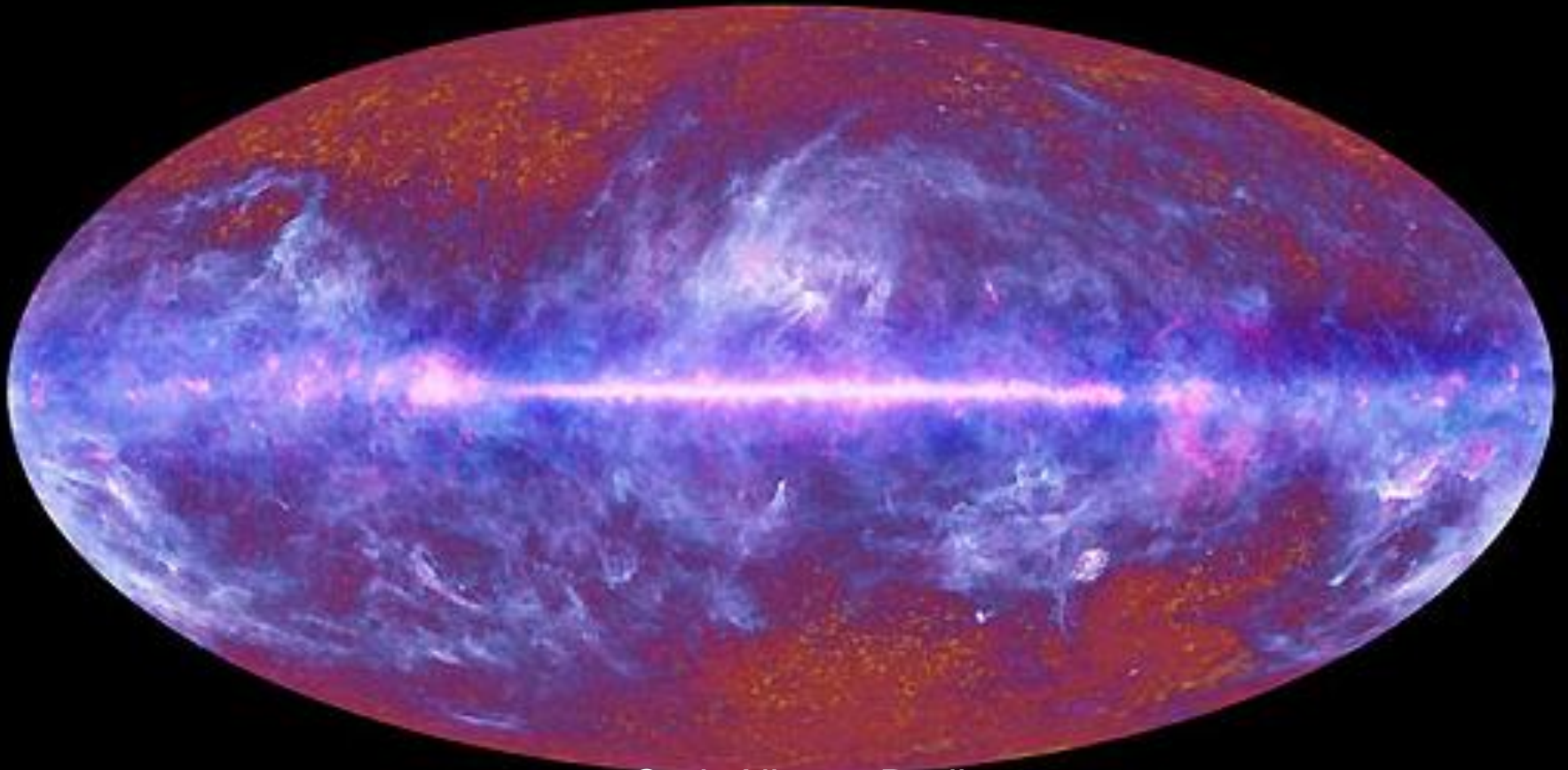
FAST, Milano
2-5 MAGGIO 2014

sotto l'Alto Patronato del Presidente della Repubblica

*con la collaborazione
e il contributo di*

26^ª

dalla descrizione alla sintesi del vivente



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Università di Pavia
Accademico dei Lincei
carloalberto.redi@unipv.it

Notre vie est un voyage
Dans l'Hiver e dans la Nuit,
Nous cherchons notre passage
Dans le Ciel où rien ne luit.

Canzone delle Guardie Svizzere: 1793

Louis-Ferdinand Céline
Viaggio al termine della notte

THE UNIVERSE

Life Form #126GV29APZ23
Planet Earth
Solar System 1
Milky Way Galaxy
Virgo Supercluster

Dear Life Form,

Congratulations!

You have been selected for the role of **EXISTENCE**. We are proud to offer you this highly coveted position, and applaud you on overcoming the immense odds to be with us. You are about to enter a highly competitive work environment filled with natural wonders, millions of diverse species, astronomical treasures, and personal tragedies and triumphs.

Your position will begin starting **AT BIRTH** and will last until **DEATH**. You have been given the following tools in your starter kit:

- Large, highly developed brain
- Opposable thumbs
- Bipedalism
- Complex social networks

Now that you're ready to begin, we suggest you make the most of your time. You may want to start by cultivating social relationships and improving conditions for other newcomers.

If you have questions, please consult your assigned advisor, **SCIENCE**. We wish you best of luck during your time with us, and look forward to seeing you in another form once your contract has expired.

Sincerely,



The Universe



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**



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

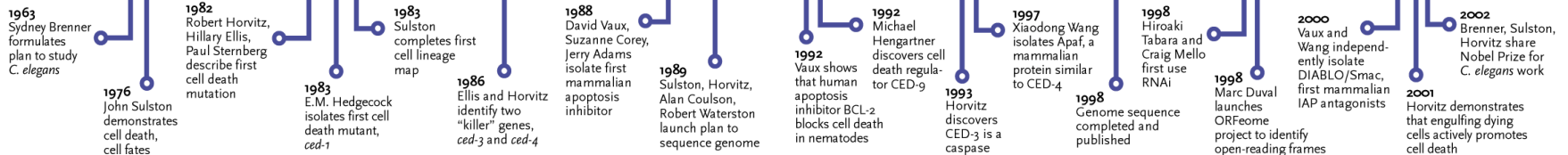
Feature Technology

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.

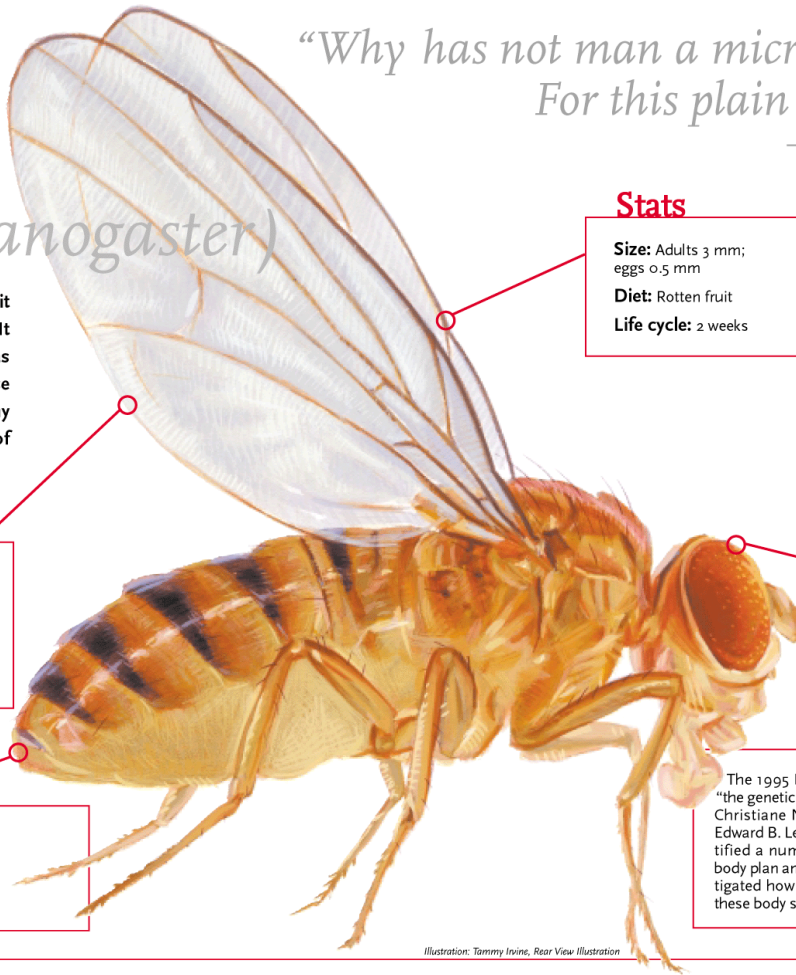


Illustration: Tammy Irvine, Rear View Illustration



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.

'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

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

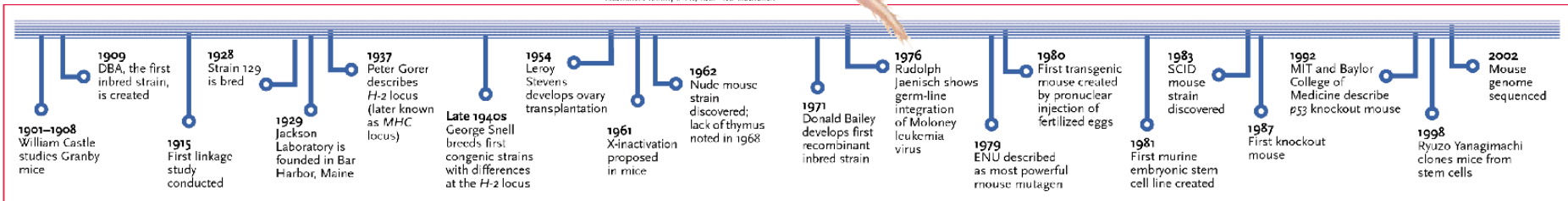
Feature Technology

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

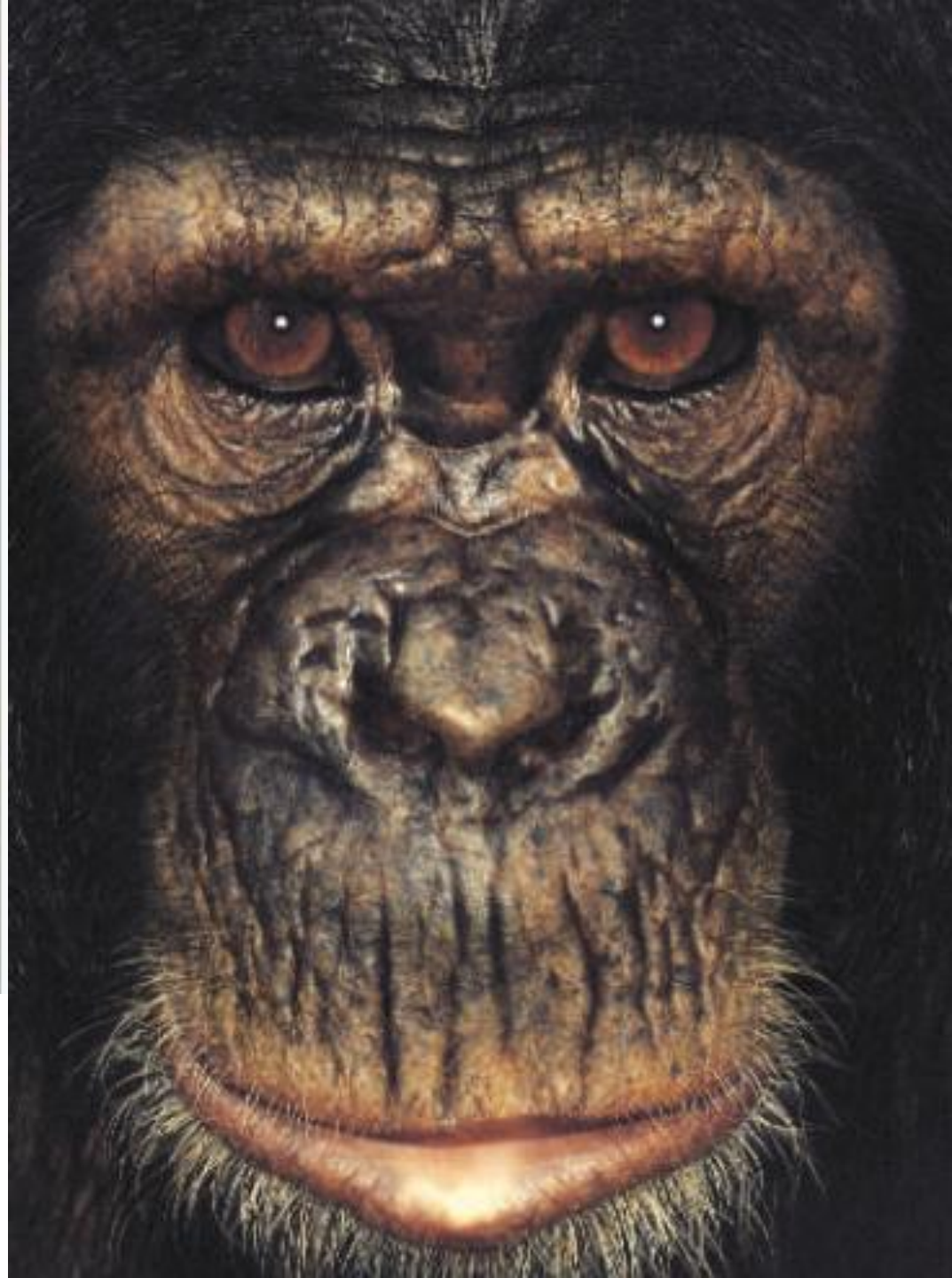
STAR FORMATION
A massive protostar unveiled

CANCER IMMUNITY
How tumours dodge T cells

AIR POLLUTION
China's AQI, held up
seen from space

ASTROPHYSICS
Mystifying phenomena

THE CHIMPANZEE GENOME

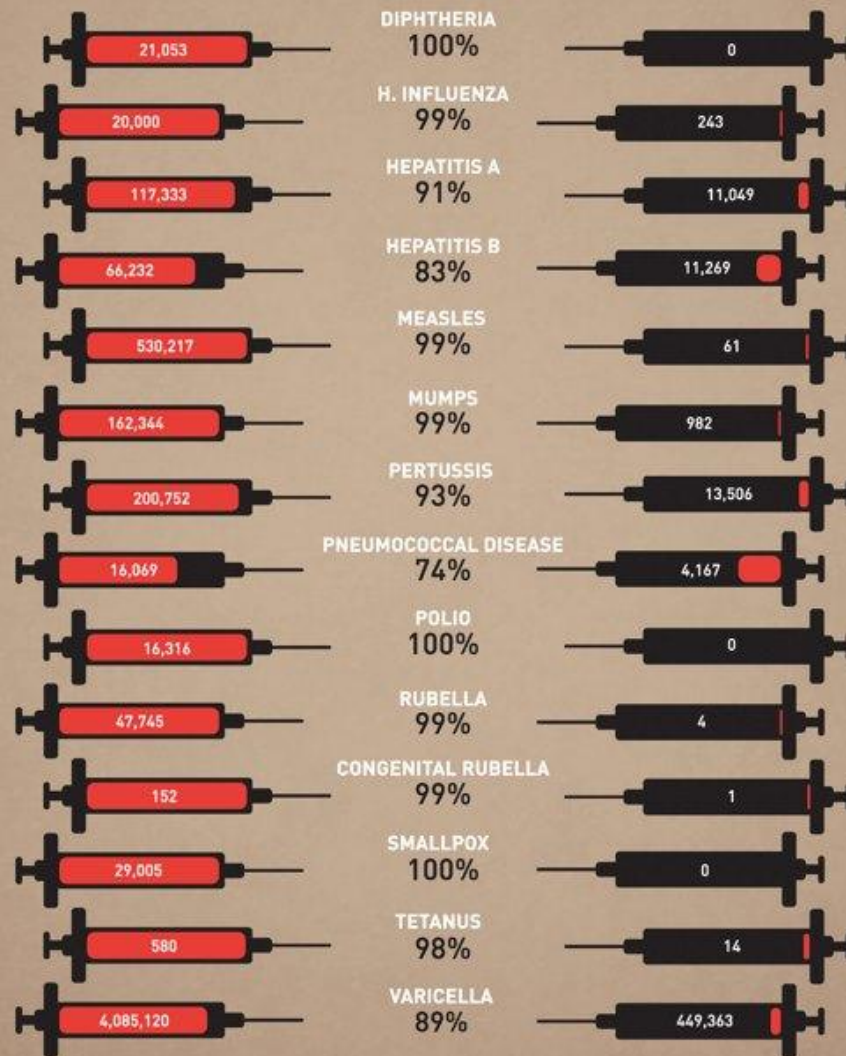


PRE-VACCINE ERA
ESTIMATED ANNUAL
MORBIDITY IN THE U.S.

%

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

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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

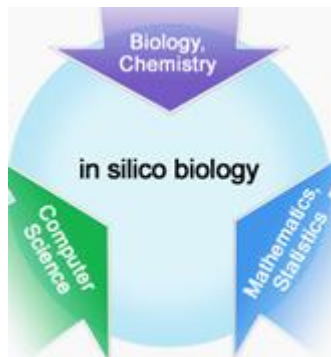
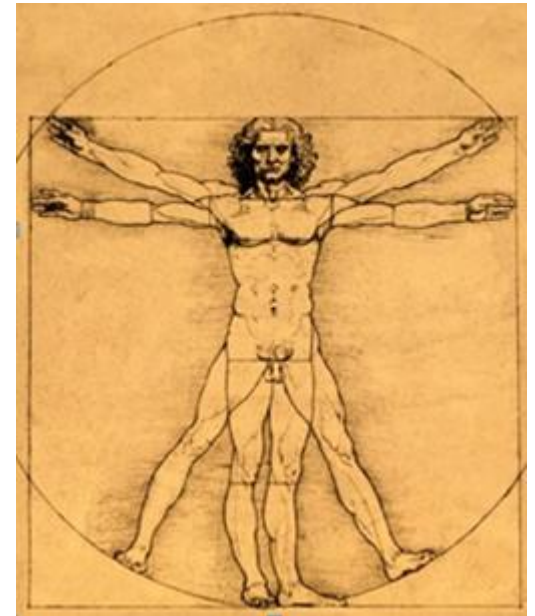
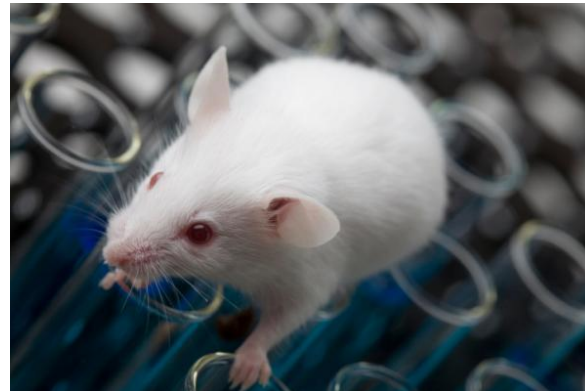
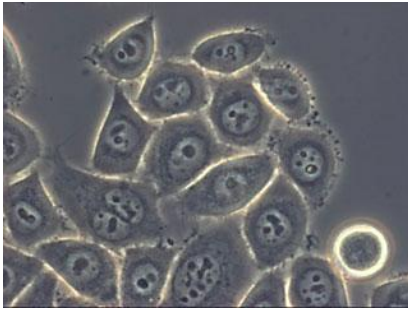
In vitro / in silico



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

COM'È REGOLAMENTATA LA SPERIMENTAZIONE ANIMALE?

Direttiva Europea 2010/63/CE sulla Sperimentazione Animale

Recepita da 19 dei 28 stati membri



Recepimento Italiano – estate 2013

26 giugno: La XIV Commissione del Senato approva un emendamento che propone un nuovo testo per il recepimento della direttiva 2010/63/UE

31 luglio: La Camera approva la versione del provvedimento proposta dal Senato, senza apportarvi modifiche

6 agosto: La legge viene pubblicata in Gazzetta Ufficiale. Il testo è invariato rispetto a quello approvato dal Senato

GLI EMENDAMENTI ITALIANI LE RICADUTE SULLA RICERCA

Divieto per procedure che non prevedono anestesia o analgesia

Si applica anche nel caso di semplici prelievi o di indagini incompatibili con l'anestesia

Divieto di utilizzo di animali per gli xenotrapianti

Ricadute su: trapianti umani, ricerca sul cancro, sviluppo di terapie cellulari

Divieto di utilizzo di animali per le ricerche su sostanze d'abuso

Ricadute su: ricerca su effetti di nuove sostanze d'abuso, astinenza da sostanze d'abuso e disturbi alimentari, ecc.

Divieto di utilizzo di animali negli ambiti sperimentali e di esercitazioni didattiche

Ostacoli alla formazione professionale e alla libera circolazione dei ricercatori, delle conoscenze scientifiche e delle tecnologie

Divieto di allevamento di cani, gatti e primati non umani destinati alla sperimentazione

Divieto in contrasto con la libertà d'impresa, il diritto di esercitare un lavoro o un'attività professionale e di conseguenza con il diritto di stabilimento

LA RICHIESTA DEI RICERCATORI

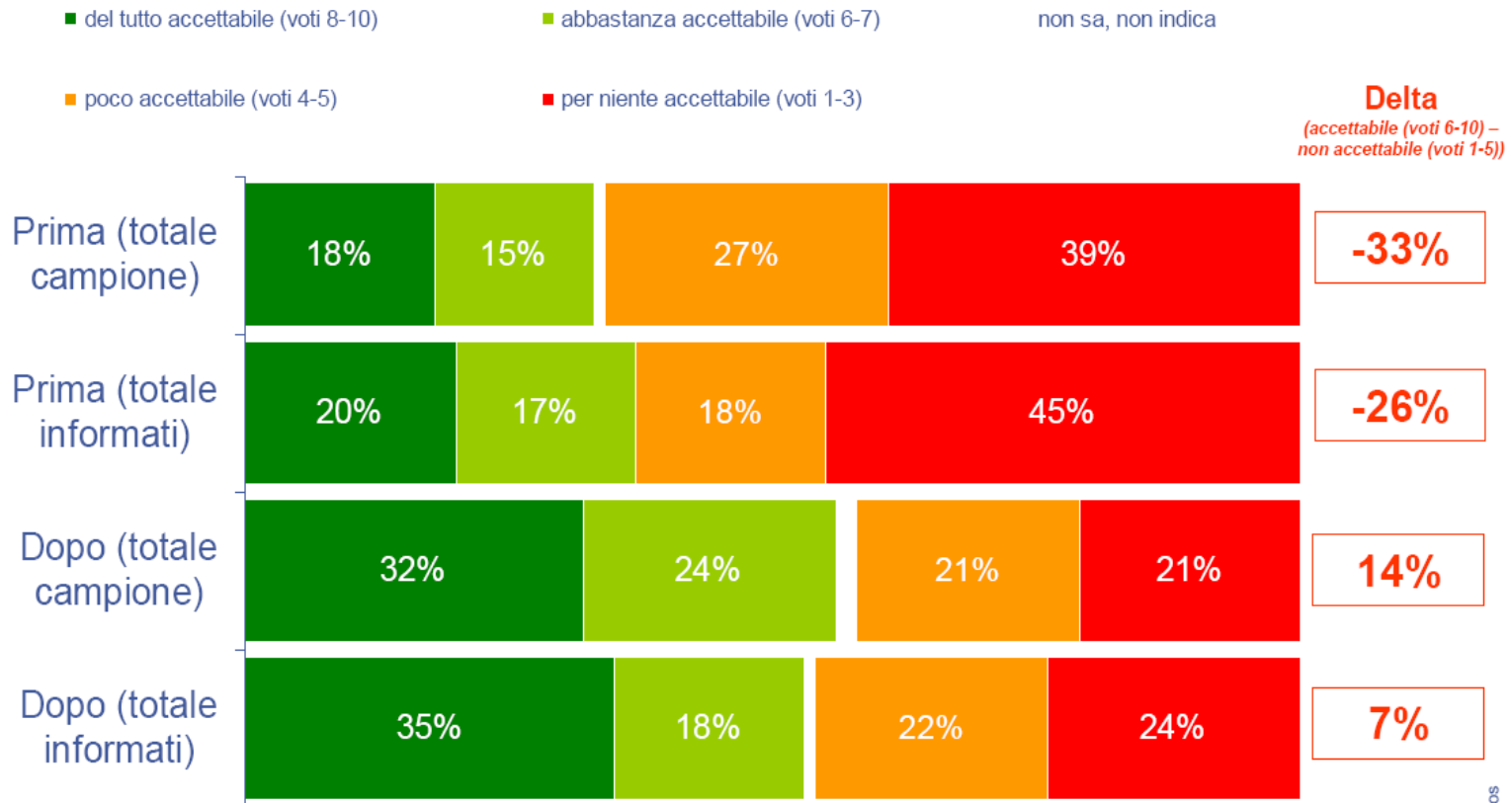


➔ ritornare al testo originario della direttiva

IL LIVELLO DI INFORMAZIONE CAMBIA L'OPINIONE DELLE PERSONE

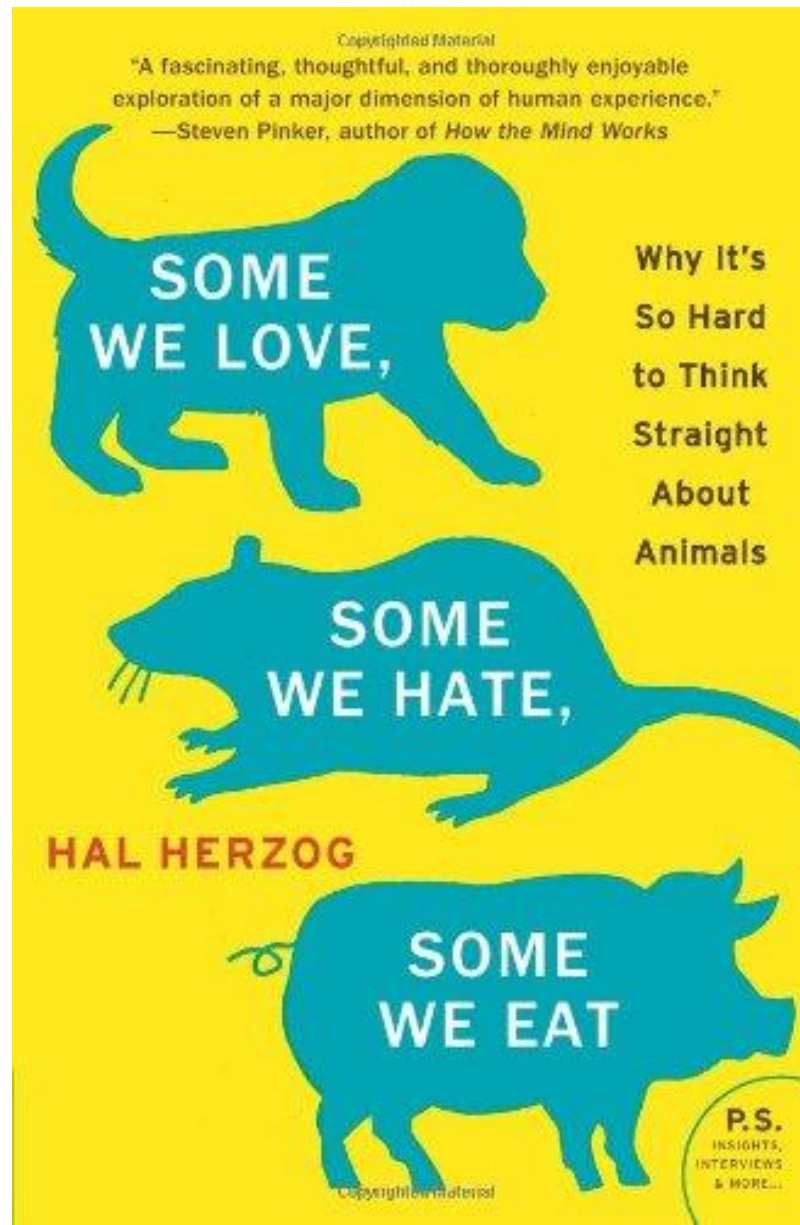


La sperimentazione scientifica sugli animali. Quanto è accettabile prima e dopo alcune informazioni?



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

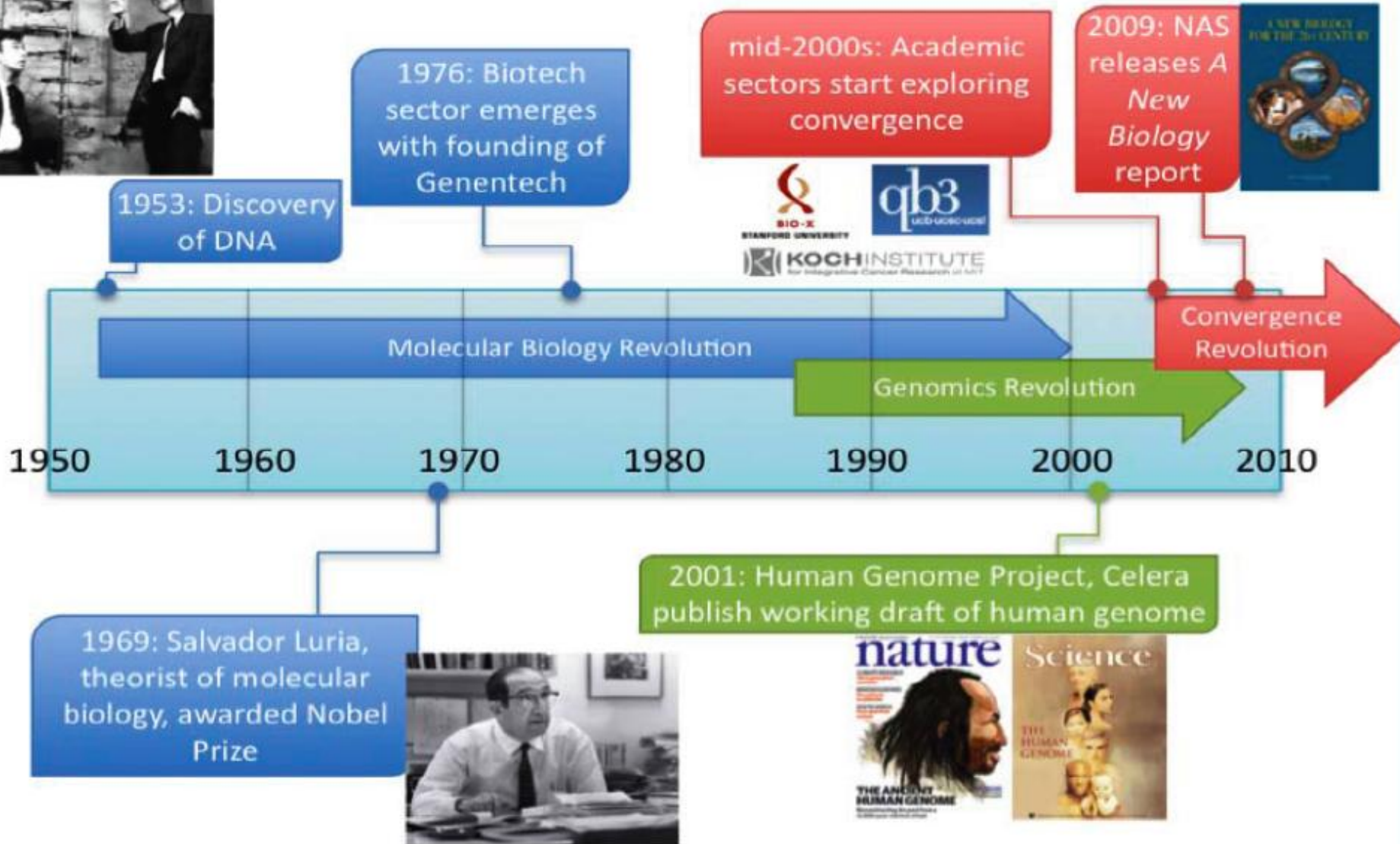
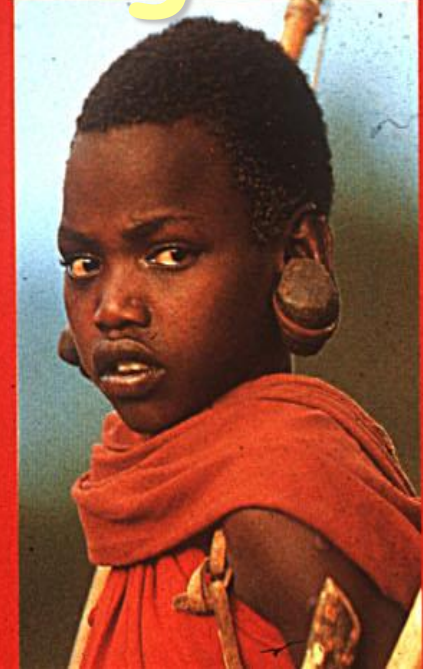
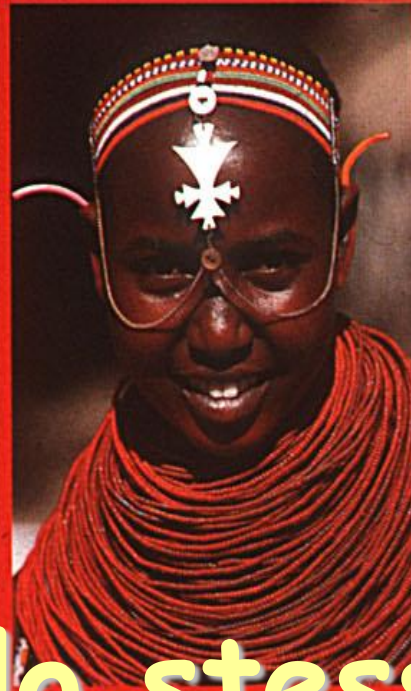
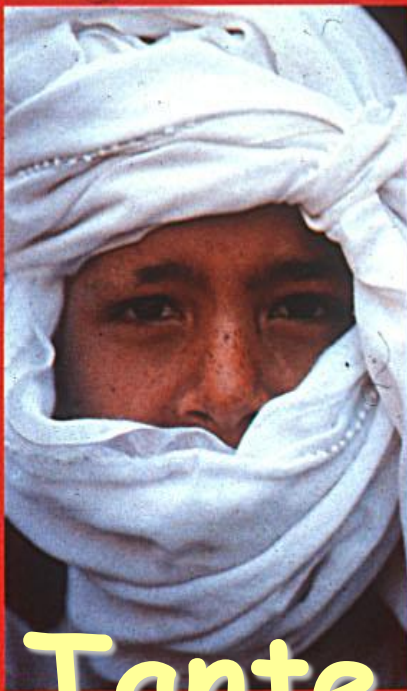


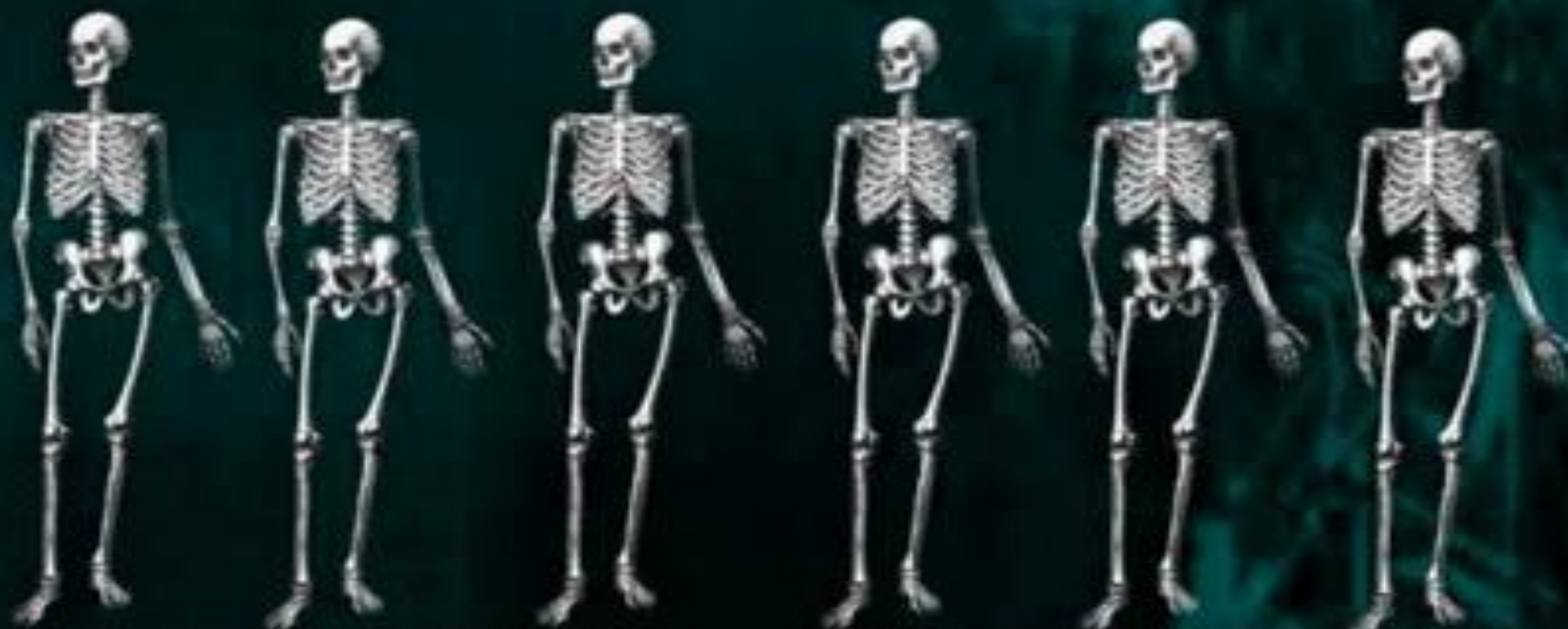
Image and info credits (clockwise from top-left): DNAmazing.com, Gene.com, BioX.stanford.edu, qb3.org, mit.edu/ki, nap.edu, sciencemag.org, nature.com, nlm.nih.gov





Tante etnie ...lo stesso genoma

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 !

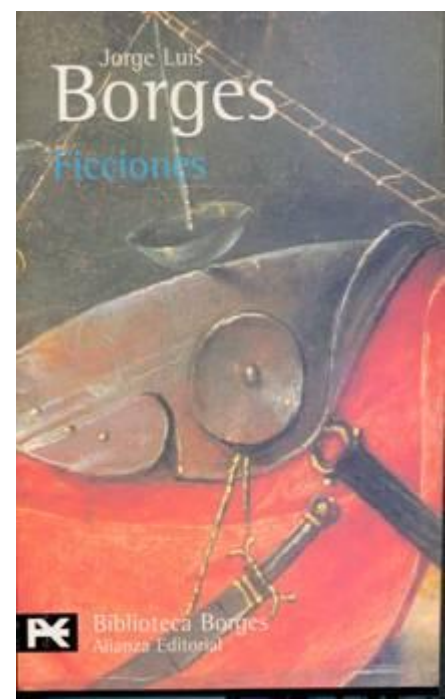
...l'universo appare nello stesso modo da qualunque punto ed in qualunque direzione lo si osservi...

La Biblioteca de Babel

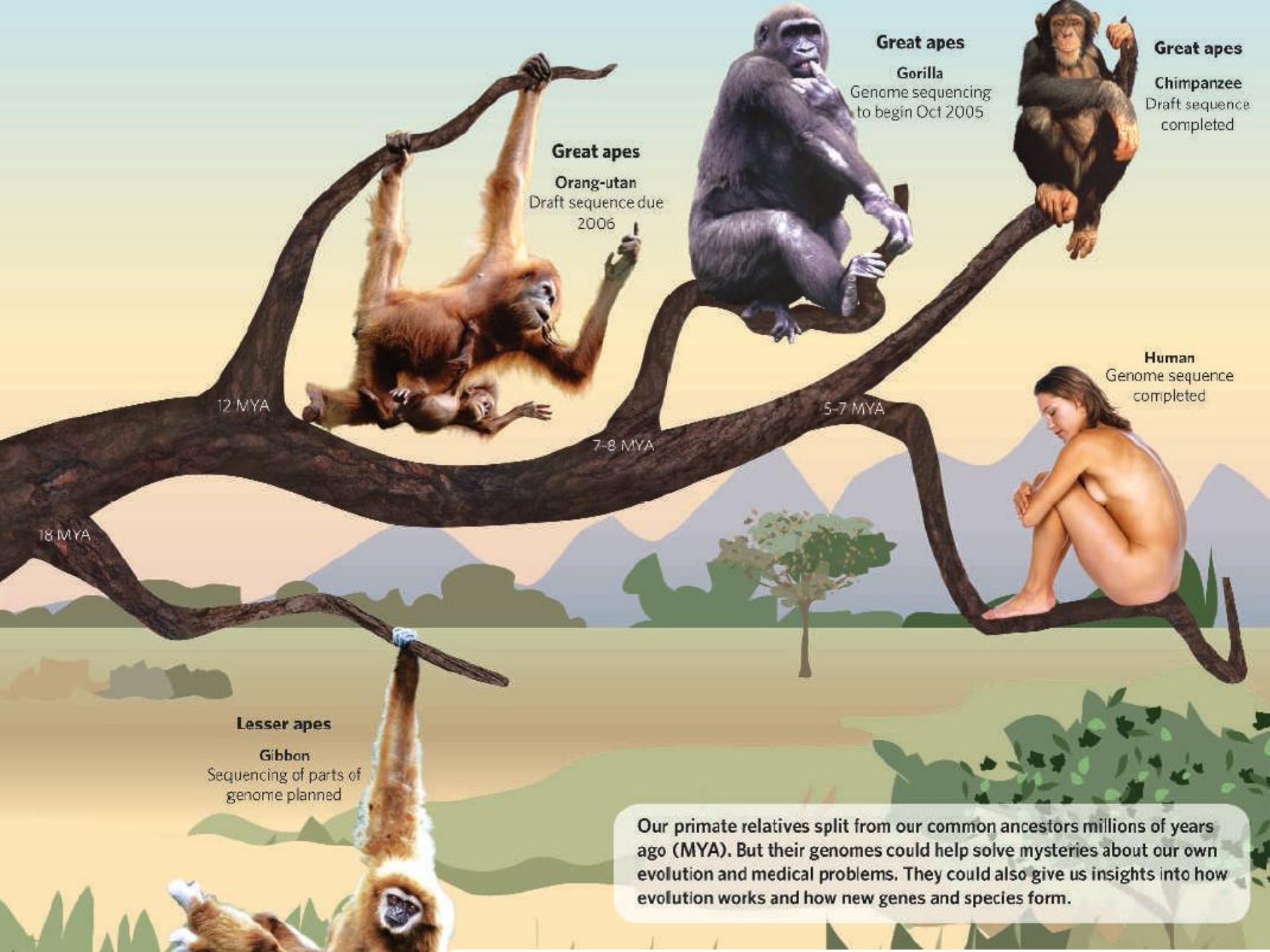
*By this art you may contemplate the
variation of the 23 letters...*

*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







Great apes

Gorilla

Genome sequencing
to begin Oct 2005

Great apes

Chimpanzee

Draft sequence
completed

Great apes

Orang-utan

Draft sequence due
2006

12 MYA

7-8 MYA

5-7 MYA

Human

Genome sequence
completed

18 MYA

Lesser apes

Gibbon

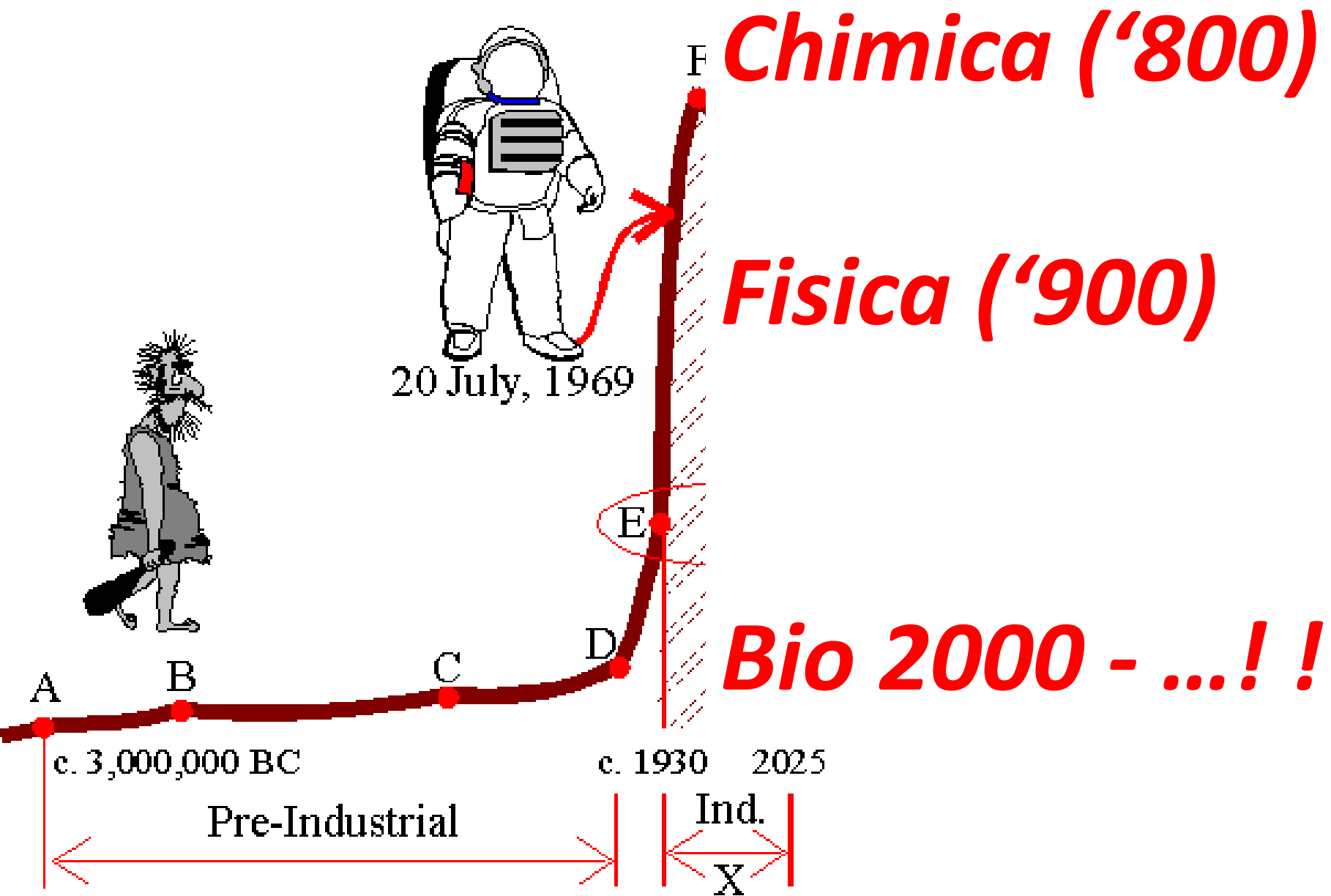
Sequencing of parts of
genome planned

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.



The
Neanderthal
in the family





Joe Klein:
The CIA's
Afghan Disaster

Yemen: The
New Center
Of Terror

Why the Recession
Hasn't Been Cool
To Teens

JANUARY 16, 2011

TIME

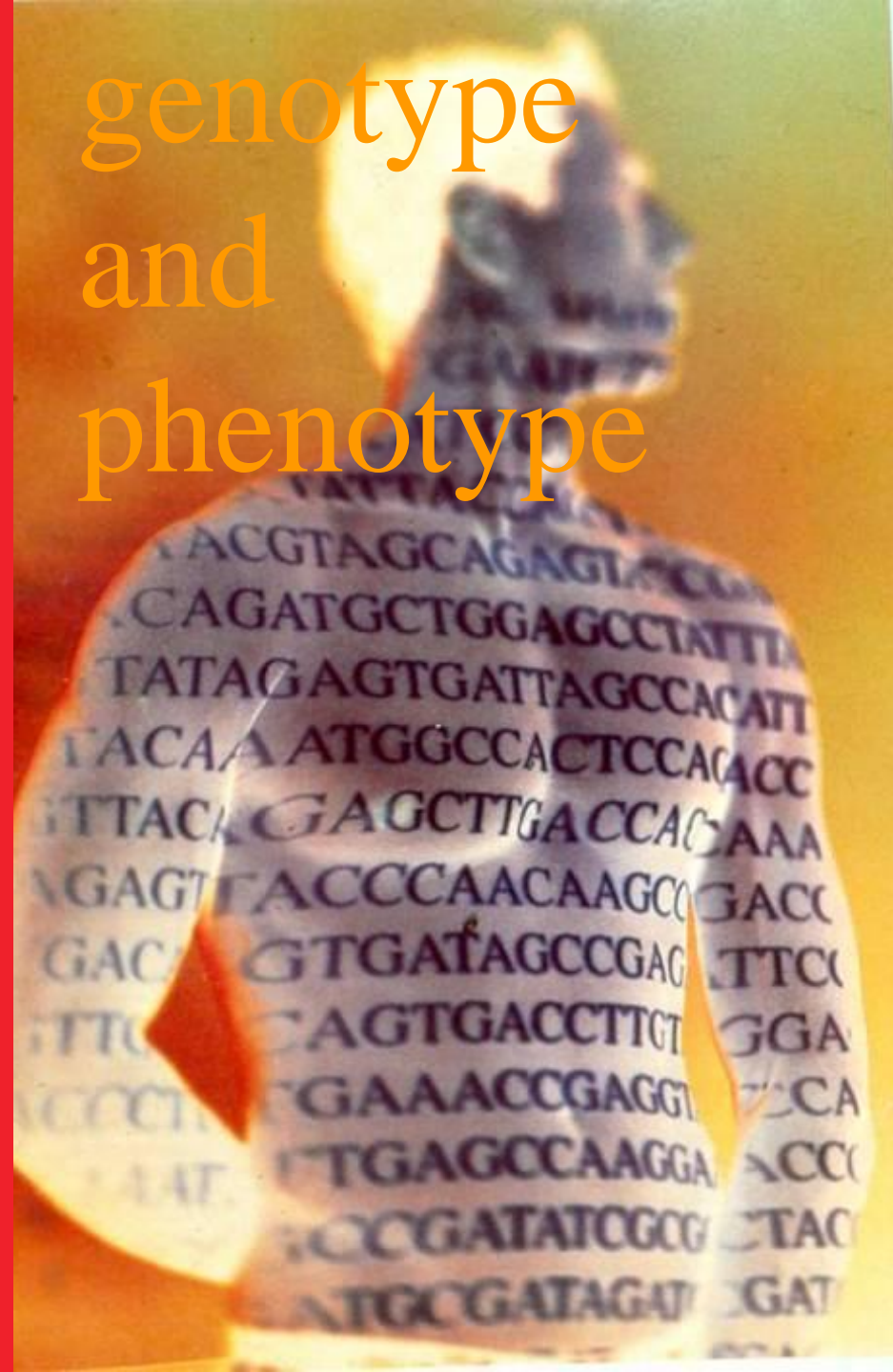
WHY YOUR DNA ISN'T YOUR DESTINY

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

BY JOHN CLOUD

www.time.com

genotype
and
phenotype









Josh Charles: The Peabody Library at Mount Vernon Place
(Josh Charles, actor in CBS drama "The Good Wife", Emmy nomination)



**CULTURA
QUANDO?**



































Così in Europa

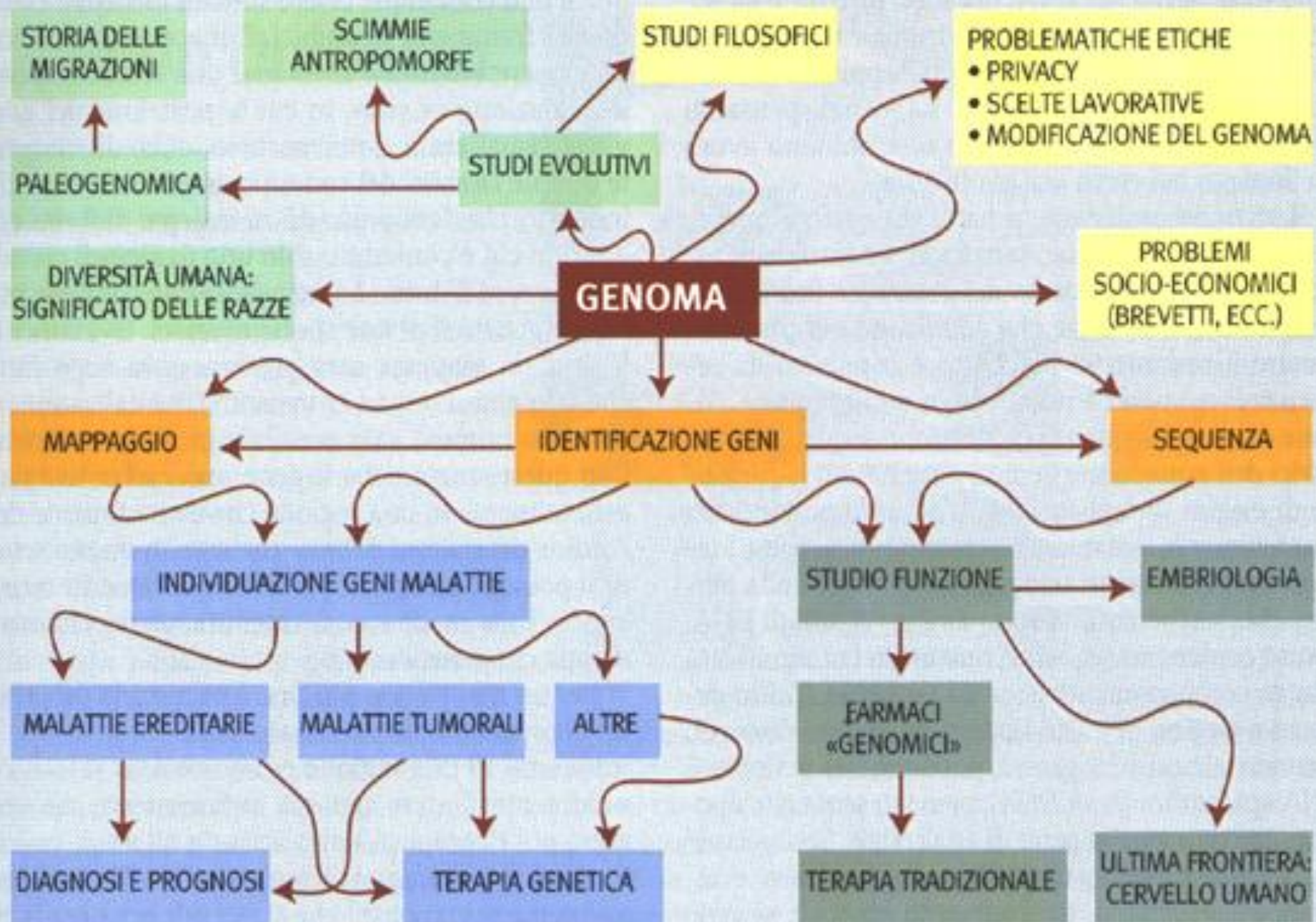
Percentuale di spesa pubblica destinata a cultura e istruzione. Dati 2011

CULTURA

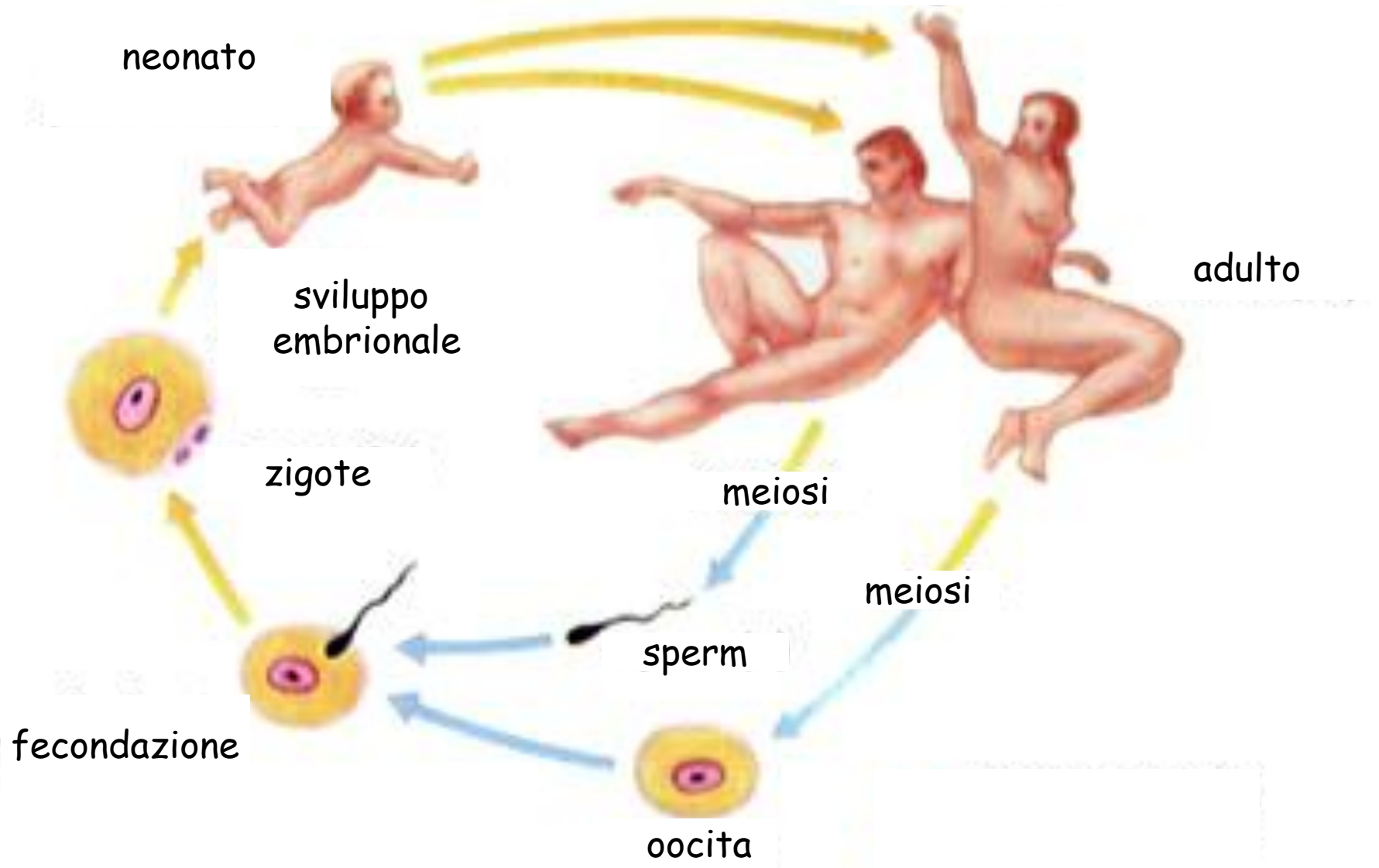
Islanda	7,4	
Estonia	5,0	
Lettonia	4,2	
Lussemburgo	4,0	
Slovenia	3,7	
Ungheria	3,5	
Olanda	3,5	
Spagna	3,3	
Slovacchia	3,0	
Rep. Ceca	2,9	
Polonia	2,9	
Norvegia	2,9	
Danimarca	2,8	
Cipro	2,8	
Romania	2,7	
Lituania	2,6	
Svizzera	2,6	
Francia	2,5	
Belgio	2,4	
EU-27	2,2	
EA-17	2,2	
Portogallo	2,2	
Finlandia	2,2	
Svezia	2,2	
Bulgaria	2,1	
Malta	2,1	
Regno Unito	2,1	
Austria	1,9	
Germania	1,8	
Irlanda	1,8	
Grecia	1,2	
ITALIA	1,1	

ISTRUZIONE

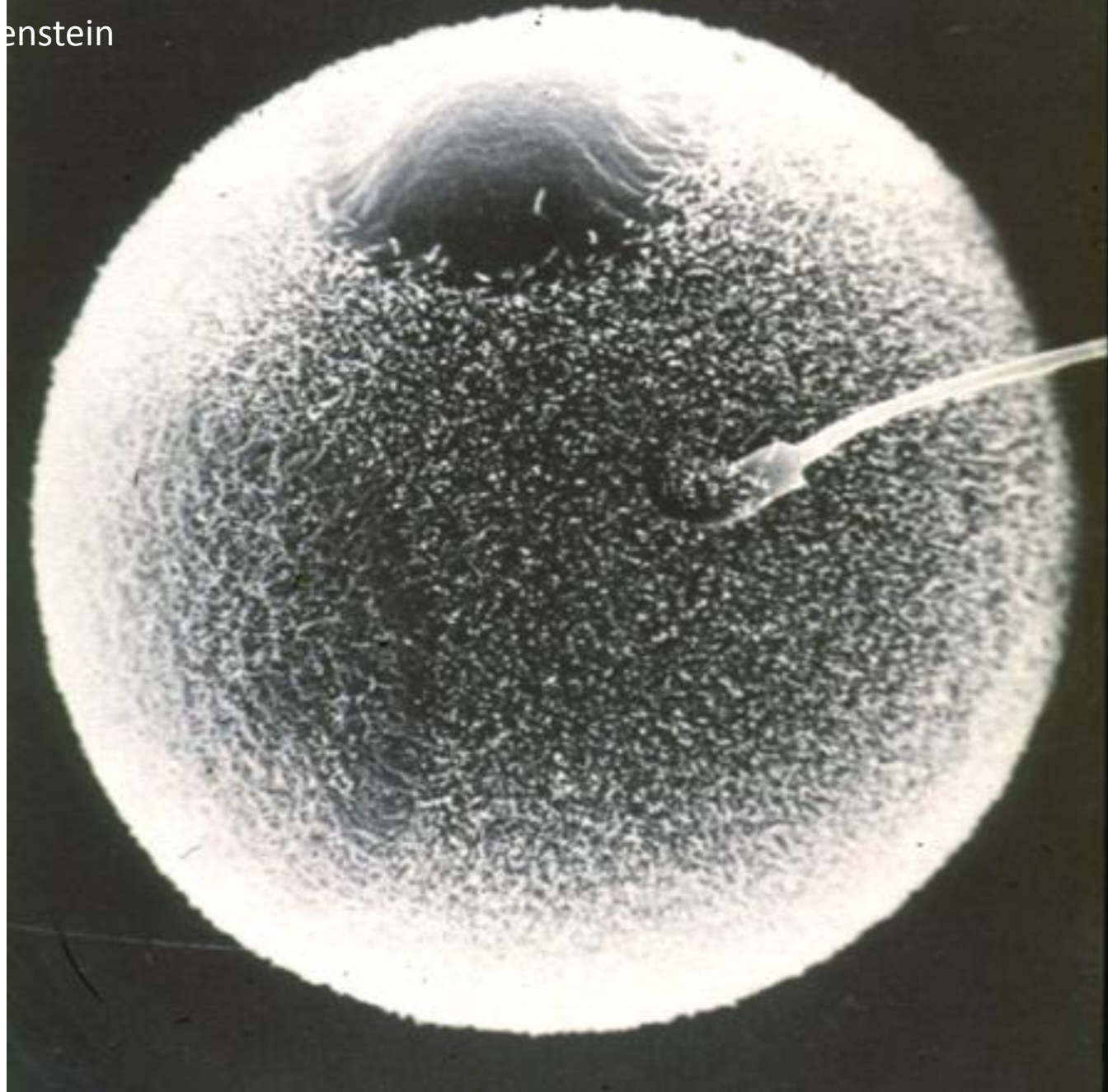
Svizzera	17,9	
Estonia	16,9	
Islanda	16,6	
Cipro	15,6	
Lituania	15,6	
Lettonia	14,9	
Malta	13,9	
Danimarca	13,5	
Regno Unito	13,4	
Svezia	13,3	
Slovenia	13,1	
Portogallo	12,9	
Polonia	12,8	
Norvegia	12,6	
Lussemburgo	12,1	
Belgio	11,6	
Olanda	11,6	
Finlandia	11,6	
Rep.Ceca	11,4	
Austria	11,0	
EU-27	10,9	
Irlanda	10,9	
Francia	10,8	
Slovacchia	10,6	
Spagna	10,5	
Romania	10,5	
Ungheria	10,4	
Bulgaria	10,2	
EA-17	10,1	
Germania	9,4	
ITALIA	8,5	
Grecia	7,9	



Crescita e differenziamento



gica non è, naturalmente, la "Vita". E nemmeno la vita psicologica.
ondo».
enstein



Jeremy Cherfas
and
John Gribbin

The Redundant Male



THE END OF MEN

AND THE RISE OF WOMEN

HANNA ROSIN



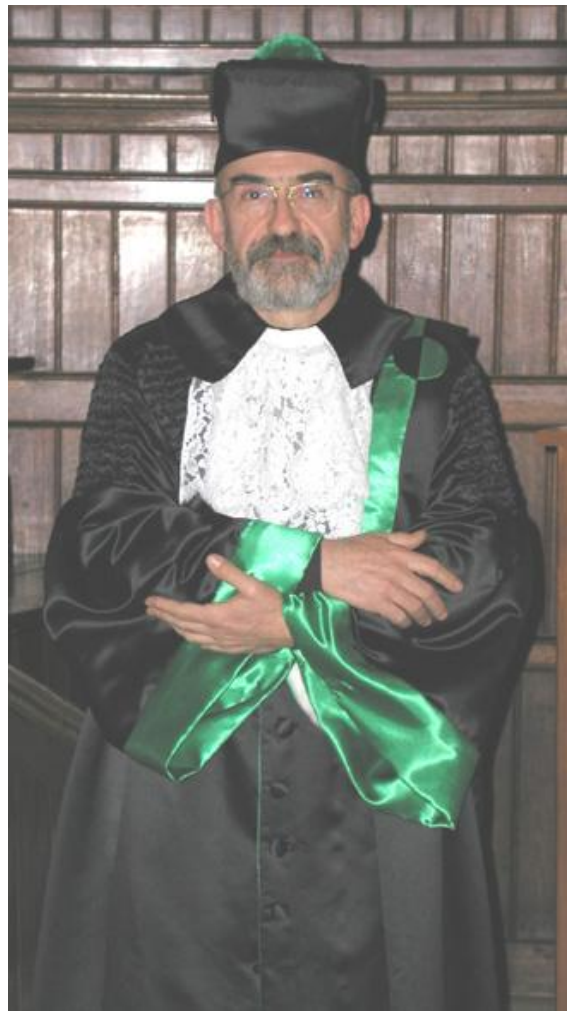
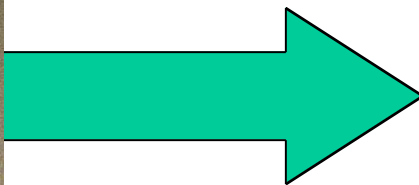








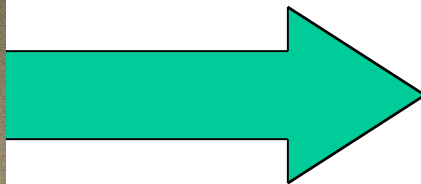
1



10^{15}



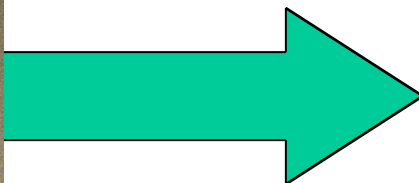
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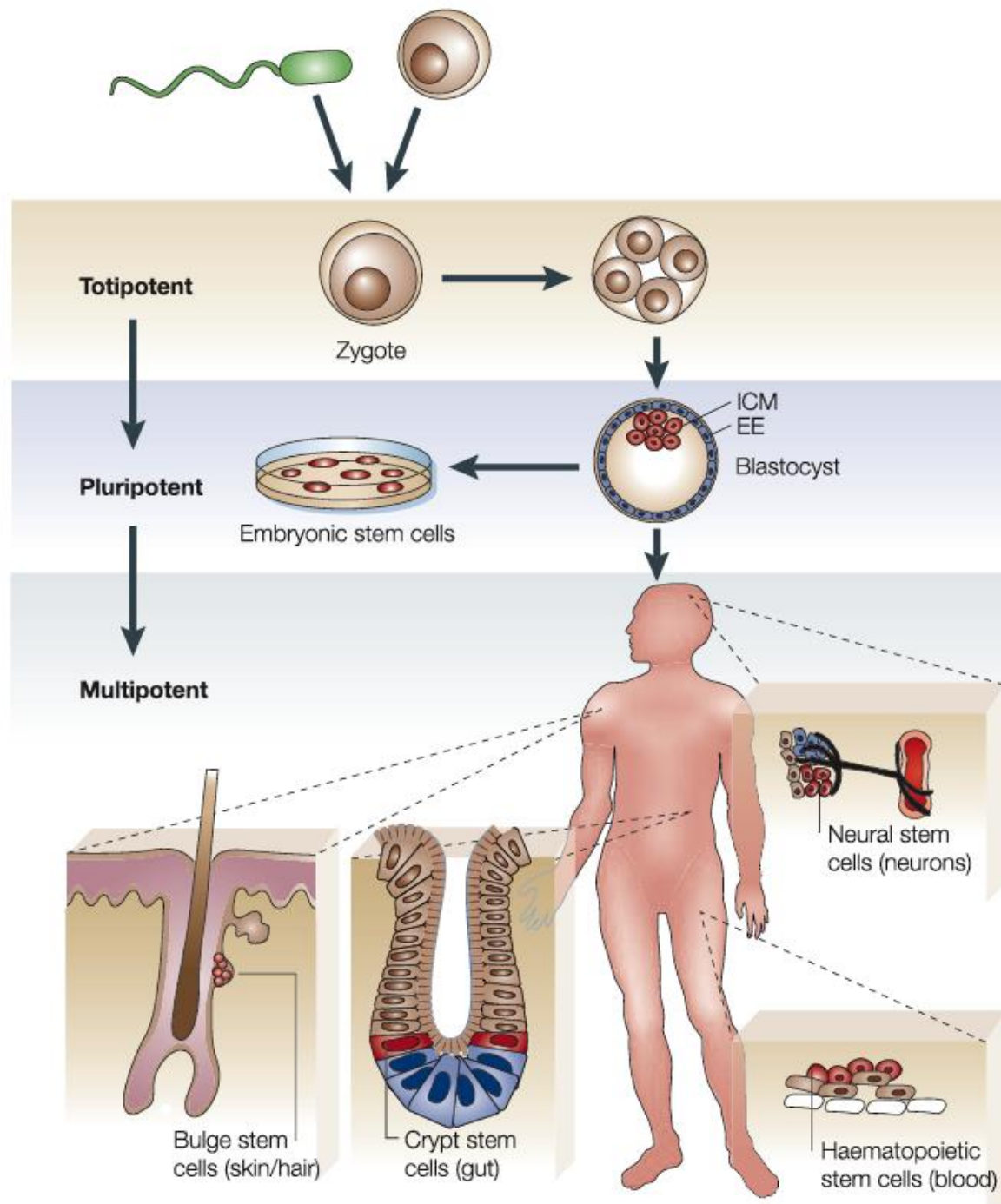
10^{15}



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10^{15}





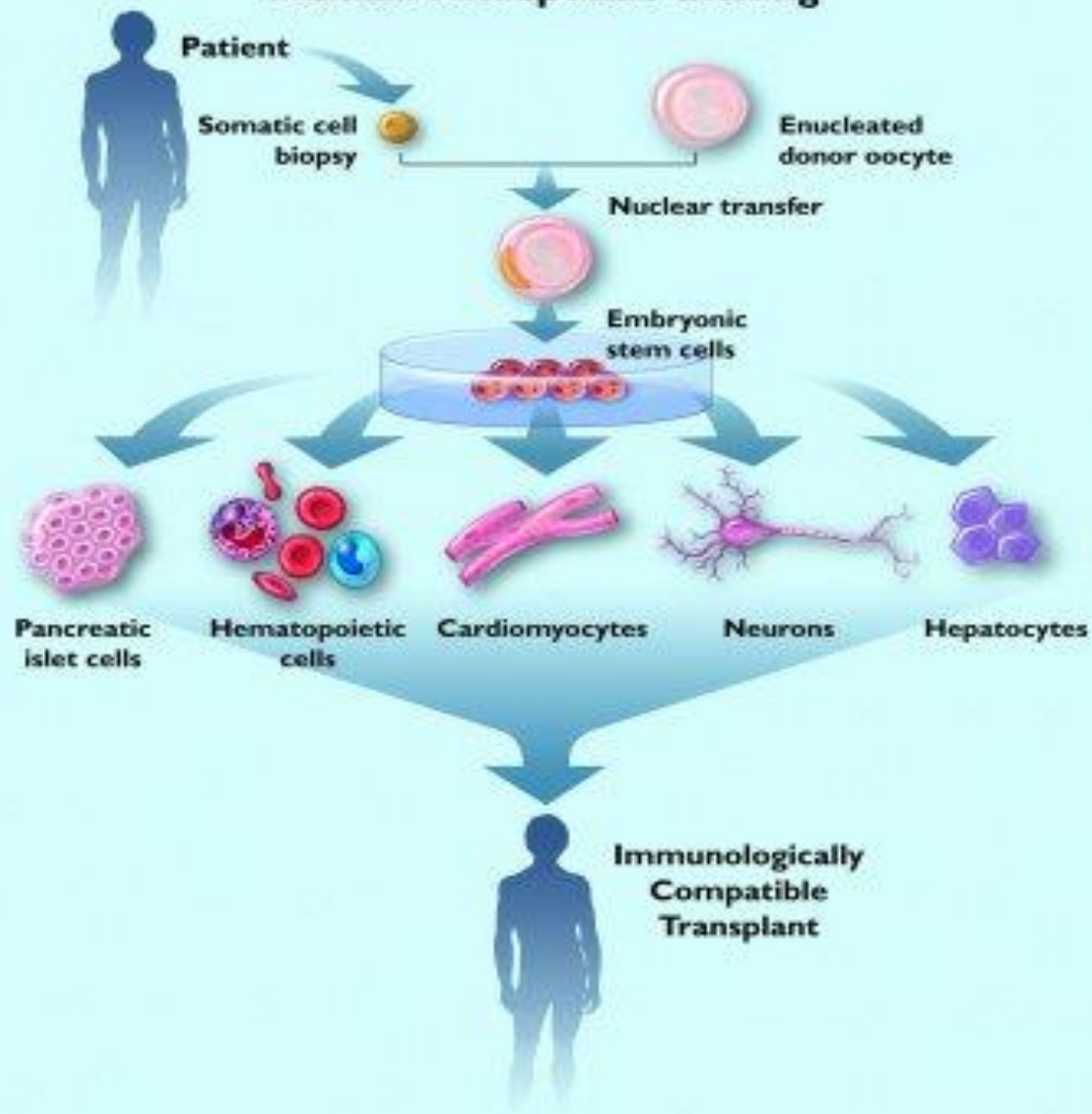
Hans Spemann

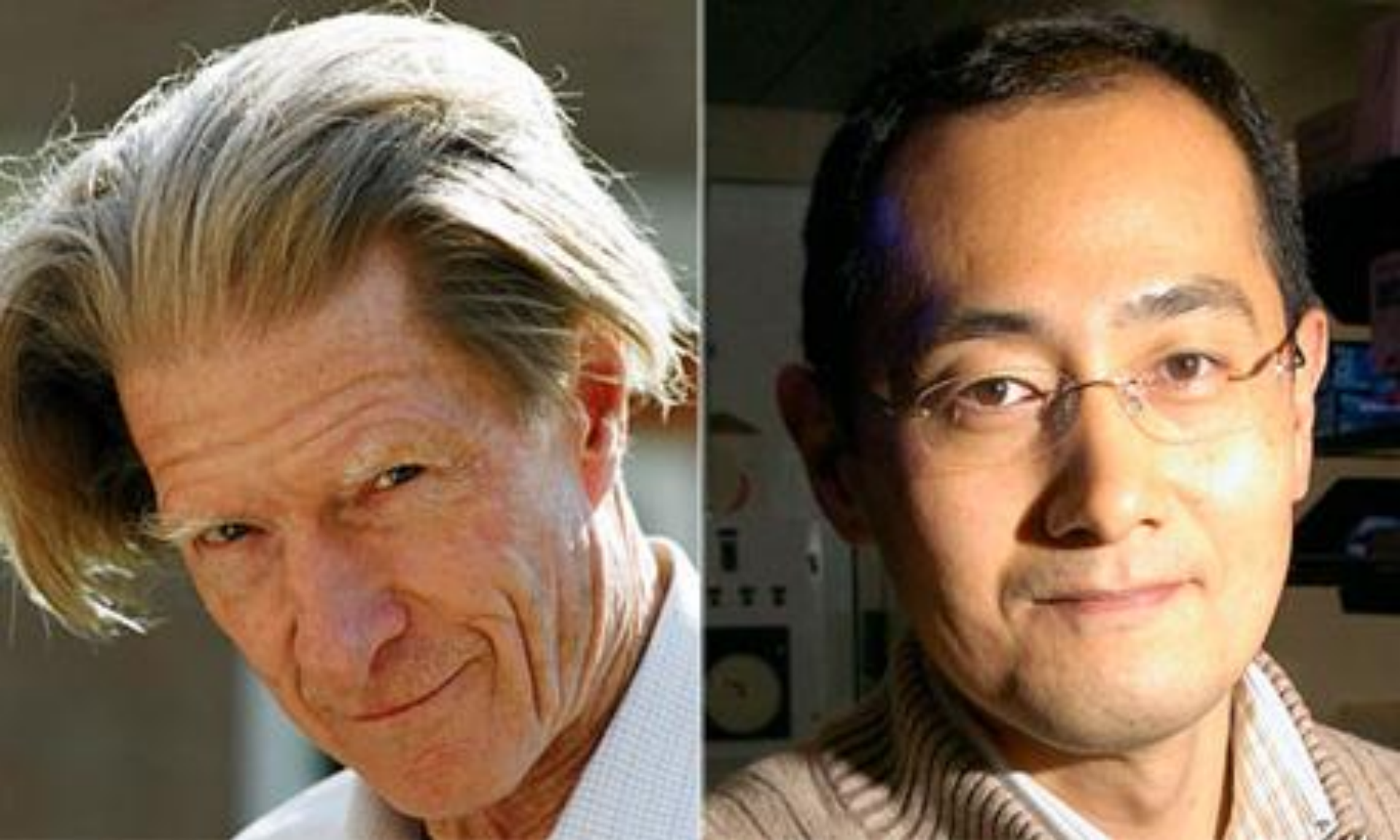
(1869 - 1941)

1938 - Cloning is envisioned as "fantastical experiment".



Human Therapeutic Cloning





John Gurdon (left) and Shinya Yamanaka
showed how to reprogram cells into their embryonic states

SCIENCE REPORT

Summer HALF, 1949.

NAME GURDON

Division D22 Subject Biology.

Place	$\frac{K}{14}$	$\frac{11}{15}$	$\frac{15}{18}$	Marks	$\frac{231}{550}$
-------	----------------	-----------------	-----------------	-------	-------------------

It has been a disastrous half. His work has been far from satisfactory. His prepared stuff has been badly learnt, and several of his test pieces have been torn over; one of such pieces of prepared work scored 2 marks out of a possible 50. His other work has been equally bad, and several times he has been in trouble, because he will not listen, but will insist on doing his work in his own way. I believe he has ideas about becoming a Scientist; on his present showing this is quite ridiculous, if he can't learn simple Biological facts he would have no chance of doing the work of a Specialist, and it would be sheer waste of time, both on his part, and of those who have to teach him.

Refuser.







Anthony Atala's team
at the Wake Forest Institute for Regenerative Medicine
in Winston-Salem, North Carolina

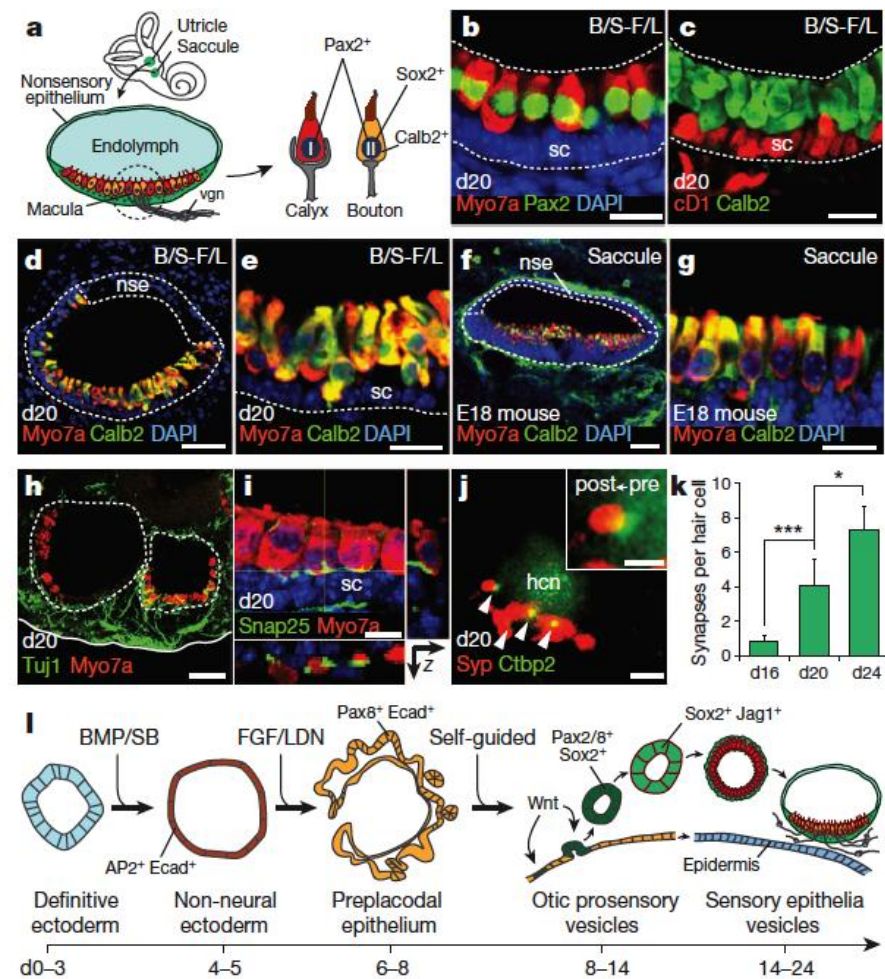


Figure 4 | Stem-cell-derived sensory epithelia are comparable to immature vestibular end organs. **a**, Schematic of vestibular end organs and type I/II

LETTER

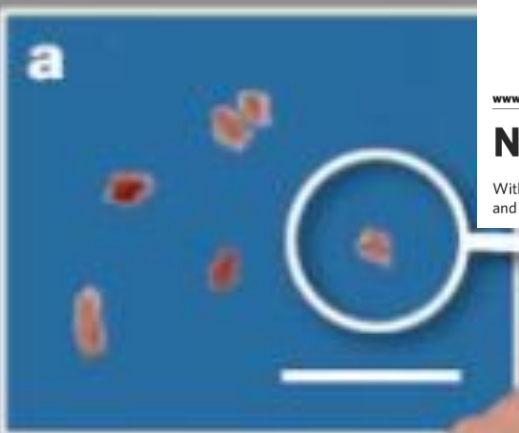
8 AUGUST 2013 | VOL 500 | NATURE | 217

doi:10.1038/nature12298

Generation of inner ear sensory epithelia from pluripotent stem cells in 3D culture

Karl R. Koehler^{1,2,3}, Andrew M. Mikosz^{2,3}, Andrei I. Molosh^{2,4}, Dharmeshkumar Patel^{2,3} & Eri Hashino^{1,2,3}

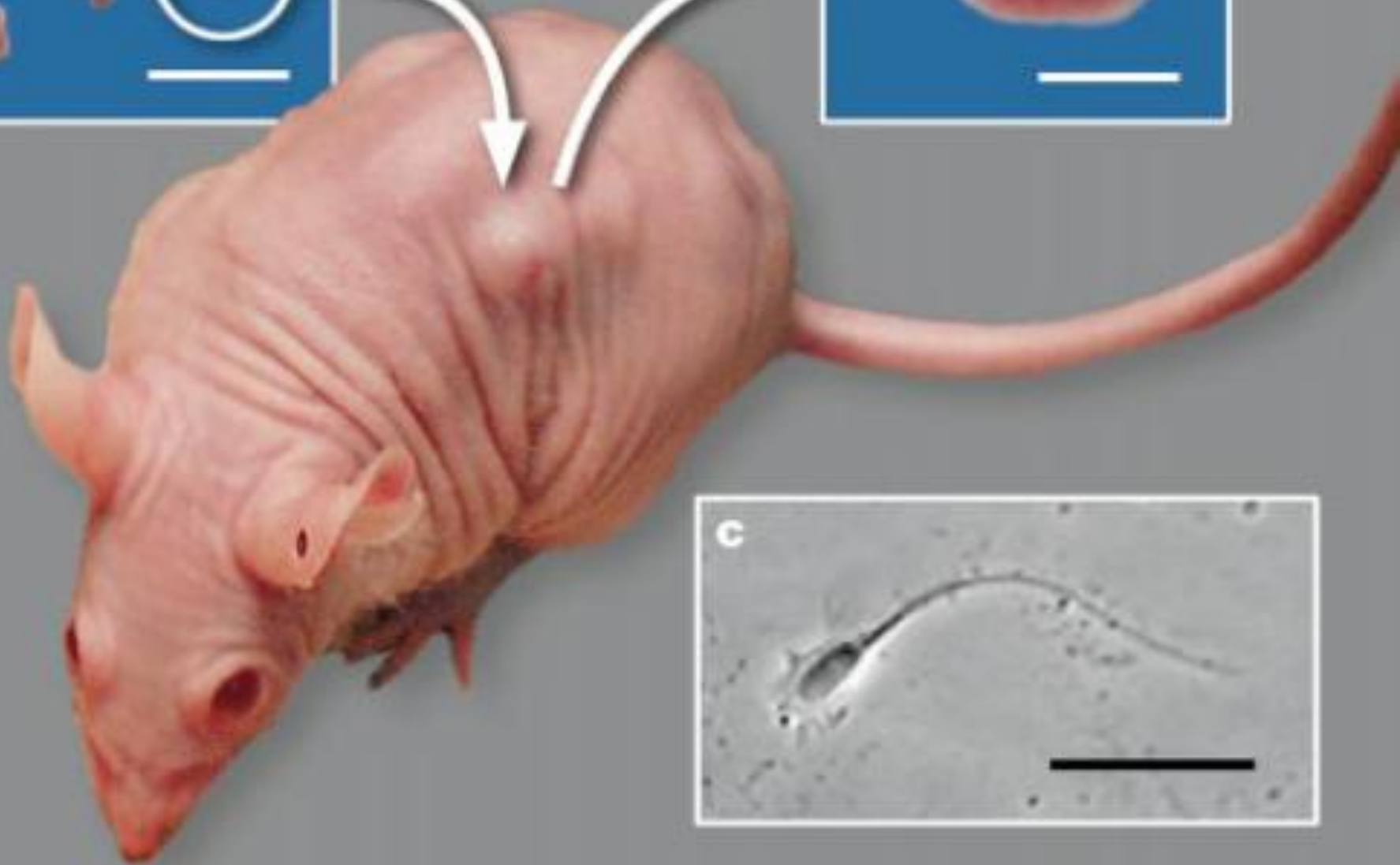
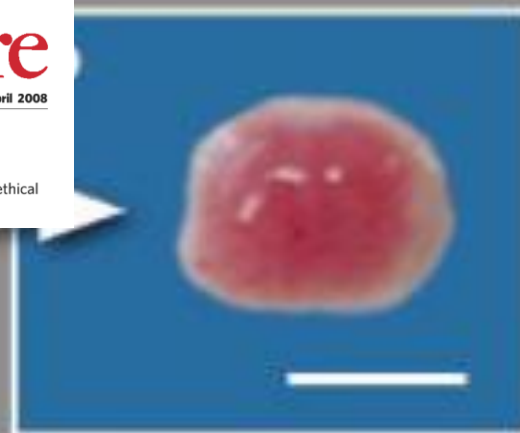
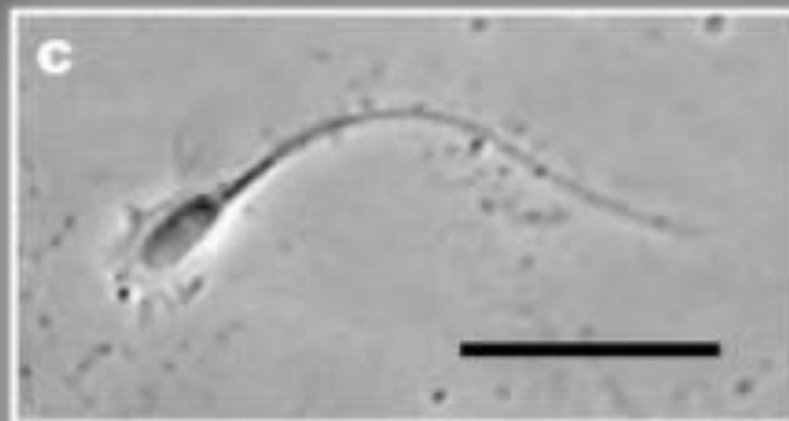


a**nature**www.nature.com/nature

Vol 452 | Issue no. 7190 | 24 April 2008

New sources of sex cells

Within the next decade or so, it will become possible to derive sperm and eggs from skin cells. The ethical and technical hurdles need to be addressed with the scientific and therapeutic benefits in mind.

**c**

Cesare Perotti è responsabile del settore sternali e manipolazione cellulare del servizio di Immunematologia e medicina trasfusionale della Fondazione IROCS Policlinico San Matteo di Pavia.

Claudia Del Fante è dirigente medico del servizio di Immunematologia e medicina trasfusionale della Fondazione IROCS Policlinico San Matteo di Pavia.

Carlo Alberto Redi è professore di biotecnologie della riproduzione all'Università di Pavia; accademico dell'Inciel e membro del Comitato Nazionale per la biosicurezza, le biotecnologie e le scienze della vita.



MEDICINA

Staminali dal cordone ombelicale

Il sangue prelevato dal cordone è un tesoro di cellule staminali usate per curare numerose malattie e come tutti i tesori ha attirato anche interessi privati, che però non hanno alcun fondamento terapeutico

di Cesare Perotti, Claudia Del Fante e Carlo Alberto Redi

IN BREVE

Da circa vent'anni il cordone ombelicale è una fonte importante di cellule staminali per la cura di molte malattie, non solo del sangue, e non è più considerato uno scarto. Inoltre, progressi della biologia delle staminali hanno suggerito la

costituzione di banche del cordone dove caratterizzare le cellule staminali e metterle a disposizione dei pazienti. Oggi in Italia viene donato solo il cinque per cento dei cordoni, di cui solo un terzo circa è utilizzabile. In

totale nelle 18 banche italiane sono disponibili poco più di 20.000 cordoni per terapie dedicate non solo alle malattie del sangue. Solo la raccolta solidaristica (cioè la donazione a banche pubbliche) assicura un corretto uso terapeutico

delle staminali contenute nei cordoni, come sostenuto dalle più autorevoli società scientifiche. Mentre la conservazione privata a uso personale è priva di ogni fondamento scientifico e terapeutico, ed è alimentata solo da fini commerciali.

Foto: M. S. / Contrasto

Un medico afferra con le pinze il cordone ombelicale di un bambino che sta nascendo con il taglio cesareo. Cordone ombelicale e placenta contengono sangue ricco di cellule staminali.

*Conosci la **GRANDE IMPORTANZA**
delle cellule staminali contenute nel
sangue del **cordone ombelicale** del tuo bimbo?*

*Conservandole offri a tuo figlio la possibilità di avere a disposizione
per un lungo periodo di tempo cellule staminali vitali con ottime
capacità replicative.*

*Un gesto prezioso che puoi compiere solo al
momento della sua nascita, un momento unico
ed irripetibile!*



Conserva
per tuo figlio le
cellule staminali
del sangue
del cordone
ombelicale
**Il parto è l'unico
momento**

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insieme a noi

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INVIA

Every baby
knows the
scientific method!



FORZA♥CHRY

STAMINA

I BIMBI
NON SI
TOCCANO

SI AL DIRITTO
DI SCEGLIERE
SI A STAMINA
SI ALLA VITA

SI AL METODO
MATTIA E LU
E TUTTI GLI AL
VOGLIONO CONTINUARE A

LUDOVICA FRANCHI



SI AL
SI

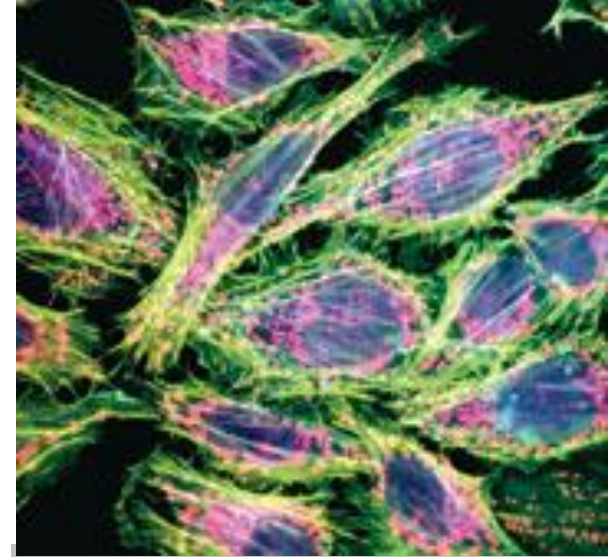






HeLa cells

since 1951 self-replicating
used in thousands biol exp
contribution to medicine



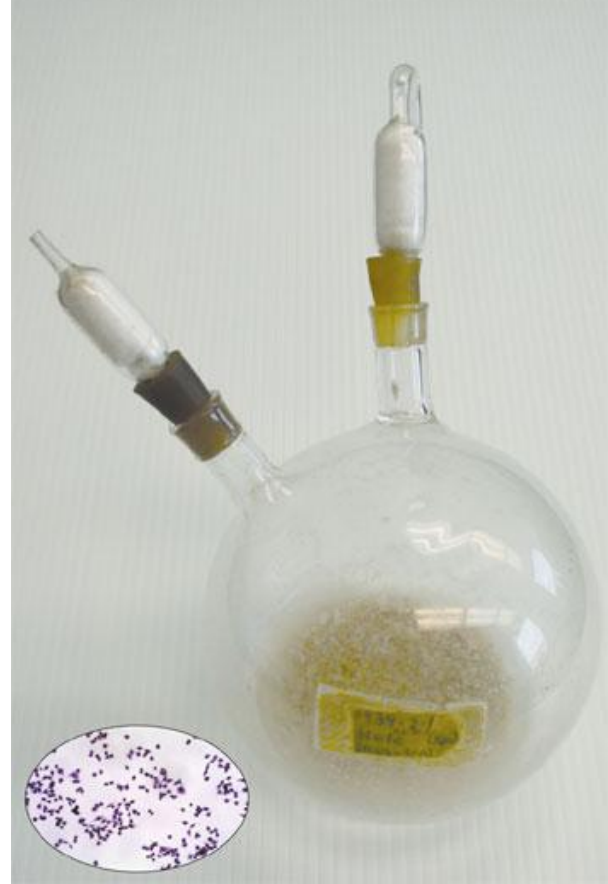
Henrietta Lacks

1920 - 1951

HeLa cancer cells have evolved into a
self-replicating, single-cell life-form.

HeLa cells should be given the new species name of
[Helacyton gartleri](#).

The cells are a genetic chimera of HPV18 and human
cervical cells and now have a distinct, stable, non-
human chromosome number.





WHO'S AFRAID OF
**HUMAN
CLONING**
?

Gregory E. Pence

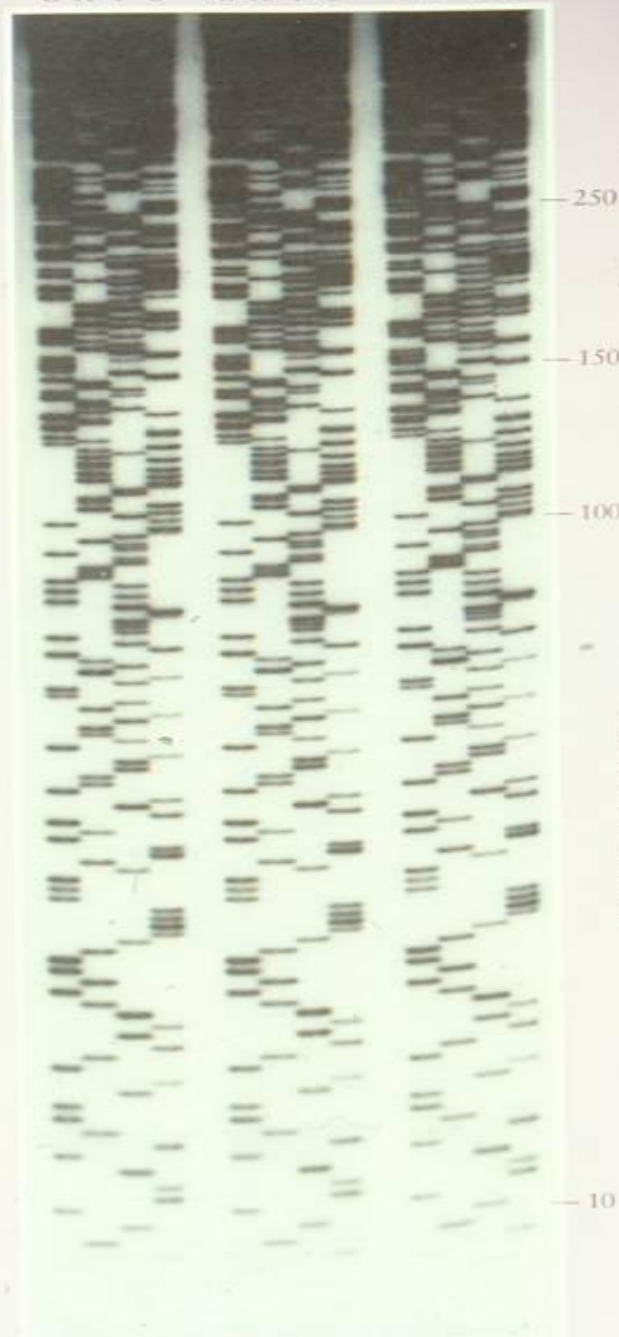
Playing God or Scientific Progress?

**HUMAN
CLONING**



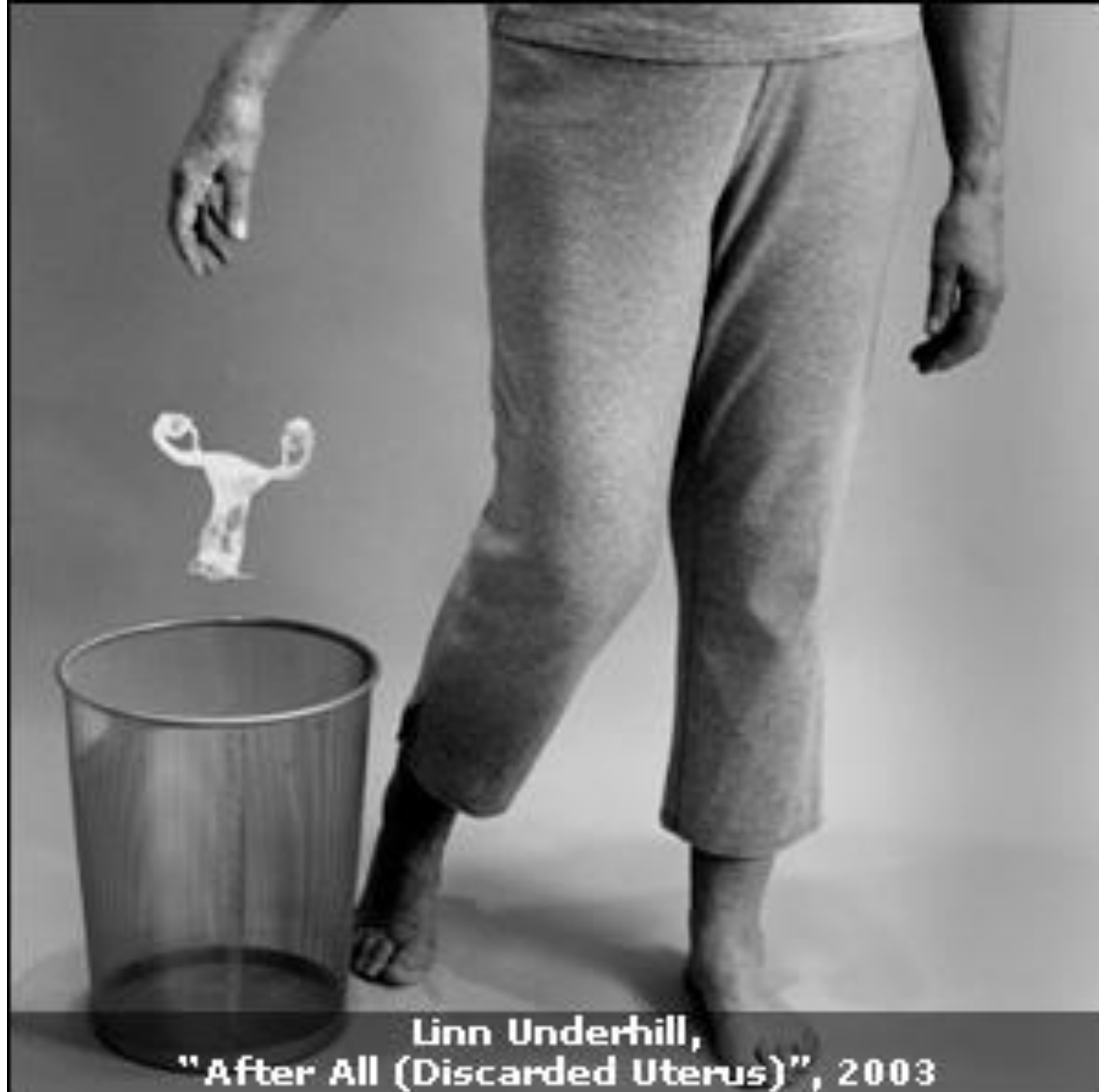
Performance in DNA Sequencing

GATC GATC GATC



Typical results obtained with the "Sequencing" Kit from Pharmacia LKB. The excellent performance of this kit reflects the high quality of the components it contains, not least, the quality of the dNTPs and ddNTPs in the sequencing mixes. The template was M13mp18; sequencing was performed using the protocol provided with the kit.





Linn Underhill,
"After All (Discarded Uterus)", 2003

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Mt. Sinai's, Dept. of Dermatology



Pelli

Jürgen Habermas

Il futuro della natura umana

I rischi di una genetica liberale

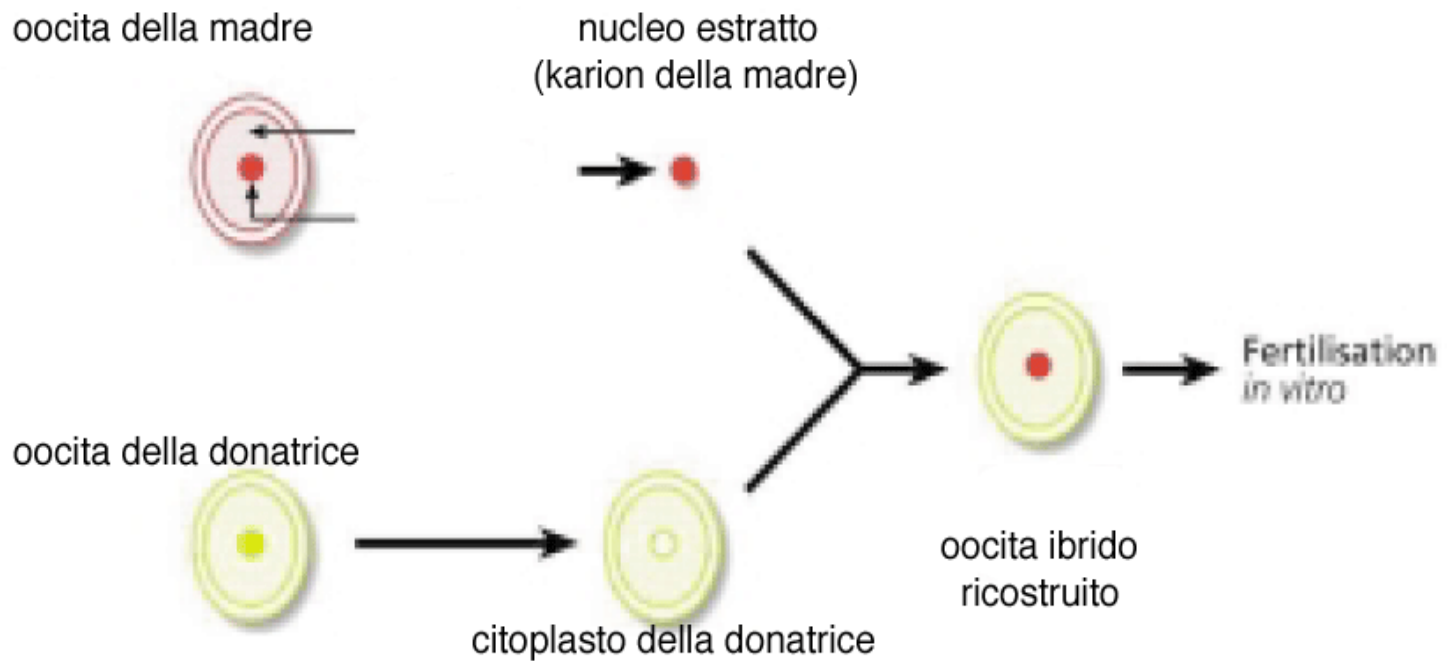
A cura di Leonardo Ceppa

Frontiera insuperabile !?!?!?!?

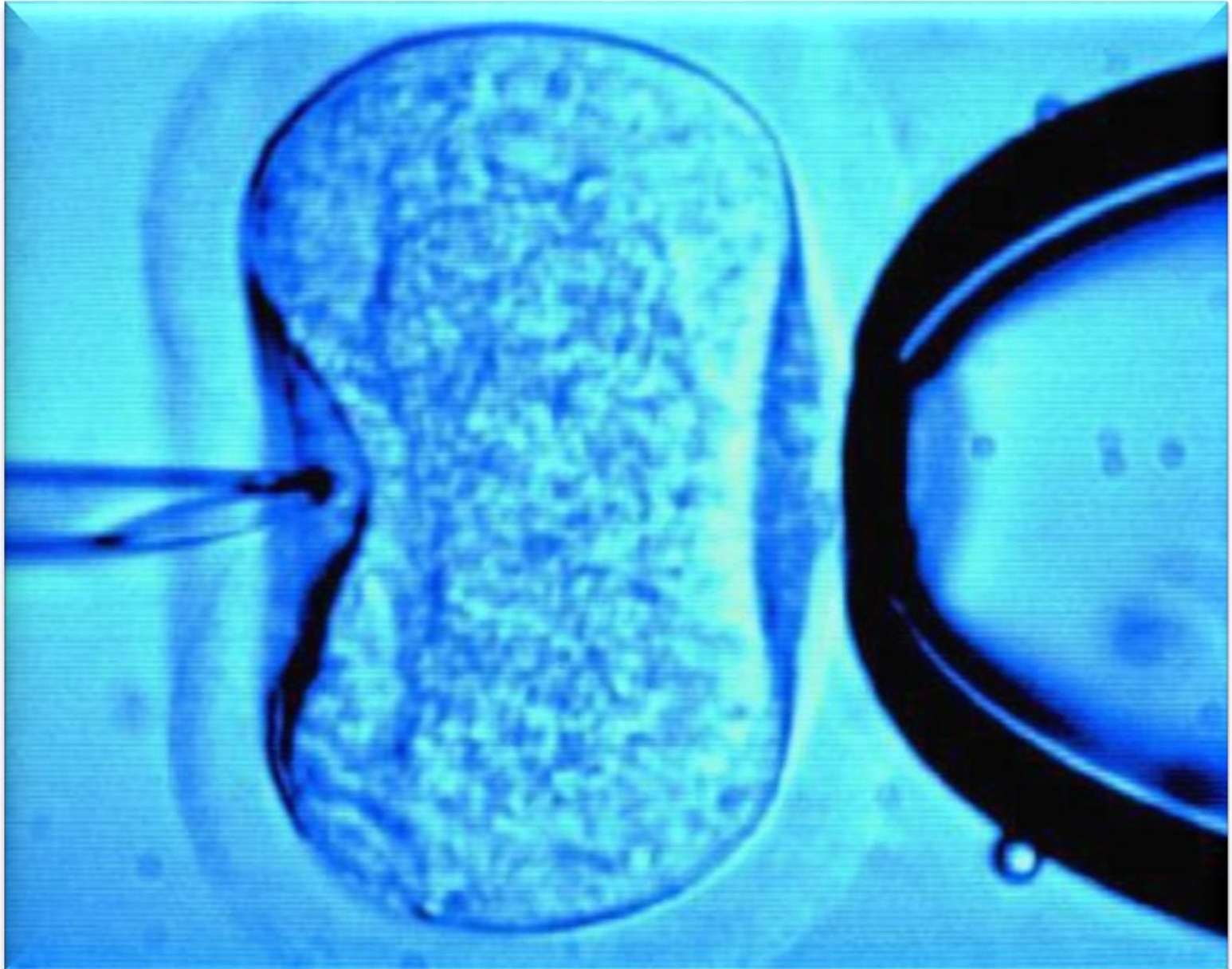


BIBLIOTECA EINAUDI

Treating mitochondrial disease by oocyte (egg) nucleus transfer – key steps



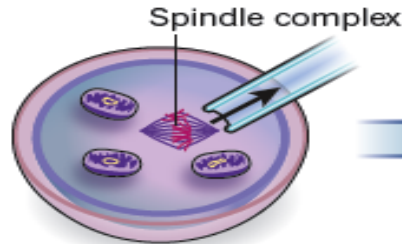
In vitro fertilization



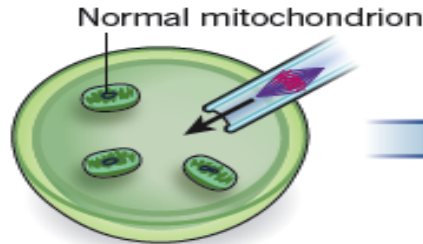
TWO WAYS TO CRACK AN EGG

Researchers are studying two ways to fuse a diseased egg with a healthy one to prevent rare mitochondrial diseases.

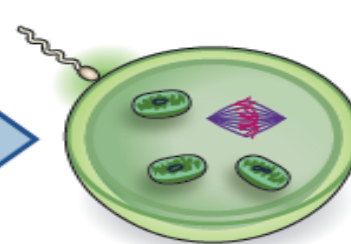
Maternal spindle transfer



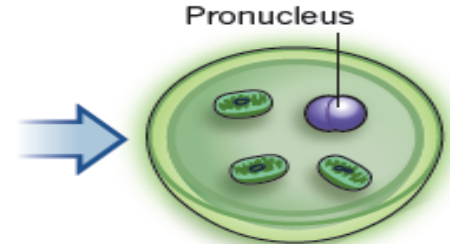
The chromosomes are removed from an unfertilized egg that has mutated mitochondrial DNA.



These are added to an unfertilized donor egg that has had its nucleus removed.

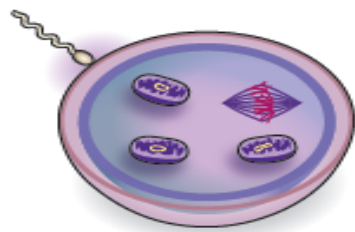


This fused egg is fertilized *in vitro*.

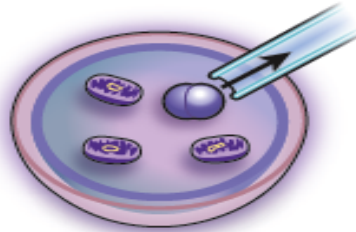


The egg develops normally to form an embryo.

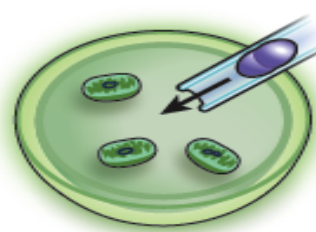
Pronuclear transfer



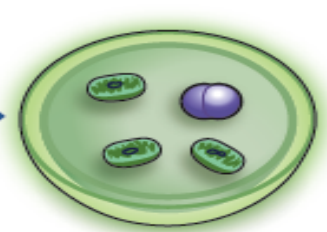
An egg with mutated mitochondrial DNA is fertilized *in vitro*.



The resulting pronucleus is removed.



This is transferred to a fertilized donor egg that has had its pronucleus removed.



The fused egg develops normally.

EMBRYOLOGY

UK sets sights on gene therapy in eggs

Public consultation and safety assessment would pave the way for embryo manipulation to treat genetic diseases.

L'OSSERVATORE ROMANO

GIORNALE QUOTIDIANO



POLITICO RELIGIOSO

*Unicuique suum**Non praevalerunt*

Anno CLIII n. 113 (46.357)

Città del Vaticano

sabato 18 maggio 2013

Il vescovo di Roma incoraggia le Pontificie opere missionarie a sostenere le comunità in difficoltà

Sino agli estremi confini della terra

Sostegno alle «giovani Chiese, che non di rado operano in un clima di difficoltà, di discriminazione, anche di persecuzione» è stato chiesto dal Papa ai partecipanti all'assemblea generale delle Pontificie Opere Missionarie, ricevuti in udienza stamane, venerdì 17.

In particolare il Santo Padre ha sottolineato che le Opere Missionarie aiutano «a tenere sempre viva l'attività di evangelizzazione» che, ha ricordato, è «paradigma di ogni opera della Chiesa». Non a caso «il vescovo di Roma è chiamato ad essere Pastore non solo della sua Chiesa particolare, ma anche di tutte le Chiese, affinché il Vangelo sia annunciato sino agli estremi confini della terra».

Una missione estremamente attuale, ha sottolineato il Pontefice, perché ci sono tanti popoli che non hanno ancora conosciuto e incontrato Cristo. In questo senso «le Pontificie Opere Missionarie sono uno strumento privilegiato nelle mani del Papa». Soprattutto se mirate alla promozione e alla formazione di uno spirito missionario universale e ad una sempre maggiore comunione e collaborazione tra le diverse comunità, spesso tentate «di chiudersi in se



La tecnica per creare in vitro embrioni umani

Una scienza che non si pone scrupoli

di AUGUSTO PESSINA*

La tecnica di clonazione basata sul *nuclear transfer* («trasferimento del nucleo») – introdotta e applicata per la prima volta sugli anfibi da John Gurdon (premio Nobel per la medicina 2012) e successivamente utilizzata da Jan Wilmut per clonare la pecora Dolly – è ora possibile anche sull'uomo. La notizia, pubblicata dalla rivista «Cell», ha avuto sui media grande risalto.

Dopo la clonazione di Dolly nel 1997 molti laboratori hanno fatto a gara per verificare la possibilità di creare cloni umani, e alcuni di essi hanno anche dichiarato di essersi riusciti. Ma finora non risulta che sia nato un uomo clonato. Diverse sono state infatti le relazioni scientifiche che hanno evidenziato la difficoltà di applicare questa tecnica alla specie umana, perché sembrava molto arduo far crescere questo zigote artificiale (creato inserendo in un ovocita umano denudato il nucleo di una cellula adulta). Anche le campagne per favorire la donazione di ovociti introdotta nei

possibilità pratica della clonazione riproduttiva.

In realtà l'attenzione dei media è stata subito rivolta alla cosiddetta clonazione terapeutica che potrebbe dare ai malati speranze di guarigione. Da un punto di vista etico sono in molti a ritenere una mostruosità la creazione in vitro di un embrione (clone del donatore del nucleo somatico) per farlo nascere (clonazione riproduttiva). Tuttavia agli stessi non sembra essere grave creare in vitro un embrione umano da utilizzare per farne cellule.

Il problema serio è che non basta coniugare la magica parola «terapeutica» al termine clonazione per fare diventare etica la soppressione di una vita umana creata solo allo scopo di farne cellule da usare in terapie (la cui efficacia è peraltro ancora da dimostrare).

Riferendoci poi alla sperimentazione riportata da «Cell» va anche sottolineato che per ottenere i gameti femminili la procedura ha avuto necessariamente bisogno di trattare donne disponibili a queste ricerche come donatrici di ovociti.