

Science, 1998

Embryonic Stem Cell Lines Derived from Human Blastocysts

James A. Thomson,* Joseph Itskovitz-Eldor, Sander S. Shapiro,
Michelle A. Waknitz, Jennifer J. Swiergiel, Vivienne S. Marshall,
Jeffrey M. Jones

Human blastocyst-derived, pluripotent cell lines are described that have normal karyotypes, express high levels of telomerase activity, and express cell surface markers that characterize primate embryonic stem cells but do not characterize other early lineages. After undifferentiated proliferation in vitro for 4 to 5 months, these cells still maintained the developmental potential to form trophoblast and derivatives of all three embryonic germ layers, including gut epithelium (endoderm); cartilage, bone, smooth muscle, and striated muscle (mesoderm); and neural epithelium, embryonic ganglia, and stratified squamous epithelium (ectoderm). These cell lines should be useful in human developmental biology, drug discovery, and transplantation medicine.





2001



2009



Historical background

1998	Derivation of human Embryonic Stem Cells	Science	Thomson J
2001	President Bush ban on hES (only 72 lines allowed)-	-	-
2001	In vitro differentiation from hES cells	Zhang et al,	Carpenter et al.
2003	European moratorium on EU fundings of hES	-	-
2004	Homologous recombination in hES cells	Nat. Biotech.	Thomson J
2004	New human Embryonic stem-cell lines	NEJM	Melton D
2004	Immunogenicity due to NSCEG25	Nature Medicine	Varki A
2004	Gain of chromosomes 17q and 12 in hES	Nature Biotech	Andrews P
2004	hES from discarded mutant blastocysts	ReprodBiomed	Verlinsky Y



California Proposition 71 (2004)

TEXT OF PROPOSED LAWS

Proposition 71

This initiative measure is submitted to the people in accordance with the provisions of Section 8 of Article II of the California Constitution.

Protect and benefit the California budget: by postponing general fund payments on the bonds for the first five years; by funding scientific

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The Act makes conducting stem cell research a state constitutional right.

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It authorizes the sale of general obligation bonds to allocate three billion dollars over a period of ten years to stem cell research and research facilities. Although the funds could be used to finance all kinds of stem cell research, it gives priority to hES cell research.

Proposition 71 created the California Institute for Regenerative Medicine (CIRM).

2003 Europe





Regulations in EU Member States regarding hES¹ cell research

	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	IE	IT*	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
Allowing procurement of hES cells from super-numary embryos by law		X			X		X		X	X	X	X								X		X		X			X
Specific legislation for human embryo research incl. supernumerary embryos but without specific reference to hES cells								X					X					X							X		
Prohibiting procurement of hES cells from human embryos but allowing importation of hES cell lines						X									X												
No specific legislation regarding hES cell research	X		X	X										X		X	X		X		X		X			X	
Allowing creation of human embryos for procurement of hES cells by law		X																						X			X
Prohibiting creation of human embryo for research purpose and for procurement of hES cells by law or by ratification of the Convention of the Council of Europe on Human rights and Biomedicine signed in Oviedo on 4 April 1997			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	

¹⁾ hES cells = human Embryonic Stem cells *IT has no law regarding the importation & IT scientists are working on imported hES cell lines

COUNTRY CODE KEY:

AT : Austria
BE : Belgium
BG : Bulgaria
CY : Cyprus
CZ : Czech Republic

DE : Germany
DK : Denmark
EE : Estonia
EL : Greece
ES : Spain

FI : Finland
FR : France
HU : Hungary
IE : Ireland
IT : Italy

LT : Lithuania
LU : Luxembourg
LV : Latvia
MT : Malta
NL : Netherlands

PL : Poland
PT : Portugal
RO : Romania
SE : Sweden
SI : Slovenia

SK : Slovakia
UK : United Kingdom



In some countries legislation allows

- to create human blastocysts for research purposes
- to derive hES only from overexceeding blastocysts
- to work on already derived hES cells but not to derive new lines
- to work on lines derived before 2001 or 2007
- Countries with no legislation



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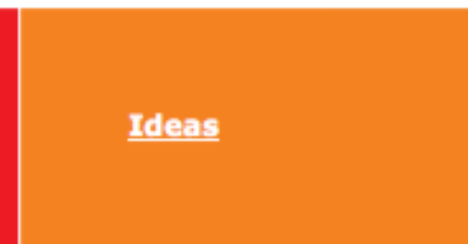
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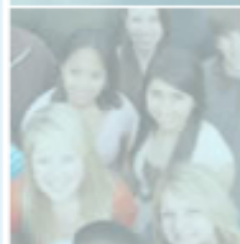
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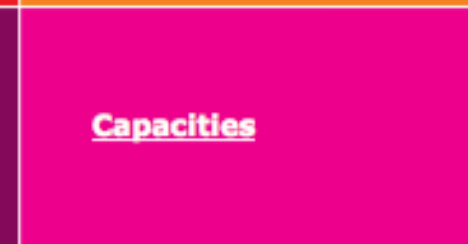
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News highlights

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[Date: 2011-08-03]

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Italy



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Italy 2009

"Politicians should decide strategic research objectives and leave scientists to choose how best to achieve them."

Three scientists are appealing against the Italian government's decision to exclude human embryonic stem cells from a recent call for proposals to fund stem-cell biology.

The scientists' lawyer, Vittorio Angiolini, who specializes in bioethics and human rights, filed the appeal with Rome's administrative court on 24 June. He argues that excluding human embryonic stem cells infringes on the constitutional freedom of scientific research. The use of established lines of human embryonic stem cells in research is legal in Italy.

The original draft of the funding call did not exclude any type of stem cell. "We don't know where the sentence that was added came from," says Elisabetta Cerbai, a human embryologist at the University of



SPOOKY COMPUTERS CLOSER TO REALITY

Solid-state quantum processing demonstrated.
www.nature.com/news

MM PHOTO/ALAMY


Italians sue over stem cells



Stem-cell proponent Elisabetta Cerbai.


UNIV. FLORENCE CENTER OF MOLECULAR MEDICINE

307 hES lines available


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Grants & Funding



NIH Human Embryonic Stem Cell Registry

Research Using These Lines is Eligible for NIH Funding

The lines listed below are eligible for use in NIH funded research. Those lines that carry disease-specific mutations are noted as such under the line name.

For guidance regarding applications proposing to use hESC see: NIH Guide Notices [NOT-OD-10-020](#) and [NOT-OD-10-029](#).

Eligible Lines: 307 (in 139 Submissions)
Sorted by: NIH Registration Number
Date/Time: 06/02/2015 at 06:36 AM

Cell Line	NIH Registration Number (Use for NIH Applications *)	Provider	Submitting Organization	Approval Date
CHB-1 (see details)	0001 On Hold **	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-2 (see details)	0002 On Hold **	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-3 (see details)	0003 On Hold **	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-4 (see details)	0004	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-5 (see details)	0005	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-6 (see details)	0006	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-8 (see details)	0007	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-9 (see details)	0008	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-10 (see details)	0009	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-11 (see details)	0010	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
CHB-12 (see details)	0011	George Q. Daley, M.D., Ph.D.	Children's Hospital Corporation	12/02/2009
RUES1 (see details)	0012	The Rockefeller University, Ali Brivanlou	The Rockefeller University	12/02/2009
UM112-2 PGD; disease-specific mutation (see details)	0307	Gary D. Smith/ University of Michigan	University of Michigan	04/02/2015