BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Thomson, James A	Director, Regenerative Biology, Morgridge Institute for Research; Professor, University of Wisconsin & University of California at Santa Barbara
eRA COMMONS USER NAME (credential, e.g., agency login) jathomson	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Illinois, Champaign, IL	BS	05/1981	Biophysics
University of Pennsylvania, Philadelphia, PA	VMD	05/1985	Veterinary Medicine
University of Pennsylvania, Philadelphia, PA	PhD	05/1988	Molecular Biology

A. Personal Statement

My research focus is the self-renewal and pluripotency of stem cells, including how embryonic stem (ES) cells choose between self-renewal and the initial decision to differentiate, and how a differentiated cell with limited developmental potential can be reprogrammed. I am currently the Director of Regenerative Biology at the Morgridge Institute for Research in Madison, Wisconsin, and professor of Cell & Regenerative Biology at the University of Wisconsin. I am also a professor in the Molecular, Cellular, and Developmental Biology (MCDB) Department at the University of California, Santa Barbara. My research group reported the first derivation of ES cells from a non-human primate in 1995, work that led us to the first derivation of human ES cells in 1998, and derivation of the first human induced pluripotent stem (iPS) cell (simultaneously with Dr. Shinya Yamanaka's research group at Kyoto University in Kyoto, Japan) in 2007. An experienced teacher, I've mentored 39 visiting scientists, graduate students, and postdoctoral fellows.

B. Positions and Honors

Positions

1989-91 Postdoctoral Research Fellow, Oregon Regional Primate Research Center.
1991-94 Resident, Veterinary Pathology, University of Wisconsin School of Veterinary Medicine.
1995-02 Chief Pathologist, Wisconsin Regional Primate Research Center, University of Wisconsin.
1999-02 Assistant Professor, Dept. of Anatomy, University of Wisconsin-Madison Medical School.
2002 Professor, Dept. of Anatomy, University of Wisconsin
2003-13 John D. MacArthur Professor, Dept. of Anatomy, University of WI-Madison Medical School.
2003- Jim Kress Endowed Chair in Embryonic Stem Cell Biology
2008- Director of Regenerative Biology, Morgridge Institute for Research, Madison, WI

Honors and Awards

1999 The isolation of human ES cells was cited by the journal *Science* in its "Scientific Breakthrough of the Year"
1999 American Academy of Achievement Golden Plate Award
2001 Wilson S. Stone Memorial Award for Biomedical Research
2001 Hall of Fame Award for Scientific Achievement, Annual Conference of Biotechnology CEOs
2002 Lois Pope Award Annual LIFE International Research Award
2002 Elected to the Wisconsin Academy of Sciences, Arts, and Letters
2002 World Technology Award, Health and Medicine
2003 American College of Veterinary Pathologists, Outstanding Achievement Award
2003 Frank Annunzio Award (Science/Technology) sponsored by the Christopher Columbus Foundation
2005 Distinguished Service Award for Enhancing Education through Biological Research. The National Association of Biology Teachers, Inc.
2005 Named in "Milestones of Science" poster. *Science*

2006	Nathan R. Brewer Scientific Achievement Award, American Association for Laboratory Animal Science
2007	Brian D. Howell Excellence in Innovation Award, 2007 Best of Madison Business Awards, Madison, WI
2008	Elected to the National Academy of Sciences; Recipient of the Meira and Shaul G. Massry Prize
2011	Co-Winner, King Faisal International Prize
2011	Co-Winner, Albany Medical Prize
2013	McEwen Award for Innovation, The International Society of Stem Cell Research (ISSCR)

C. Contribution to Science

1. Primate Embryonic Stem Cells. Mouse embryonic stem (ES) cells were derived in the early 1980's. By the early 1990's, there had been numerous attempts to derive embryonic stem cells from other laboratory animals and domestic species, but all those attempts had failed. Human Embryonal Carcinoma (EC cells), the malignant counterpart to embryonic stem cells, had been derived in the 1980's but their growth factor requirements, cell surface markers, and morphology was dramatically different from mouse ES/EC cells. Thus, it was not known whether the ability to derive ES cells was a peculiarity of mouse biology, and it was not known whether the differences observed in the human EC cells were merely related to their tumor origin. Dr. Thomson's derivation of rhesus ES cells and marmoset ES cells in 1995 and 1996 demonstrated that it was indeed possible to derive stable, pluripotent cell lines from species closely related to humans, and that the properties of the resulting primate cell lines more closely resembled the distinct pluripotent state of human EC cells rather than mouse ES/EC cells.

a. Thomson JA, Kalishman J, Golos TG, Durning M, Harris CP, Becker RA, Hearn JP. Isolation of a primate embryonic stem cell line. Proc Natl Acad Sci USA 92(17):7844-8, 1995. PMC41242.

b. Thomson JA, Kalishman J, Golos TG, Durning M, Harris CP, Becker RA, Hearn JP. Pluripotent cell lines derived from common marmoset (Callithrix jacchus) blastocysts. Biol Reprod 55(2):254-259, 1996. PMID: 8828827.

c. Primate Embryonic Stem Cells
Inventor: Thomson, J.A.
U.S. Patent No. 5,843,780 issued 12/1/98

2. Human Embryonic Stem Cells. Dr. Thomson's derivation of human ES cells in 1998 created an unprecedented access to the basic cellular building blocks of the human body for basic research, drug development, and transplantation. In subsequent years, Dr. Thomson's laboratory identified the signaling pathways that sustain undifferentiated proliferation of human ES cells, and created the defined medias (TeSR and E8) that are most widely used today. Because the growth factors that sustain mouse ES cells actually cause the differentiation of human ES cells, identifying culture conditions for human cells was an essential prerequisite for the derivation of human iPS cells.

a. Thomson JA, Itskovitz-Eldor J, Shapiro SS, Waknitz MA, Swiergiel JJ, Marshall VS, Jones JM. Embryonic stem cell lines derived from human blastocysts. Science 282(5391):1145-1147, 1998. PMID: 9804556.

b. Zwaka TP, Thomson JA. Homologous recombination in human embryonic stem cells. Nat Biotechnol 21(3):319-21, 2003.

c. Ludwig TE, Levenstein ME, Jones J, Berggren W, Mitchen E, Frane J, Crandall L, Daigh CA, Conard K, Piekarczyk M, Llanas R, Thomson JA. Derivation of human embryonic stem cells in defined conditions. Nat Biotechnol 24(2):185-7, 2006.

d. Chen G, Gulbranson D, Hou Z, Bolin J, Probasco MD, Smuga-Otto K, Howden S, Diol N, Propson NE, Wagner R, Lee GO, Antosiewicz-Bourget J, Teng JMC, Thomson JA. "Chemically defined conditions for human iPS cell derivation and culture." Nature Methods 8(5):424-9, 2011. PMCID: PMC3084903.

e. Primate Embryonic Stem Cells (Covers Human Embryonic Stem Cells)
Inventor: Thomson, J.A.
U.S. Patent No. 6,200,806 issued 3/13/01

3. Human Induced Pluripotent Stem Cells. Dr. Thomson published the derivation of human induced pluripotent stem cells contemporaneously with Shinya Yamanaka in 2007. Human iPS cells are similar to human ES cell in that they can expand without limit and yet have the ability to form all the cells of the body, but because they can be sourced from an existing individual with known genetics, they offer more control over genetic background. Being able to derive iPS cells with specific genetic background is useful for modeling genetic disease, for testing drugs on cells from a range of ethnic backgrounds for safety and efficacy, and for modulating the immune response in transplantation therapies.

a. Yu J, Vodyanik M, Smuga-Otto K, Frane J, Antosiewicz-Bourget J, Frane J, Tian S, Nie J, Jonsdottir GA, Ruotti V, Stewart R, Slukvin II, Thomson JA. Induced pluripotent stem cell lines derived from human somatic cells. Science 318:1917-20, 2007. PMID: 18029452.

b. Yu J, Hu K, Smuga-Otto K, Tian S, Stewart R, Slukin II, Thomson JA. Human induced pluripotent stem cells free of vector and transgene sequences. Science 324:797-801, 2009. PMC2758053.

c. 12. Choi K-D, Yu J, Smuga-Otto K, Salvagiotto G, Rehrauer W, Vodyanik M, Thomson JA, Slukvin I. Hematopoietic and endothelial differentiation of human induced pluripotent stem cells. Stem Cells 27(3):559-67, 2009. PMC2931800.

d. Culturing Human Embryonic Stem Cells
Inventors: Ludwig, T.E. and Thomson, J.A.
U.S. Patent No. 7,442,548 issued 10/28/08

Complete List of Published Work in SciENcv:
http://www.ncbi.nlm.nih.gov/myncbi/james a.thomson.1/cv/13172/

D. Research Support
Ongoing Research Support

1UH3TR000506-01 (PI: Thomson) 7/24/12-6/30/17
NIH/NCATS
Human iPS/ES Cell-Based Models for Predictive Developmental Neural Toxicity
This project seeks to develop three-dimensional constructs of human neural tissue to better predict the neural toxicity of drugs prior to clinical trials.
Role: PI

5P51OD011106-54 (PI: Mailick) 06/10/97-04/30/17
NIH
Wisconsin National Primate Research Center Support
The base operating grant provides infrastructure and resource development support.
Role: Unit Head for Stem Cell Resources

Foundation Fighting Blindness (PI: Gamm) 06/2013-05/2016
Wynn-Gund Early Translational Research Acceleration Program
Dr. Thomson oversees a research associate and research specialist to perform co-culture and analysis of nerual retina and RPA derived from cGMP super donor human IPS cell lines.
Role: Co-Investigator

5U01HL099773-02 (PI: Thomson) 09/30/09-04/30/16
NIH
Midwest Progenitor Cell Consortium
Dr. Thomson oversees the efforts to identify early genetic events in hematopoietic and cardiovascular differentiation and develop purification technologies to isolate these precursor cells.
Role: PI

Environmental Protection Agency (PI: Murphy) 12/1/14-11/30/18
LiverMAPs: Liver Models for Analysis of Pathways
The goal of this project is to determine how liver maturation is controlled so that fully mature hepatocytes can be derived from human ES/iPS cells for use in toxicity testing.

Completed Research Support

1U54DK093467 (PI: Soh) 09/25/11-02/28/15
NIH
QPASS: Quantitative Parallel Aptamer Selection System
Role: Co-Principal Investigator

5U01ES017166-04 (PI: Ren) 09/29/08-6/30/13
NIH
The San Diego Epigenome Center
Dr. Thomson oversees a scientist and research specialist to provide human ES cells and iPS cells for epigenetic study.
Role: Co-Principal Investigator

5P01GM081629-03 (PI: Thomson) 08/01/08-07/31/13
NIH
Determinants of Self-Renewal, Differentiation, and Reprogramming of hESCs
Dr. Thomson oversees the study to identify the critical events that occur in the window of time that the ES cells commit to exit the pluripotent state after growth factor withdrawal. In addition, Dr. Thomson coordinates with the PIs of each of the other projects and core as part of this program project grant.
Role: PI

TA-CBT-0607-0444-UWI-WG (PI: Gamm) 06/01/08-05/31/13
Foundation Fighting Blindness
Customized iPS Cell Therapy for Recessive Monogenetic Retinal Degenerative Disease
Dr. Thomson oversees a research associate and research specialist to produce disease-specific iPS cell lines.
Role: Co-Investigator

NHLBI-RR-05-19 (PI: Hei) 09/30/05-02/28/10
NIH/NHLBI
National Stem Cell Bank
Dr. Thomson provides direction to the assistant scientist and technician optimizing human ES cell medium.
Role: Subcontractor