

CURRICULUM VITAE

Toshihiko Ezashi, D.V.M., Ph.D.

Research Associate Professor
Bond Life Sciences Center, Division of Animal Sciences
University of Missouri-Columbia

240a Christopher S. Bond Life Sciences Center
1201 E. Rollins Street
Columbia MO 65211-7310
E-mail: ezashit@missouri.edu
Phone: (573) 884-9601
Fax: (573) 884-9394

Education:

- 1982-1986 B.S., Veterinary Medicine, Azabu University, Sagamihara, Kanagawa, Japan
1986-1988 M.S. & D.V.M. Veterinary Medicine, Azabu University, Sagamihara, Kanagawa, Japan
National Qualification: Veterinarian (Japan, #27338, April 1988; ~ present)
1988-1993 Ph.D., Physiological Medical Science, Gunma University, Maebashi, Gunma, Japan

Principal Positions Held:

- 1992-1995 Postdoctoral Fellow, Department of Cell Biology, Osaka Bioscience Institute
1995-1999 Postdoctoral Fellow, Division of Animal Sciences, University of Missouri
1999-2013 Research Assistant Professor, Division of Animal Sciences, Bond Life Sciences Center (2004~),
University of Missouri
2013-present Research Associate Professor, Bond Life Sciences Center, Division of Animal Sciences
University of Missouri

Awards and Honors for Research Activity:

- 1994 The Encouragement Award, Osaka Bioscience Institute
1997 Travel Award, International Society for the Interferon and Cytokine Research
1998 Poster Contest Award and Presentation Award, Molecular Biology Week '98, University of Missouri
1999 Larry Ewing Memorial Trainee Travel Award, Society for the Study of Reproduction
2005 The discovery I made with my mentor and co-author R. Michael Roberts was named one of the top 50
in the world for 2005 by Scientific American. [Scientific American website](#)
2009-2010 Missouri Life Sciences Research Board Grant
2011-2012 Co-recipient of "Challenge Award" from Addgene
2013-2014 Patton Trust Research Grants, Kansas City Area Life Sciences Institute
2013-2018 NIH/NICHD Grant R01HD077108
2014-2018 University of Missouri PRIME Fund

Editorial Board Member:

- 2009- *World Journal of Stem Cells* : <http://www.wjgnet.com/1948-0210/edboard.htm>
2012- *Endocrinology & Metabolic Syndrome* : <http://www.omicsonline.org/editorialboardEMS.php>
2012- *ISRN Stem Cells* : <http://www.isrn.com/journals/sc/editors/>
2012- *Biomedical Reports* : <http://www.spandidos-publications.com/br/editorial.jsp>
2012- *OA Biotechnology* <http://www.oapublishinglondon.com/>
2012- The Guest Reviewer in *Stem Cell Discovery* : <http://www.scirp.org/journal/scd/>

2013- Hormonal Studies : <http://www.hoajonline.com/hormones/editorialboard>

Memberships in Professional Societies:

1997-present, Society for the Study of Reproduction (SSR)

2008-present, The International Society for Stem Cell Research (ISSCR)

Service and Professional Activities:

Reviewer in Scientific Journals

Stem Cells and Development

Proceedings of the National Academy of Sciences of the United States of America

Molecular and Cellular Biology

Biology of Reproduction

Reproduction

Molecular Reproduction and Development

Cell and Tissue Research

Cellular Reprogramming

Current Stem Cell Research and Therapy

Journal of Endocrinology

Journal of Reproduction and Development

Molecular Biology Reports

Placenta

PLoS One

Regenerative Medicine

Reproduction in Domestic Animals

Theriogenology

Reproduction, Fertility and Development

Biomaterials

Publications: Journal Articles and Chapters in Books:

Journal Articles (Peer-reviewed)

1. Kato Y., Shimokawa N., Kato T., Hirai T., Yoshihama K., Kawai H., Hattori M., **Ezashi T.**, Shimogori Y. & Wakabayashi K. (1990) Porcine growth hormone: molecular cloning of cDNA and expression in bacterial and mammalian cells. *Biochimica et Biophysica Acta* 1048:290-293. [PMID2182128](#)
2. Kato Y., **Ezashi T.**, Hirai T. & Kato T. (1990) Strain Difference in Nucleotide Sequences of Rat Glycoprotein Hormone Subunit cDNAs and Gene Fragment. *Zoological Science* 7: 879-887.
3. **Ezashi T.**, Hirai T., Kato T., Wakabayashi K. & Kato Y. (1990) The gene for the β subunit of porcine LH: clusters of GC boxes and CACCC elements. *Journal of Molecular Endocrinology* 5:137-146. [PMID1701088](#)
4. Kato Y., **Ezashi T.**, Hirai T. & Kato T. (1991) The gene for the common α subunit of porcine pituitary glycoprotein hormone. *Journal of Molecular Endocrinology* 7:27-34. [PMID1716473](#)
5. Kato Y., **Ezashi T.** & Kato T. (1992) Restriction fragment length polymorphism of the porcine pituitary glycoprotein common α -subunit gene. *Journal of Reproduction and Development* 38:45-47.
6. **Ezashi T.**, Kato T., Wakabayashi K. & Kato Y. (1992) Presence of nuclear factors bound to both cAMP-responsive element and AP1 factor binding site in the porcine anterior pituitary. *Biochemical and Biophysical Research Communications* 188:170-176. [PMID1417841](#)
7. Kato Y., Kato T., **Ezashi T.** & Inoue K. (1993) *In situ* binding for detection of proteins that bind to regulatory elements. *Biochemical and Biophysical Research Communications* 195:963-968. [PMID8373428](#)

8. Sakamoto K., **Ezashi T.**, Miwa K., Okuda-Ashitaka E., Houtani T., Sugimoto T., Ito S. & Hayaishi O. (1994) Molecular cloning and expression of a cDNA of the bovine prostaglandin F_{2α} receptor. *Journal of Biological Chemistry* 269:3881-3886. [PMID7508922](#)
9. Ito S., Sakamoto K., Mochizuki-Oda N., **Ezashi T.**, Miwa K., Okuda-Ashitaka E., Shevchenko V.I., Kiso Y. & Hayaishi O. (1994) Prostaglandin F_{2α} receptor is coupled to Gq in cDNA transfected Chinese hamster ovary cells. *Biochemical and Biophysical Research Communications* 200:756-762. [PMID8179609](#)
10. Sakamoto K., Miwa K., **Ezashi T.**, Okuda-Ashitaka E., Okuda K., Houtani T., Sugimoto T., Ito S. & Hayaishi O. (1995) Expression of mRNA encoding the prostaglandin F_{2α} receptor in bovine corpora lutea throughout the oestrous cycle and pregnancy. *Journal of Reproduction and Fertility* 103:99-105. [PMID7707306](#)
11. Sakamoto K., **Ezashi T.**, Miwa K., Okuda-Ashitaka E., Houtani T., Sugimoto T., Ito S. & Hayaishi O. (1995) Molecular cloning and expression of a cDNA of the bovine prostaglandin F_{2α} receptor. *Advances in prostaglandin, thromboxane, and leukotriene research* 23:259-261.
12. Okuda-Ashitaka E., Sakamoto K., **Ezashi T.**, Miwa K., Ito S. & Hayaishi O. (1996) Suppression of prostaglandin E receptor signaling by the variant form of EP1 subtype. *Journal of Biological Chemistry* 271:31255-31261. [PMID8940129](#)
13. **Ezashi T.**, Sakamoto K., Miwa K., Okuda-Ashitaka E., Ito S. & Hayaishi O. (1997) Genomic organization and characterization of the gene encoding bovine prostaglandin F_{2α} receptor. *Gene* 190:271-278. [PMID9197544](#)
14. **Ezashi T.**, Ealy A.D., Ostrowski M.C. & Roberts R.M. (1998) Control of interferon-tau gene expression by Ets-2. *Proceedings of the National Academy of Sciences of the United States of America* 95:7882-7887. [PMID9653109](#)
15. Roberts R.M., Ealy A.D., Alexenko A.P., Han C-S. & **Ezashi T.** (1999) Trophoblast interferons. *Placenta* 20:259-264. [PMID10329345](#)
16. Han C-S., Chen Y., **Ezashi T.** & Roberts R.M. (2001) Antiviral activities of the soluble extracellular domains of type I interferon receptors. *Proceedings of the National Academy of Sciences of the United States of America* 98:6138-6143. [PMID11344274](#)
17. Szafranska B., Miura R., Ghosh D., Xie S., **Ezashi T.**, Roberts R.M. & Green J.A. (2001) The gene for porcine pregnancy-associated glycoprotein 2 (poPAG2): Its structural organization and analysis of its promoter. *Molecular Reproduction and Development* 60:137-146. [PMID11553911](#)
18. **Ezashi T.**, Ghosh D. & Roberts R.M. (2001) Repression of Ets-2 induced transactivation of the interferon-τ promoter by Oct-4. *Molecular and Cellular Biology* 21:7883-7891. [PMID11689681](#)
19. Roberts R.M., **Ezashi T.**, Rosenfeld C.S., Ealy A. & Kubisch H.M. (2003) The interferon-τ: evolution of the genes and their promoters, and maternal-trophoblast interactions in control of their expression. *Reproduction* Suppl. 61, 239-251. [PMID14635939](#)
20. Ghosh D., **Ezashi T.**, Ostrowski M.C. & Roberts R.M. (2003) A Central Role for Ets-2 in the Transcriptional Regulation and Cyclic AMP-Responsiveness of the Human Chorionic Gonadotropin-Beta Subunit Gene. *Molecular Endocrinology* 17:11-26 [PMID12511603](#)
21. Roberts R.M., **Ezashi T.** & Das P. (2004) Trophoblast gene expression: Transcription factors in the specification of early trophoblast. *Reproductive Biology and Endocrinology* 2:47 [PMID15236655](#)
22. **Ezashi T.** & Roberts R.M. (2004) Regulation of IFN-τ gene promoters by growth factors that target the Ets-2 composite enhancer: a possible model for maternal control of IFN-τ production by the conceptus during early pregnancy. *Endocrinology* 145: 4452-4460. [PMID15217985](#)
23. **Ezashi T.**, Das P. & Roberts R.M. (2005) Low O₂ tensions and the prevention of differentiation of human embryonic stem cells. *Proceedings of the National Academy of Sciences of the United States of America* 102:4783-4788 [PMID15772165](#)

24. **Ezashi T.**, Das P. & Roberts R.M. (2006) Regulation of IFN- τ gene expression by uterine factors: interaction between the conceptus and maternal environment during early pregnancy in cattle and sheep. *Journal of Reproduction and Development* 52: S98-S109
25. Das P., **Ezashi T.**, Schulz L.C., Westfall S.D., Livingston K.A. & Roberts R.M. (2007) Effects of FGF2 and Oxygen in the BMP4-Driven Differentiation of Trophoblast from Human Embryonic Stem Cells. *Stem Cell Research* 1:61-74. [PMID:19194525](#)
26. Srinivasan R., Jang S-W, Ward R.M., Sachdev S., **Ezashi T.** & Svaren J. (2007) Differential Regulation of NAB Corepressor Genes in Schwann Cells. *BMC Molecular Biology*, 8:117. [PMID18096076](#)
27. Roberts R.M., Chen Y., **Ezashi T.** & Walker A.M. (2008) Interferons and the Maternal-Conceptus Dialog in Mammals. *Seminars in Cell & Developmental Biology*, 19:170-177. [PMID18032074](#)
28. Das P., **Ezashi T.**, Gupta R. & Roberts R.M. (2008) Combinatorial roles of protein kinase A, Ets2 and CBP/p300 in the transcriptional control of interferon-tau expression in trophoblast. *Molecular Endocrinology* 22:331-343. [PMID17975022](#)
29. Schulz L.C., **Ezashi T.**, Das P., Westfall S.D., Livingston K.A. & Roberts R.M. (2008) Human embryonic stem cells as models for trophoblast differentiation. *Placenta* 22: S10-S16. [PMID18054384](#)
30. **Ezashi T.**, Das P., Gupta G. Walker A. & Roberts R.M. (2008) The Role of Homeobox Protein Distal-Less 3 and Its Interaction with Ets2 in Regulating Interferon-Tau Gene Expression---Synergistic transcriptional activation with Ets2. *Biology of Reproduction* 79:115-124. [PMID 18322277](#)
31. Westfall S.D., Sachdev S., Das P., Hearne L.B., Hannink M., Roberts R.M. & **Ezashi T.** (2008) Identification of Oxygen-Sensitive Transcriptional Programs in Human Embryonic Stem Cells. *Stem Cells and Development* 17: 869-881. [PMID 18811242](#)
32. **Ezashi T.**, Telugu B.P., Alexenko A., Sachdev S., Sinha S. & Roberts R.M. (2009) Derivation of induced pluripotent stem cells from pig somatic cells. *Proceedings of the National Academy of Sciences of the United States of America* 106:10993-10998. [PMID 19541600](#)
33. Tanasijevic B., Dai B., **Ezashi T.**, Livingston K., Roberts R.M. & Rasmussen T.P. (2009) Progressive accumulation of epigenetic heterogeneity during human ES cell culture. *Epigenetics* 4:330-338. [PMID 19571681](#)
34. Roberts R.M., Telugu B.P. & **Ezashi T.** (2009) Induced pluripotent stem cells from swine (*Sus scrofa*): why they may prove to be important. *Cell Cycle* 8, Issue 19 [PMID: 19738434](#)
35. Telugu B.P., **Ezashi T.** & Roberts R.M. (2010) The Promise of Stem Cell Research in Pigs and Other Ungulate Species. *Stem Cell Reviews* 6:31-41. [PMID: 19949895](#)
36. Telugu B.P., **Ezashi T.** & Roberts R.M. (2010) Porcine Induced Pluripotent Stem Cells Analogous to Naïve and Primed Embryonic Stem Cells of the Mouse. *International Journal of Developmental Biology* 54:1703-1711 [PMID:21305472](#)
37. Zhou L., Wang W., Liu Y., Fernandez J.C., **Ezashi T.**, Telugu B.P., Roberts R.M., Kaplan H.J. & Dean D.C. (2011) Differentiation of swine iPSC into Rod photoreceptors and their integration into the Retina. *Stem Cells* 29:972-80 [PMID:21491544](#)
38. Telugu B.P., **Ezashi T.**, Sinha S., Alexenko A., Spate L., Prather R.S. & Roberts R.M. (2011) LIF-dependent, pluripotent stem cells established from inner cell mass of porcine embryos. *Journal of Biological Chemistry* 286(33): 28948-53. [PMID:21705331](#)
39. **Ezashi T.**, Matsuyama H., Telugu B.P. & Roberts R.M. (2011) Generation of colonies of putative trophoblast stem cells during standard reprogramming of porcine fibroblasts to induced pluripotent stem cells. *Biology of Reproduction*. 85(5): 779-87. [PMID:21734265](#)
40. **Ezashi T.**, Telugu, B.P. & Roberts R.M. (2012) Model Systems for Studying Trophoblast Differentiation from Human Pluripotent Stem Cells. *Cell and Tissue Research*. 349(3):809-824 [PMID:22427062](#)
41. Gupta R., **Ezashi T.** & Roberts R.M. (2012) POU5F1-directed silencing of the CGA subunit gene of human chorionic gonadotropin in human choriocarcinoma and embryonic stem cells through squelching of the transactivational properties of ETS2. *Molecular Endocrinology* 26(5):859-72. [PMID:22446105](#)

42. **Ezashi T.**, Telugu B.P. & Roberts R.M. (2012) Induced pluripotent stem cells from pigs and other ungulate species: an alternative to embryonic stem cells? *Reproduction in Domestic Animals* 47 (Suppl. 4) 92-97. [PMID: 22827356](#)
43. **Ezashi T.** (2012) Stem Cell Approaches in Pregnancy Associated Disease. *Endocrinology & Metabolic Syndrome* 1:e111, doi:10.4172/[2161-1017.1000e111](#).
44. Amita M., Adachi K., Alexenko A.P., Sinha S., Schust D.J., Schulz L.C., Roberts R.M. & **Ezashi T.** (2013) Complete and unidirectional conversion of human embryonic stem cells to trophoblast by BMP4. *Proceedings of the National Academy of Sciences of the United States of America*. 110(13):E1212-21. [PMID: 23493551](#)
45. **Ezashi T.** (2013) Cellular reprogramming to study disorders of intellectual disability and neurodevelopment. *OA Biochemistry*. 2013 Feb 01;1(1):3
46. Telugu B.P., Adachi K., Schlitt J.M., **Ezashi T.**, Schust D.J., Roberts R.M. & Schultz L.C. (2013) Comparison of extravillous trophoblast cells derived from human embryonic stem cells and from first trimester human placentas. *Placenta*. 34(7):536-43. [PMID: 23631809](#)
47. Roberts R.M., Loh K.M., Amita M., Bernardo A.S., Adachi K., Alexenko A.P., Schust D.J., Schultz L.C., Telugu B.P., **Ezashi T.** & Pedersen R.A. (2014) Differentiation of Trophoblast Cells from Human Embryonic Stem Cells: To be or not to be? *Reproduction*. 147(5):D1-12. [PMID: 24518070](#)
48. Lee K., Kwon D-N., **Ezashi T***, Choi Y-J, Park C, Ericsson A.C., Brown A.N., Samuel M, Park K-W., Walters E, Kim D.Y., Kim J-H, Franklin C.L., Murphy C.N., Roberts R.M., Prather R.S. and Kim J-H. (2014) Engraftment of human iPS and allogeneic porcine cells into pigs with inactivated RAG2 and accompanying severe combined immunodeficiency. *Proceedings of the National Academy of Sciences of the United States of America* 111(20):7260-5. [PMID: 24799706](#) *Joint first author.
49. Yang P., Dai A. Alexenko A.P., Liu Y., Stephens A.J., Schultz L.C., Schust D.J., Roberts R.M. and **Ezashi T.** Abnormal Oxidative Stress Responses in Fibroblasts from Preeclampsia Infants. *PLoS One* Jul 24;9(7):e103110. [PMID: 25058409](#)

Book chapters

1. **Ezashi T.** & Roberts R.M. (2000) Yeast One-Hybrid System: A Genetic system to identify DNA-binding proteins, In L. Zhu (Ed), *Yeast Hybrid Technologies*. Eaton Publishing, Natick, MA. 177-195. ISBN: 1881299155
2. Roberts R.M., **Ezashi T.**, Westfall S., Sachdev S. & Hannink M. (2006) Epigenetics and Embryonic Stem Cells. (Chapter 18) In Jinglun Xue (Ed) *Epigenetics: Principles, Protocols and Practice*. Shanghai Science and Technology Publishers, Inc. pp.273-281 & pp.355-372. [ISBN 7-5323-8674-0](#)
3. **Ezashi T.**, Telugu B.P. & Roberts R.M. (2011) Generation and Characterization of Induced Pluripotent Stem Cells from Pig. In Krishnarao Appasani (Ed) *Stem Cells & Regenerative Medicine*. Springer Science (Humana) Press, Inc. [DOI: 10.1007/978-1-60761-860-7](#)
4. **Ezashi T.**, Telugu B.P. & Roberts R.M. (2011) Dynamic Changes in Gene Expression during Early Trophoblast Differentiation from Human Embryonic Stem Cells Treated with BMP4 INTECH "Embryonic Stem Cells" [ISBN 978-953-307-196-1](#)
5. **Ezashi T.** & Roberts R.M. (2013) Porcine Pluripotent Stem Cells and their Differentiation. In H. Rodriguez-Martinez, N.M. Soede & W.L. Flowers (Ed) *Control of Pig Reproduction IX*, Society for Reproduction and Fertility.

List of Other Publications (Abstracts and Seminar/Symposium Presentations, selected from last 17 years):

1. **Ezashi T.**, Ealy A.D. & Roberts R.M. (1997) Ets2 transactivation of interferon-tau gene expression. Annual meeting of the International Society for Interferon & Cytokine Research, San Diego, CA.

2. **Ezashi T.** (1998) Transcriptional control of interferon-tau genes by Ets-2. Medical Science Seminar at Kansai Medial University, Moriguchi, Osaka, Japan.
3. **Ezashi T.**, Ealy A.D. & Roberts R.M. (1998) Transactivation of interferon-tau genes by Ets-2. 31st annual meeting of the Society for the Study of Reproduction at College Station, TX.
4. **Ezashi T.**, Ghosh D. & Roberts R.M. (1999) Suppression of Ets-2 induced transactivation of interferon-tau promoter by Oct-3/4. 32nd annual meeting of the SSR at Pullman, WA.
5. **Ezashi T.** & Roberts R.M. (2000) Colony-stimulating factor-1 enhances bovine interferon-tau gene transcription via a Ras responsive enhancer. 33rd annual meeting of the Society for the Study of Reproduction at Madison, WI.
6. Ghosh D., **Ezashi T.** & Roberts R.M. (2001) Control of the human chorionic gonadotropin- α and - β genes by Ets-2 and Ras. 34th annual meeting of the Society for the Study of Reproduction at Ottawa, Canada.
7. **Ezashi T.**, Ghosh D. & Roberts R.M. (2001) Repression of Ets-2 induced transactivation of interferon-tau promoter by Oct-4. 34th annual meeting of the Society for the Study of Reproduction at Ottawa, Canada.
8. **Ezashi T.** & Roberts R.M. (2002) Homeobox protein Distal-less 3 plays a role in controlling interferon-tau promoter activity. 35th annual meeting of the Society for the Study of Reproduction at Baltimore, MD.
9. Chakrabarty A., **Ezashi T.** & Roberts R.M. (2003) Transcriptional activation of the ovine trophoblast kunitz domain protein-1 (ovTKDP-1) by Ets2: Is there a common theme in early trophoblast-specific gene regulation? 36th annual meeting of the Society for the Study of Reproduction at Cincinnati, OH.
10. **Ezashi T.** & Roberts R.M. (2003) Activating protein-2 gamma plays a combinatorial role with Ets2 and Dlx3 in controlling interferon-tau promoter activity. 36th annual meeting of the Society for the Study of Reproduction at Cincinnati, OH.
11. **Ezashi T.** (2004) Human Embryonic Stem Cells--Culture, maintenance, and differentiation into trophoblasts. Invited lecture to the Genetics Area Program Seminar at University of Missouri-Columbia, April 15, 2004.
12. Das P., **Ezashi T.** & Roberts R.M. (2004) Protein kinase A acts synergistically with Ets2 to transeactivate interferon-tau gene promoter activity over 500-fold. 37th annual meeting of the Society for the Study of Reproduction at Vancouver, Canada.
13. Das P., **Ezashi T.**, Livingston K.A. & Roberts R.M. (2005) Effects of BMP4 and hypoxia on the differentiation of human embryonic stem cells to trophoblast. 38th annual meeting of the Society for the Study of Reproduction at Quebec, Canada.
14. **Ezashi T.**, Das P. & Roberts R.M. (2005) Low O₂ tensions and the prevention of differentiation of human embryonic stem cells. 38th annual meeting of the Society for the Study of Reproduction at Quebec, Canada.
15. Gupta R., **Ezashi T.**, Ghosh D., Das P. & Roberts R.M. (2006) Interaction of the transcription factors Ets2 and Distal-less 3 (Dlx3) in control of human chorionic gonadotrophin-alpha (hCG α) gene promoter activity. 39th annual meeting of the Society for the Study of Reproduction at Omaha, NE.
16. **Ezashi T.**, Westfall S.D., Sachdev S., Hannink M. & Roberts R.M. (2006) Identification of oxygen-sensitive transcriptional programs in human embryonic stem cells. 39th annual meeting of the Society for the Study of Reproduction at Omaha, NE.
17. **Ezashi T.**, Telugu B.P., Alexenko A., Sachdev S., Sinha S. & Roberts R.M. (2009) Derivation of induced pluripotent stem cells from pig somatic cells. Gordon Research Conference: Mammalian Gametogenesis and Embryogenesis, Waterville Valley, NH.
18. Telugu B.P. **Ezashi T.**, Alexenko A., Spate L., Prather R.S. & Roberts R.M. (2010) Embryonic and induced pluripotent stem cells analogous to inner cells mass-derived LIF-dependent mouse embryonic stem cells established from the domestic pig, *sus scrofa*. 43rd annual meeting of the Society for the Study of Reproduction at Milwaukee, WI.
19. Roberts R.M., **Ezashi T.** & Telugu B.P. (2010) LIF-dependent and FGF-dependent porcine induced pluripotent stem cells. 43rd annual meeting of the Society for the Study of Reproduction at Milwaukee, WI.
20. Matsuyama H., **Ezashi T.**, Telugu B.P., Alexenko A. & Roberts R.M. (2010) Derivation of putative, metastable induced trophoblast stem cells from pig. 43rd annual meeting of the Society for the Study of Reproduction at Milwaukee, WI.
21. **Ezashi T.**, Telugu B.P. & Roberts R.M. (2010) Directed neuronal specification of porcine induced pluripotent stem cells (piPSC). 43rd annual meeting of the Society for the Study of Reproduction at Milwaukee, WI.

22. **Ezashi T.** & Roberts R.M. (2010) Expression Analysis of Adhesion Molecules in Early Trophoblast Differentiation from Human Embryonic Stem Cells Treated with BMP4: an Exploratory, Descriptive Study. Integrin Signaling in Physiology and Disease at Columbia, MO.
23. **Ezashi T.**, Matsuyama H., Telugu B.P. & Roberts R.M. (2011) Induced ungulate trophoblast stem cells: Derivation from fibroblasts. Agriculture and Food Research Initiative Joint Animal Systems Project Director Meeting, Washington, DC.
24. **Ezashi T.** (2011) Stem cell research in pigs and other ungulate species. Mizzou Advantage Conference on Reproduction. University of Missouri, Columbia, MO.
25. **Ezashi T.** (2011) Derivation of porcine induced pluripotent stem cells and their differentiation potential (*invited talk*). Reproductive science seminar at Okayama University, Okayama, Japan.
26. **Ezashi T.**, Amita M, Telugu B.P., Schust D.J., Schulz L.C. & Roberts R.M. (2012) Trophoblast Differentiation from Human Induced Pluripotent Stem Cells Treated with BMP4. The International Society for Stem Cell Research 10th Annual Meeting, Yokohama, Japan. June 13-16, 2012.
27. **Ezashi T.**, Telugu, B.P. & Roberts, R.M. (2012). Induced pluripotent stem cells from pigs and other ungulate species: an alternative to embryonic stem cells? The 17th international Congress on Animal Reproduction, Vancouver, Canada.
28. Holmes T.J., Larson J.C., Turturro M.V., Vaicik M., Papavasiliou G., Larkin S.M., Holmes C.D., Jurkevich A, Sinha S, **Ezashi T.** & Brey E. (2012) Multimodality, Multispectral and 3D Light Microscopy of Engineered Tissues without Dyes. The 3rd Tissue Engineering and Regenerative Medicine International Society (TERMIS) World Congress, Vienna, Austria.
29. **Ezashi T.**, Amita M, Telugu B.P., Adachi K., Schust D.J., Schulz L.C. & Roberts R.M. (2012) Trophoblast Differentiation from Human Induced Pluripotent Stem Cells Treated with BMP4. The 9th Annual Gilbert S. Greenwald Symposium on Reproduction. Kansas City KS.
30. Amita M., **Ezashi T.** Telugu B.P., Alexenko A.P., Adachi K., Sinha S. & Roberts R.M. (2012) Cell signaling system directing trophoblast differentiation from human pluripotent stem cells. The 9th Annual Gilbert S. Greenwald Symposium on Reproduction. Kansas City KS October 11-12, 2012.
31. **Ezashi T.** (2012). Induced pluripotent stem cells from pigs and other ungulate species: an alternative to embryonic stem cells? Animal reproductive biology promotion seminar. Animal sciences research center, University of Missouri. October 17, 2012
32. **Ezashi T.** (2012). Induced pluripotent stem cells from pigs and other ungulate species: an alternative to embryonic stem cells? Animal, Plant and Fisheries Quarantine and Inspection Agency (QIA), Korea. October 29, 2012
33. **Ezashi T.** (2012). Induced pluripotent stem cells from pigs and other ungulate species: an alternative to embryonic stem cells? Faculty of Veterinary Science, Chungnam National University, Korea. October 31, 2012
34. **Ezashi T.** (2012). Induced pluripotent stem cells from pigs and other ungulate species: an alternative to embryonic stem cells? Korean Society of Veterinary Science conference, Korea. November 2, 2012
35. Holmes T., Larkin S., Holmes C., Larson J., Vaicik M., Turturro M., Jurkevic A., Sinha S., **Ezashi T.**, Papavasiliou G. & Brey E. (2012) Multispectral/Multimodal 3D Image Reconstruction without Dyes. The American Society for Cell Biology San Francisco, CA. Dec 15-19, 2012
36. Adachi K., Schust D.J., Schulz L.C., Amita M., **Ezashi T.** & Roberts R.M. (2013) Can We Model Human EVT Differentiation Using Stem Cells? Society for Gynecologic Investigation 60th Annual Scientific Meeting Orlando, FL. Mar 20-23.
37. Amita M., **Ezashi T.**, Telugu B.P., Alexenko A., Adachi K., Sinha S., & R. M. Roberts (2013) More effective way to generate extravillous trophoblast cells by human embryonic stem cells, using BMP4 with inhibitors of activin A signaling and FGF receptor. Society for Gynecologic Investigation 60th Annual Scientific Meeting Orlando, FL. Mar 20-23.
38. Holmes T., Larkin S., Holmes C., Larson J., Vaicik M., Turturro M., Jurkevic A., Sinha S., **Ezashi T.**, Papavasiliou G. & Brey E. (2013) Multimodal 3D Light Microscopy without Dye. The Focus on Microscopy conference, Holland, Mar.
39. Adachi K., Schust D.J., Amita M, Yang P., **Ezashi T.** & Roberts R.M. (2013) Short term exposure of BMP4 and inhibitors of activin and FGF signaling induces valuable trophoblast model from human

embryonic stem cell. 69th American Society for Reproductive Medicine Annual Meeting in Boston, MA, Oct 12-17.

40. **Ezashi T.** & Roberts R.M. (2013) Porcine pluripotent stem cells and their differentiation. 9th International Conference on Pig Reproduction (invited talk). Olsztyn, Poland, Jun 9-12.
41. Yang P, **Ezashi T.**, Schust D.J., Brahmasani S.R. & Roberts R.M. (2013) Higher sensitivity to oxidative stress in umbilical cord fibroblast derived from preeclampsia patients. 46th annual meeting of the Society for the Study of Reproduction at Québec, Canada, Jul 22-26.
42. Adachi K., Amita M, Schust D.J., Schulz L.C., **Ezashi T.** & Roberts R.M. (2013) Generation of extravillous trophoblast and syncytiotrophoblast from human embryonic stem cell. 46th annual meeting of the Society for the Study of Reproduction at Québec, Canada, Jul 22-26.
43. **Ezashi T.** (2013) Porcine and other ungulate species' induced pluripotent stem cells and their differentiation (invited talk). Animal Reproductive Biology Seminar at Azabu University, Japan, Nov 22.
44. **Ezashi T.** (2013) Induced pluripotent stem cells from pigs and other domestic animals (invited talk). International Symposium on "Diversifying Biological Resources" University of Tsukuba, Japan, Nov 20–21.
45. **Ezashi T.** (2014) Cellular reprogramming to study neuronal and intellectual disorders (invited talk). Graduate school lecture at Kansai Medical University, Japan, March 27.
46. **Ezashi T.** (2014) Cellular reprogramming to study neuronal and intellectual disorders. Smith-Magenis Syndrome Research Symposium, St. Louis MO, July 31.

Research Supports:

ACTIVE

University of Missouri PRIME Fund	Ezashi	05/01/2014-04/30/2018
PRM-14-028		\$53,406

The PRIME Fund provides restoration of a 17% cut from proposed amount of NIH award, R01HD077108 *Pluripotent stem cells: modeling syncytiotrophoblast development and pathogenesis*. The fund, along with Department/College cost matches in the amount of \$53,406, is to be directed towards the project.

R01HD077108	Ezashi (contact PI), Schust (co-PI)	08/15/2013-04/30/2018
NIH/NICHD	3.0 calendar	\$207,500/yr

Project Title: Pluripotent Stem Cells: Modeling syncytiotrophoblast development and pathogenesis

While many diseases of poor placentation, including early pregnancy loss, intrauterine growth retardation and preeclampsia, have their origins in abnormal early placental development, such development cannot be studied *in vivo* in humans. We will develop stem cell-based models that will, for the first time, provide insight into this part of pregnancy. These models should help to define the pathogenesis of these and related diseases and direct development of novel diagnostic and treatment strategies. The goal of this study is to use BMP4-treated human embryonic and induced pluripotent stem cells to study the differentiation and function of syncytiotrophoblast in normal pregnancy and in pre-eclampsia.

Kansas City Area Life Sciences Institute	Ezashi (PI), Elsea (co-PI)	07/01/2013-06/30/2014
Patton Trust Research Grants	1.2 calendar	\$47,011

Title of Project: Cellular reprogramming to study neuronal and intellectual disorders

Lack of neuronal and intellectual disorder models of human neurons has limited understanding of the etiological and neurobiological mechanisms in the brain, such cellular and molecular materials cannot be studied *in vivo* in humans. We will develop stem cell-based models that will generate basic tools for establishing functional human neurons to reveal disease specific phenotypes in four neurodevelopmental disorders that are each caused by single gene abnormalities.

R01HD069979	Roberts (PI)	03/01/2012-02/28/2017
NIH/NICHD	3.0 calendar	\$205,000/yr

Title of Project: Induced Pluripotent Stem Cells from Swine: application to genetic modification

This proposal tests the hypothesis that lines of induced pluripotent stem cells (iPSC) derived from the inner cell mass of porcine blastocysts can be used to produce genetically modified pigs at a significant advantage over other somatic cell types by nuclear transfer. These cells are likely to have considerable value to the livestock industry and to biomedical research in general.

Role: Co-PI

R01HD067759 Roberts (PI) 12/16/2010-11/30/2015
 NIH/NICHD 2.4 calendar \$229,091/yr

Title of Project: Pluripotent human stem cells as models for normal and diseased trophoblast

This project is designed to establish a new model for studying extravillous trophoblast (EVT), a placental cell type that invades the wall of the womb during the first trimester of pregnancy and whose failure to invade properly can lead to serious consequences for mother and child, including a condition called pre-eclampsia. Instead of isolating the cells from placentae, the goal is to generate EVT from human pluripotent stem cells, thereby allowing us to study factors that control their invasiveness. Also by generating such pluripotent cells from umbilical cords of babies born to mothers that developed pre-eclampsia, we hope to recreate the cell type that caused the disease in the first place.

Role: Co-PI

COMPLETED GRANTS

2011-67015-20070 Roberts (PI) 12/01/2010-11/30/2013
 USDA/NIFA 3.0 calendar \$266,177/yr

Title of Project: Induced Ungulate Trophoblast Stem Cells: Derivation from Fibroblasts

The main goal of this project is to characterize lines of trophoblast that arose during standard reprogramming of embryonic fibroblasts. Some of these lines show features of being trophoblast stem cells. Aims include showing that the cells can contribute to trophectoderm of blastocysts and to trophoblast of mature placenta and demonstrating that the cells can be directed in vitro to differentiated trophoblast cells.

Role: Co-PI

Missouri Life Sciences Research Board Ezashi (PI) 01/01/2009-06/30/2010
Title of Project: Derivation of Induced Pluripotent Stem Cells from the Pig \$180,000

This project has been requested to confirm the pluripotency of “induced” stem cells derived from porcine embryonic fibroblasts with the long term goal of cloning and preserving valuable animals. This starter grant was awarded to obtain preliminary data for a grant to a federal agency.

Role: PI

R01HD42201 NIH/NICHD Roberts (PI) 07/01/2003-10/31/2008

Title of Project: Transcription Factors in Trophectoderm Differentiation

The major hypothesis behind the original proposal was that the transcriptional mechanisms that underpin emergence of trophoblast are linked to the ones that regulate the early activation of the signature genes of trophoblast, e.g. hCG subunit genes (*CGA & CGB*) in the human and the interferontau genes (*IFNT*) of cattle and sheep, each of which is first expressed as trophectoderm emerges.

Role: Co-PI