

Julie Baker

Professor of Genetics

Bio

ACADEMIC APPOINTMENTS

- Professor, Genetics
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Maternal & Child Health Research Institute (MCHRI)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

We examine how cells communicate and function during fetal development. The work in my laboratory focuses on the establishment of specific cell fates using genomics to decipher interactions between chromatin and developmental signaling cascades, between genomes and rapidly evolving cell types, and between genomic copy number variation and gene expression. In recent years we have focused on the vastly understudied biology of the trophoblast lineage, particularly how this lineage evolved.

Teaching

COURSES

2025-26

- Current Issues in Genetics: GENE 219 (Win)
- Genetics and Developmental Biology Training Camp: DBIO 200, GENE 200 (Aut)
- Genetics, Molecular Biology and Evolution: HUMBIO 2A (Aut)
- Introduction to Genetics, Ethics, and Society: GENE 220 (Spr)
- Living with Viruses: COLLEGE 112 (Spr)
- Responsible Conduct of Research in Genetics and Developmental Biology: DBIO 255 (Spr)
- The Baby Wars: who should control our ability to reproduce -- the mother, the state, the fetus?: GENE 105N (Win)

2024-25

- Current Issues in Genetics: GENE 219 (Win)
- Genetics and Developmental Biology Training Camp: DBIO 200, GENE 200 (Aut)
- Genetics, Molecular Biology and Evolution: HUMBIO 2A (Aut)
- Introduction to Genetics, Ethics, and Society: GENE 220 (Spr)
- Living with Viruses: COLLEGE 112 (Spr)
- The Baby Wars: who should control our ability to reproduce -- the mother, the state, the fetus?: GENE 105N (Win)

2023-24

- Genetics and Developmental Biology Training Camp: DBIO 200, GENE 200 (Aut)
- Genetics, Molecular Biology and Evolution: HUMBIO 2A (Aut)
- Introduction to Genetics, Ethics, and Society: GENE 220 (Spr)
- Living with Viruses: COLLEGE 112 (Spr)

2022-23

- Genetics, Evolution, and Ecology: HUMBIO 2A (Aut)
- Introduction to Genetics, Ethics, and Society: GENE 220 (Spr)
- Living with Viruses: COLLEGE 112 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Alanna Pyke

Postdoctoral Faculty Sponsor

Abby Bergman

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Genetics (Phd Program)

Publications

PUBLICATIONS

- **The genomes of the livebearing fish species *Poeciliopsis retropinna* and *Poeciliopsis turrubarensis* reflect their different reproductive strategies.** *Molecular biology and evolution*
van Kruistum, H., Guernsey, M. W., Baker, J. C., Kloet, S. L., Groenen, M. A., Pollux, B. J., Megens, H.
2020
- **Metabolism of cholesterol and progesterone is differentially regulated in primary trophoblastic subtypes and might be disturbed in recurrent miscarriages.** *Journal of lipid research*
Vondra, S., Kunihs, V., Eberhart, T., Eigner, K., Bauer, R., Haslinger, P., Haider, S., Windsperger, K., Klambauer, G., Schutz, B., Mikula, M., Zhu, X., Urban, et al
2019
- **Gene expression across mammalian organ development.** *Nature*
Cardoso-Moreira, M., Halbert, J., Valloton, D., Velten, B., Chen, C., Shao, Y., Liechti, A., Ascencao, K., Rummel, C., Ovchinnikova, S., Mazin, P. V., Xenarios, I., Harshman, et al
2019
- **The Genomic Landscape of the Peruvian Andes**
Nieves-Colon, M. A., Rawls, E., Obregon-Tito, A., Tito, R., Lewis, C., Sandoval Mendoza, K., Bustamante, C. D., Wojcik, G. L., Gignoux, C., Baker, J., Fejerman, L., Vidaurre, T., Lizarraga, et al
WILEY.2019: 176
- **Molecular and Cellular Characterization of Placenta Previa and Accreta.**
Zhang, E. T., Rivera, K., Hannibal, R. L., McGowan, K., Zhu, X., Meinhardt, G., Knoefler, M., Pollheimer, J., Folkins, A., Lyell, D. J., Baker, J. C.
SAGE PUBLICATIONS INC.2019: 262A–263A
- **Siva plays a critical role in mouse embryonic development.** *Cell death and differentiation*
Jacobs, S. B., Van Nostrand, J. L., Bowen, M. E., Baker, J. C., Attardi, L. D.
2019
- **Genome amplification and cellular senescence are hallmarks of human placenta development.** *PLoS genetics*

Velicky, P., Meinhardt, G., Plessl, K., Vondra, S., Weiss, T., Haslinger, P., Lendl, T., Aumayr, K., Mairhofer, M., Zhu, X., Schutz, B., Hannibal, R. L., Lindau, et al
2018; 14 (10): e1007698

- **CONVERGENCE AND DIVERGENCE: THE STORY OF PLACENTA EVOLUTION AS TOLD BY POECILIOPSIS FISHES**
Guernsey, M., Hagmayer, A., Reznick, D., Pollux, B., Baker, J.
W B SAUNDERS CO LTD.2018: E7–E8
- **Investigating human placentation and pregnancy using first trimester chorionic villi.** *Placenta*
Hannibal, R. L., Cardoso-Moreira, M., Chetty, S. P., Lau, J., Qi, Z., Gonzalez-Maldonado, E., Cherry, A. M., Yu, J., Norton, M. E., Baker, J. C.
2018; 65: 65–75
- **IFPA meeting 2016 workshop report I: Genomic communication, bioinformatics, trophoblast biology and transport systems.** *Placenta*
Albrecht, C., Baker, J. C., Blundell, C., Chavez, S. L., Carbone, L., Chamley, L., Hannibal, R. L., Illsley, N., Kurre, P., Laurent, L. C., McKenzie, C., Morales-Prieto, D., Pantham, et al
2017
- **Transcriptional dynamics of tail regeneration in *Xenopus tropicalis*** *GENESIS*
Chang, J., Baker, J., Wills, A.
2017; 55 (1-2)
- **Desynchronizing Embryonic Cell Division Waves Reveals the Robustness of *Xenopus laevis* Development.** *Cell reports*
Anderson, G. A., Gelens, L. n., Baker, J. C., Ferrell, J. E.
2017; 21 (1): 37–46
- **Molecular conservation of marsupial and eutherian placentation and lactation.** *eLife*
Guernsey, M. W., Chuong, E. B., Cornelis, G. n., Renfree, M. B., Baker, J. C.
2017; 6
- **GLOBAL RE-WIRING OF MOLECULAR NETWORKS IN PLACENTA ACCRETA**
Hannibal, R., Song, J., McGowan, K., Folkins, A., Heerema-McKenney, A., Lyell, D., Baker, J.
W B SAUNDERS CO LTD.2016: 92
- **XenMine: A genomic interaction tool for the *Xenopus* community.** *Developmental biology*
Reid, C. D., Karra, K., Chang, J., Piskol, R., Li, Q., Li, J. B., Cherry, J. M., Baker, J. C.
2016
- **Human Embryonic Stem Cell Lines with Lesions in FOXP3 and NF1** *PLOS ONE*
Zhu, H., Behr, B., Reddy, V. V., Hughes, M., Pan, Y., Baker, J.
2016; 11 (3)
- **Selective Amplification of the Genome Surrounding Key Placental Genes in Trophoblast Giant Cells.** *Current biology*
Hannibal, R. L., Baker, J. C.
2016; 26 (2): 230-236
- **Human Embryonic Stem Cell Lines with Lesions in FOXP3 and NF1.** *PloS one*
Zhu, H., Behr, B., Reddy, V. V., Hughes, M., Pan, Y., Baker, J.
2016; 11 (3)
- **Constraint and divergence of global gene expression in the mammalian embryo** *ELIFE*
Spies, N., Smith, C. L., Rodriguez, J. M., Baker, J. C., Batzoglu, S., Sidow, A.
2015; 4
- **HEB associates with PRC2 and SMAD2/3 to regulate developmental fates** *NATURE COMMUNICATIONS*
Yoon, S., Foley, J. W., Baker, J. C.
2015; 6
- **E2a Is Necessary for Smad2/3-Dependent Transcription and the Direct Repression of lefty during Gastrulation.** *Developmental cell*
Wills, A. E., Baker, J. C.
2015; 32 (3): 345-357

- **HEB associates with PRC2 and SMAD2/3 to regulate developmental fates.** *Nature communications*
Yoon, S., Foley, J. W., Baker, J. C.
2015; 6: 6546-?
- **Is there a correlation between chorionic villi morphology, gene expression and pregnancy outcomes?**
Chetty, S., Hannibal, R., Moreira, M., Baker, J., Norton, M.
MOSBY-ELSEVIER.2015: S125
- **Identifying direct targets of transcription factor Rfx2 that coordinate ciliogenesis and cell movement.** *Genomics data*
Kwon, T., Chung, M., Gupta, R., Baker, J. C., Wallingford, J. B., Marcotte, E. M.
2014; 2: 192-194
- **Developmental enhancers are marked independently of zygotic Nodal signals in Xenopus** *DEVELOPMENTAL BIOLOGY*
Gupta, R., Wills, A., Ucar, D., Baker, J.
2014; 395 (1): 38-49
- **Developmental enhancers are marked independently of zygotic Nodal signals in Xenopus.** *Developmental biology*
Gupta, R., Wills, A., Ucar, D., Baker, J.
2014; 395 (1): 38-49
- **GLOBAL REWIRING OF MOLECULAR NETWORKS IN PLACENTA PREVIA AND ACCRETE**
Hannibal, R., Song, J., Folkins, A., Lyell, D., Heerema-McKenney, A., Baker, J.
W B SAUNDERS CO LTD.2014: A47
- **H3K4me3 Breadth Is Linked to Cell Identity and Transcriptional Consistency.** *Cell*
Benayoun, B. A., Pollina, E. A., Ucar, D., Mahmoudi, S., Karra, K., Wong, E. D., Devarajan, K., Daugherty, A. C., Kundaje, A. B., Mancini, E., Hitz, B. C., Gupta, R., Rando, et al
2014; 158 (3): 673-688
- **Maternal bias and escape from X chromosome imprinting in the midgestation mouse placenta.** *Developmental biology*
Finn, E. H., Smith, C. L., Rodriguez, J., Sidow, A., Baker, J. C.
2014; 390 (1): 80-92
- **Copy number variation is a fundamental aspect of the placental genome.** *PLoS genetics*
Hannibal, R. L., Chuong, E. B., Rivera-Mulia, J. C., Gilbert, D. M., Valouev, A., Baker, J. C.
2014; 10 (5)
- **Copy number variation is a fundamental aspect of the placental genome.** *PLoS genetics*
Hannibal, R. L., Chuong, E. B., Rivera-Mulia, J. C., Gilbert, D. M., Valouev, A., Baker, J. C.
2014; 10 (5)
- **Chromatin immunoprecipitation and deep sequencing in Xenopus tropicalis and Xenopus laevis.** *Methods (San Diego, Calif.)*
Wills, A. E., Gupta, R., Chuong, E., Baker, J. C.
2014; 66 (3): 410-421
- **The evolution of lncRNA repertoires and expression patterns in tetrapods** *NATURE*
Necsulea, A., Soumillon, M., Warnefors, M., Liechti, A., Daish, T., Zeller, U., Baker, J. C., Gruetzner, F., Kaessmann, H.
2014; 505 (7485): 635-?
- **Coordinated genomic control of ciliogenesis and cell movement by RFX2** *ELIFE*
Chung, M., Kwon, T., Tu, F., Brooks, E. R., Gupta, R., Meyer, M., Baker, J. C., Marcotte, E. M., Wallingford, J. B.
2014; 3
- **Evolutionary perspectives into placental biology and disease.** *Applied & translational genomics*
Chuong, E. B., Hannibal, R. L., Green, S. L., Baker, J. C.
2013; 2: 64-69
- **REPLICATION TIMING PREDICTS UNDERREPLICATED DOMAINS IN POLYPLOID TROPHOBLAST GIANT CELLS**
Hannibal, R., Chuong, E., Mulia, J., Gilbert, D., Valouev, A., Baker, J.
W B SAUNDERS CO LTD.2013: A8

- **Synthesis of a photocaged tamoxifen for light-dependent activation of Cre-ER recombinase-driven gene modification.** *Chemical communications*
Inlay, M. A., Choe, V., Bharathi, S., Fernhoff, N. B., Baker, J. R., Weissman, I. L., Choi, S. K.
2013; 49 (43): 4971-4973
- **Transdisciplinary translational science and the case of preterm birth** *JOURNAL OF PERINATOLOGY*
Stevenson, D. K., Shaw, G. M., Wise, P. H., Norton, M. E., Druzin, M. L., Valantine, H. A., McFarland, D. A.
2013; 33 (4): 251-258
- **Endogenous retroviruses function as species-specific enhancer elements in the placenta** *NATURE GENETICS*
Chuong, E. B., Rumi, M. A., Soares, M. J., Baker, J. C.
2013; 45 (3): 325-329
- **RNA sequencing reveals a diverse and dynamic repertoire of the *Xenopus tropicalis* transcriptome over development** *GENOME RESEARCH*
Tan, M. H., Au, K. F., Yablonovitch, A. L., Wills, A. E., Chuang, J., Baker, J. C., Wong, W. H., Li, J. B.
2013; 23 (1): 201-216
- **Evolutionary perspectives into placental biology and disease** *Applied & Translational Genomics*
Chuong, E. B., Hannibal, R. L., Green, S. L., Baker, J. C.
2013; 2: 64-69
- **The RB family is required for the self-renewal and survival of human embryonic stem cells** *NATURE COMMUNICATIONS*
Conklin, J. F., Baker, J., Sage, J.
2012; 3
- **Distinguishing Human Cell Types Based on Housekeeping Gene Signatures** *STEM CELLS*
Oyolu, C., Zakharia, F., Baker, J.
2012; 30 (3): 580-584
- **Screening ethnically diverse human embryonic stem cells identifies a chromosome 20 minimal amplicon conferring growth advantage** *NATURE BIOTECHNOLOGY*
Amps, K., Andrews, P. W., Anyfantis, G., Armstrong, L., Avery, S., Baharvand, H., Baker, J., Baker, D., Munoz, M. B., Beil, S., Benvenisty, N., Ben-Yosef, D., Biancotti, et al
2011; 29 (12): 1132-U113
- **Global hormone profiling of murine placenta reveals Secretin expression** *PLACENTA*
Knox, K., Leuenberger, D., Penn, A. A., Baker, J. C.
2011; 32 (11): 811-816
- **Chromatin and transcriptional signatures for Nodal signaling during endoderm formation in hESCs** *DEVELOPMENTAL BIOLOGY*
Kim, S. W., Yoon, S., Chuong, E., Oyolu, C., Wills, A. E., Gupta, R., Baker, J.
2011; 357 (2): 492-504
- **HEB and E2A function as SMAD/FOXH1 cofactors** *GENES & DEVELOPMENT*
Yoon, S., Wills, A. E., Chuong, E., Gupta, R., Baker, J. C.
2011; 25 (15): 1654-1661
- **A New FACS Approach Isolates hESC Derived Endoderm Using Transcription Factors** *PLOS ONE*
Pan, Y., Ouyang, Z., Wong, W. H., Baker, J. C.
2011; 6 (3)
- **Distinct DNA methylation patterns characterize differentiated human embryonic stem cells and developing human fetal liver** *GENOME RESEARCH*
Brunner, A. L., Johnson, D. S., Kim, S. W., Valouev, A., Reddy, T. E., Neff, N. F., Anton, E., Medina, C., Nguyen, L., Chiao, E., Oyolu, C. B., Schroth, G. P., Absher, et al
2009; 19 (6): 1044-1056
- **The E3 ubiquitin ligase GREUL1 anteriorizes ectoderm during *Xenopus* development** *DEVELOPMENTAL BIOLOGY*
Borchers, A. G., Hufton, A. L., Eldridge, A. G., Jackson, P. K., Harland, R. M., Baker, J. C.

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- **Wnt signaling in *Xenopus* embryos inhibits Bmp4 expression and activates neural development** *GENES & DEVELOPMENT*

Baker, J. C., Beddington, R. S., Harland, R. M.

1999; 13 (23): 3149-3159

- **From receptor to nucleus: the Smad pathway** *CURRENT OPINION IN GENETICS & DEVELOPMENT*

Baker, J. C., Harland, R. M.

1997; 7 (4): 467-473

- **A novel mesoderm inducer, Madr2 functions in the activin signal transduction pathway** *GENES & DEVELOPMENT*

Baker, J. C., Harland, R. M.

1996; 10 (15): 1880-1889

- **A human Mad protein acting as a BMP-regulated transcriptional activator** *Nature*

J. C. Baker, Liu, F., A. Hata, J. Doody, J. Carcamo, R. M. Harland, J. Massague

1996; 381