

## CURRICULUM VITAE

**Name:** Kristy Red-Horse, Ph.D.

**Positions:** Associate Professor, Department of Biology, Stanford University  
Investigator, Howard Hughes Medical Institute

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### EDUCATION

2007-2011	Stanford University	Postdoctoral Training	Biochemistry
2005-2007	Genentech, Inc.	Postdoctoral Training	Tumor Biology and Angiogenesis
2001-2005	University of California, San Francisco, CA	Ph.D.	Biomedical Sciences
1999-2001	San Francisco State University, CA	M.S.	Biology
1995-1999	University of Arkansas, Fayetteville, AR	B.A.	Microbiology

### PRINCIPAL POSITIONS HELD

2021-present	Howard Hughes Medical Institute	Investigator	
2019-present	Stanford University	Associate Professor	Biology
2012-2018	Stanford University	Assistant Professor	Biology
2007-2011	Stanford University	Postdoctoral Fellow	Biochemistry
2005-2007	Genentech, Inc.	Postdoctoral Fellow	Tumor Biology and Angiogenesis
2001-2005	University of California, San Francisco, CA	Graduate Research	Biomedical Sciences
2002	University of California, San Francisco, CA	Graduate Teaching Assistant	Immunology
1999-2001	San Francisco State University, CA	Graduate Research	Biology

### KEYWORDS/AREAS OF INTEREST

Cardiovascular biology, tissue regeneration, development, angiogenesis, mouse models, cellular and molecular biology

### FELLOWSHIPS AND AWARDS

Judah Folkman Award for Vascular Biology	2020
New York Stem Cell Foundation—Robertson Investigator	2015-2020
Searle Scholar	2013-2016
Terman Fellowship	2012-2015
	2018-2021
NIH/NHLBI Pathway to Independence Award (R00 Independent phase)	2012-2015

### PUBLICATIONS (Red-Horse laboratory publications in bold)

1. Phansalkar R, Krieger J, Zhao M, Kolluru S, Jones R, Quake SR, Weissman IR, Bernstein D, Winn VD, D'Amato G\*, Red-Horse K\*. (2021) Coronary blood vessels from distinct origins converge to equivalent states during mouse and human development. *bioRxiv* 2021.04.25.441380.
2. Rhee S\*, Paik DT\*, Yang JY, Nagelberg D, Williams I, Tian L, Roth R, Chandy M, Ban J, Belbachir N, Kim S, Zhang H, Phansalkar R, Wong RM, King DA, Valdez C, Winn VA, Morrison AJ\*, Wu JC\*, Red-Horse K\*. (2020). Endocardial/endothelial angiocrines regulate cardiomyocyte development and maturation and induce features of ventricular non-compaction. *Eur Heart J*, July 2021.
3. Rios Coronado PE, Red-Horse K. (2021). Enhancing cardiovascular research with whole-organ imaging. *Curr Opin Hematol*. May 1;28(3):214-220.

4. Jung JH, Ikeda G, Tada Y, von Bornstädt D, Santoso MR, Wahlquist C, Rhee S, Jeon YJ, Yu AC, O'Brien CG, Red-Horse K, Appel EA, Mercola M, Woo J, Yang PC. (2021). miR-106a-363 cluster in extracellular vesicles promotes endogenous myocardial repair via Notch3 pathway in ischemic heart injury. *Basic Res Cardiol*. Mar 19;116(1):19.
5. **Red-Horse K, Das S. (2021). New Research Is Shining Light on How Collateral Arteries Form in the Heart: a Future Therapeutic Direction? *Curr Cardiol Rep*. Mar 2;23(4):30.**
6. Paik DT, Tian L, Williams IM, Rhee S, Zhang H, Liu C, Mishra R, Wu SM, Red-Horse K, Wu JC. Single-Cell RNA-seq Unveils Unique Transcriptomic Signatures of Organ-Specific Endothelial Cells. *Circulation*. 2020 Sep 15.
7. **Raftrey B, Williams I, Rios Coronado PE, Chang AH, Zhao M, Roth R, Racelis R, D'Amato G, Phansalkar R, Gonzalez KM, Zhang Y, Bernstein D, Red-Horse K. (2020). Dach1 extends artery networks and protects against cardiac injury. *bioRxiv* 2020.08.07.242164.**
8. Brulois K, Rajaraman A, Szade A, Nordling S, Bogoslawski A, Dermadi D, Rahman M, Kiefel H, O'Hara E, Koning JJ, Kawashima H, Zhou B, Vestweber D, Red-Horse K, Mebius RE, Adams RH, Kubes P, Pan J, Butcher EC. (2020). A molecular map of murine lymph node blood vascular endothelium at single cell resolution. *Nat Commun*. 11, 3798.
9. Buikema JW, Lee S, Goodyer WR, Maas RG, Chirikian O, Li G, Miao Y, Paige SL, Lee D, Wu H, Paik DT, Rhee S, Tian L, Galdos FX, Puluca N, Beyersdorf B, Hu J, Beck A, Venkamatran S, Swami S, Wijnker P, Schuldt M, Dorsch LM, van Mil A, Red-Horse K, Wu JY, Geisen C, Hesse M, Serpooshan V, Jovinge S, Fleischmann BK, Doevendans PA, van der Velden J, Garcia KC, Wu JC, Sluijter JPG, Wu SM. (2020). Wnt Activation and Reduced Cell-Cell Contact Synergistically Induce Massive Expansion of Functional Human iPSC-Derived Cardiomyocytes. *Cell Stem Cell* 27, 50-63.
10. Jung KO, Kim TJ, Yu JH, Rhee S, Zhao W, Ha B, Red-Horse K, Gambhir SS, Pratz G. (2020). Whole-body tracking of single cells via positron emission tomography. *Nat Biomed Eng*. 4, 835-844.
11. **Phansalkar R, Red-Horse K. (2020). Techniques converge to map the developing human heart at single-cell level. *Nature* 577, 629-630.**
12. Gancz D, Raftrey BC, Perlmoter G, Marín-Juez R, Semo J, Matsuoka RL, Karra R, Raviv H, Moshe N, Addadi Y, Golani O, Poss KD, **Red-Horse K**, Stainier DY, Yaniv K. Distinct origins and molecular mechanisms contribute to lymphatic formation during cardiac growth and regeneration. *Elife*. 2019 Nov 8;8
13. **Red-Horse K, Siekmann AF. Veins and Arteries Build Hierarchical Branching Patterns Differently: Bottom-Up versus Top-Down. *BioEssays: news and reviews in molecular, cellular and developmental biology*. 2019;41(3):e1800198. doi: 10.1002/bies.201800198.**
14. **Das S\*, Goldstone AB\*, Wang H, Farry J, D'Amato G, Paulsen MJ, Eskandari A, Hironaka CE, Phansalkar R, Sharma B, Rhee S, Shamskhov EA, Agalliu D, de Jesus Perez V, Woo YJ\*, Red-Horse K\*. (2019). A unique collateral artery development program promotes neonatal heart regeneration. *Cell* 176, 1128-1142.**  
*Comments:*  
*Preview: A watershed finding for heart regeneration*
15. Paik DT, Tian L, Lee J, Sayed N, Chen IY, Rhee S, Rhee JW, Kim Y, Wirka RC, Buikema JW, Wu SM, Red-Horse K, Quertermous T, Wu JC. Large-Scale Single-Cell RNA-Seq Reveals Molecular Signatures of Heterogeneous Populations of Human Induced Pluripotent Stem Cell-Derived Endothelial Cells. *Circ Res*. 2018 Jul 9.
16. **Su T\*, Stanley G\*, Sinha R\*, D'Amato G, Das S, Rhee S, Chang AH, Poduri A, Raftrey B, Dinh TT, Roper WA, Li G, Quinn KE, Caron KM, Wu S, Miquero L, Butcher EC, Weissman I, Quake S, Red-Horse K. Single-cell analysis of early progenitor cells that build coronary arteries. *Nature*. 2018 Jul 4.**  
*Comments:*  
*News and Views: Coronary artery development, one cell at a time*
17. **Rhee S\*, Chung JI\*, King DA, D'amato G, Paik DT, Duan A, Chang A, Nagelberg D, Sharma B, Jeong Y, Diehn M, Wu JC, Morrison AJ\*, Red-Horse K\*. Endothelial deletion of Ino80 disrupts coronary angiogenesis and causes congenital heart disease. *Nat Commun*. 2018**
18. Hwangbo C, Wu J, Papangeli I, Adachi T, Sharma B, Park S, Zhao L, Ju H, Go GW, Cui G, Inayathullah M, Job JK, Rajadas J, Kwei SL, Li MO, Morrison AR, Quertermous T, Mani A, Red-Horse K, Chun HJ. Endothelial APLNR regulates tissue fatty acid uptake and is essential for apelin's glucose-lowering effects. *Sci Transl Med*. 2017 Sep 13;9(407)
19. **Andrew H. Chang, Brian C. Raftrey, Gaetano D'Amato, Vinay N. Surya, Aruna Poduri, Heidi I. Chen, Andrew B. Goldstone, Joseph Woo, Gerald G. Fuller, Alexander R. Dunn, and Kristy Red-Horse. (2017) DACH1 stimulates shear stress guided endothelial cell migration and coronary artery growth through the CXCL12-CXCR4 signaling axis. *Genes and Development*, 31:1308-1324.**  
*Comments:*  
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20. **Bikram Sharma, Lena Ho, Heidi I. Chen, Andrew B. Goldstone, Y. Joseph Woo, Thomas Quertermous, Bruno Reversade, and Kristy Red-Horse. (2017) Alternative progenitor cells compensate to rebuild the coronary vasculature in Apj-and Elabela-deficient hearts. *Developmental Cell*, Sep 25;42(6):655-666**  
*Comments:*  
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21. **Aruna Poduri, Andrew H Chang, Brian Raffrey, Mike Van, Kristy Red-Horse. Endothelial cells respond to the direction of mechanical stimuli through SMAD signaling to regulate coronary artery size. *Development*, Sep 15;144(18):3241-3252.**  
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22. **Das S, Red-Horse K. Cellular Plasticity in cardiovascular development and disease. (2017) *Dev Dyn*. Jan 18**
23. **Sharma B, Chang A, Red-Horse K. Coronary Artery Development: Progenitor Cells and Differentiation Pathways. (2016) *Annu Rev Physiol*. Dec 9.**
24. Papangeli I, Kim J, Maier I, Park S, Lee A, Kang Y, Tanaka K, Khan OF, Ju H, Kojima Y, Red-Horse K, Anderson DG, Siekmann AF, Chun HJ. (2016) MicroRNA 139-5p coordinates APLNR-CXCR4 crosstalk during vascular maturation. *Nat Commun*. Apr 12;7:11268.
25. **Volz, K, Chen, H, Poduri, A, McKay, A, Jacobs, A, Kofler, N, Kitajewski, J, Weissman, I, and Red-Horse, K. (2015) Pericytes are epicardial-derived intermediate progenitors for coronary artery smooth muscle. *eLife*. Oct: 19(4).**  
*Comments :*  
*Featured in an article in The Guardian: (2016) Artery cell discovery paves way for new heart disease treatment.*
26. Liu Q, Hu T, He L, Huang X, Tian X, Zhang H, He L, Pu W, Zhang L, Sun H, Fang J, Yu Y, Duan S, Hu C, Hui L, Zhang H, Quertermous T, Xu Q, Red-Horse K, Wythe JD, Zhou B. (2015) Genetic targeting of sprouting angiogenesis using Apln-CreER. *Nature Communications* Jan 19;6:6020.
27. **Chen HI\*, Sharma B\*, Akerberg BN, Numi HJ, Kivelä, R, Saharinen P, Aghajanian H, McKay AS, Bogard PE, Chang AH, Jacobs AH, Epstein JA, Stankunas K, Alitalo K, Red-Horse K. (2014) The sinus venosus contributes to the coronary vasculature through VEGF-C stimulated angiogenesis. *Development* Dec:141(23): 4500-12.**  
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*Editor's feature. (2014) The origin of the coronary vasculature *Development* 141(23), 2304.*
28. **Chen HI\*, Poduri A\*, Numi HJ, Kivelä R, Saharinen P, McKay AS, Raffrey B, Churko J, Tian X, Zhou B, Wu JC, Alitalo K, Red-Horse K. (2014) VEGF-C and aortic cardiomyocytes guide coronary artery stem development. *Journal of Clinical Investigation* Nov 3;124(11):4899-914.**  
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*Editor's Pick. (2014) A heart connection: determinants of coronary artery stem formation *JCI* impact 6.*
29. Schanz A, Red-Horse K, Hess AP, Baston-Büst DM, Heiss C, Krüssel JS. (2014) Oxygen regulates human cytotrophoblast migration by controlling chemokine and receptor expression. *Placenta*. Dec;35(12):1089-94
30. Ali SR, Ranjbarvaziri S, Talkhabi M, Zhao P, Subat A, Hojjat A, Kamran P, Müller AM, Volz KS, Tang Z, Red-Horse K, Ardehali R. (2014) Developmental Heterogeneity of Cardiac Fibroblasts Does Not Predict Pathological Proliferation and Activation. *Circ Res*. Jul 18.
31. Red-Horse K, Drake PM, Fisher S. (2014) Exploring the world of human development and reproduction. *Int J Dev Biol*.58(2-4):87-93.
32. Sharma A, Marceau CD, Hamaguchi R, Burridge P, Rajarajan K, Churko J, Wu H, Sallam K, Matsa E, Sturzu A, Che Y, Ebert A, Diecke S, Liang P, Red-Horse K, Carette JE, Wu SM, Wu JC. (2014) Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes as an In Vitro Model for Cocksackievirus B3-Induced Myocarditis and Antiviral Drug Screening Platform. *Circ Res*. Jul 11.
33. Tian X, Hu T, Zhang H, He L, Huang X, Liu Q, Yu W, He L, Yang Z, Zhang Z, Zhong TP, Yang X, Yang Z, Yan Y, Baldini A, Sun Y, Lu J, Schwartz RJ, Evans SM, Gittenberger-de Groot AC, Red-Horse K, Zhou B. (2013). Subepicardial endothelial cells invade the embryonic ventricle wall to form coronary arteries. *Cell Res* 23(9), 1075-90.
34. Greif D, Kumar M, Lighthouse J, Hum J, An A, Ding L, Red-Horse K, Olson S, Offermanns S, Krasnow MA (2012) Radial construction of an arterial wall. *Dev Cell* 23(3), 482-93.
35. Red-Horse K, Ueno H, Weissman IL, Krasnow, MA. (2010). Coronary arteries form by developmental reprogramming of venous cells. *Nature* 7288, 549-53.  
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*Riley, P. (2010) Developmental biology: Plumbing the heart. *Nature* 7288, 498-9.*  
*Wrighton, K. H. (2010) Getting to the heart of the matter. *Nat Rev Cell Biol* 5, 312.*

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36. Red-Horse K. (2008). Lymphatic vessel dynamics in the uterine wall. *Placenta* 29, S55-9.
37. Winn V, Red-Horse K, and Fisher SJ. (2007) Differentiation of the invasive cytotrophoblast lineage in normal pregnancy and in preeclampsia. *In The Endometrium: Molecular, Cellular and Clinical Perspectives, 2nd Edition*.
38. Red-Horse K, Ferrara N. (2007). Vascular targeting via caveolae. *Nat Biotechnol* 25, 431-2.
39. Red-Horse K, Crawford Y, Shojaei F, and Ferrara N. (2007). Endothelium-microenvironment interactions in the developing embryo and the adult. *Dev Cell* 12, 181-94.
40. Red-Horse K, Ferrara N. (2006). Imaging tumor angiogenesis. *J Clin Invest* 116, 2585-7.
41. Red-Horse K, Rivera J, Schanz A, Zhou Y, Winn V, Kapidzic M, Maltepe E, Okazaki K, Kochman R, Vo KC, Giudice L, Erlebacher A, McCune JM, Stoddart CA, Fisher SJ. (2006) Cytotrophoblast induction of arterial apoptosis and lymphangiogenesis in an in vivo model of human placentation. *J Clin Invest* 116, 2643-52.
42. Red-Horse K, Kapidzic M, Zhou, Y, Feng, K, and Fisher, SJ (2005). EphB4 regulates chemokine-evoked trophoblast responses: a mechanism for incorporating the human placenta into the maternal circulation. *Development* 132, 4097-106.
43. Maltepe, E, Krampitz, G, Okazaki, K, Red-Horse, K, Mak, W, Simon, MC, Fisher, SJ. (2005). Hypoxia-inducible factor-dependent histone deacetylase activity determines stem cell fate in the placenta. *Development* 132, 3393-3403.
44. Chenais, B, Derjuga, A, Massrieh, W, Red-Horse, K, Bellingard, V, Fisher, SJ, Blank V. (2005). Functional and placental expression analysis of the human NRF3 transcription factor. *Mol Endocrinol* 1, 125-37.
45. Red-Horse K, Zhou Y, Genbacev O, Prakobphol A, Foulk R, McMaster M, Fisher SJ. (2004). Trophoblast differentiation during embryo implantation and formation of the maternal-fetal interface. *J Clin Invest* 6, 744-54.
46. Red-Horse K, Drake PM, Fisher, SJ. (2004). Human pregnancy: the role of chemokine networks at the fetal-maternal interface. *Expert Rev in Mol Med* 10, 1-14.
47. Drake PM, Red-Horse K, Fisher SJ. (2004). Reciprocal chemokine receptor and ligand expression in the human placenta; implications for cytotrophoblast differentiation. *Dev Dyn* 4, 877-85.
48. Drake PM, Red-Horse K, Fisher SJ. (2002). Chemokine expression and function at the human maternal-fetal interface. *Rev Endocr Metab Disord* 2, 159-65.
49. Red-Horse K, Drake PM, Gunn MD, Fisher SJ. (2001). Chemokine ligand and receptor expression in the pregnancy uterus: reciprocal patterns in complimentary cell subsets suggest functional roles. *Am J Pathol* 6, 2199-213.