Stanford

Kristy Red-Horse

Professor of Biology

CONTACT INFORMATION

- **Administrative Contact**

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Bio

ACADEMIC APPOINTMENTS

- Professor, Biology
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Institute for Stem Cell Biology and Regenerative Medicine
- Member, Maternal & Child Health Research Institute (MCHRI)

LINKS

- Lab website: http://redhorselab.com/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Cardiovascular developmental biology

Teaching

COURSES

2023-24

- Developmental Biology: BIO 160 (Win)

2022-23

- Developmental Biology: BIO 160 (Win)

2020-21

- Developmental Biology: BIO 160 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Hannah Fung, Kenisha Puckett, Macy Vollbrecht, Helen Yue Zhang, Sherry Zheng

Postdoctoral Faculty Sponsor

Xiaochen Fan, Wen Chuan Hsieh, Sawan Jha, Mira Moufarrej, Pam Rios Coronado, Daniel Sorensen

Doctoral Dissertation Advisor (AC)

Zhainib Amir-Ugokwe, Karen Gonzalez, Azalia Martinez Jaimes, Jeffrey Naftaly, Ragini Phansalkar, Alanna Pyke, Emily Trimm, James Zwierzynski

Doctoral Dissertation Co-Advisor (AC)

Danielle Klinger

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biology (School of Humanities and Sciences) (Phd Program)

Publications

PUBLICATIONS

- **Vascular endothelial cell development and diversity.** *Nature reviews. Cardiology*
  Trimm, E., Red-Horse, K.
  2022

- **A new resource for human coronary vessel development.** *Cardiovascular research*
  Phansalkar, R., Red-Horse, K.
  2022

- **Generating human artery and vein cells from pluripotent stem cells highlights the arterial tropism of Nipah and Hendra viruses.** *Cell*
  Ang, L. T., Nguyen, A. T., Liu, K. J., Chen, A., Xiong, X., Curtis, M., Martin, R. M., Raftry, B. C., Ng, C. Y., Vogel, U., Lander, A., Lesch, B. J., Fowler, et al
  2022

- **The Tabula Sapiens: A multiple-organ, single-cell transcriptomic atlas of humans.** *Science (New York, N.Y.)*
  Jones, R. C., Karkanias, J., Krasnow, M. A., Pisco, A. O., Quake, S. R., Salzman, J., Yosef, N., Bulthaup, B., Brown, P., Harper, W., Hemenez, M., Ponnusamy, R., Salehi, et al
  2022; 376 (6594): eabl4896

- **Coronary blood vessels from distinct origins converge to equivalent states during mouse and human development** *ELIFE*
  Phansalkar, R., Krieger, J., Zhao, M., Kolluru, S., Jones, R. C., Quake, S. R., Weissman, I., Bernstein, D., Winn, V. D., D'Amato, G., Red-Horse, K.
  2021; 10

- **Endocardial/endothelial angiocrines regulate cardiomyocyte development and maturation and induce features of ventricular non-compaction.** *European heart journal*
  Rhee, S., Paik, D. T., Yang, J. Y., Nagelberg, D., Williams, I., Tian, L., Roth, R., Chandy, M., Ban, J., Belbachir, N., Kim, S., Zhang, H., Phansalkar, et al
  2021

- **Enhancing cardiovascular research with whole-organ imaging.** *Current opinion in hematology*
  Rios Coronado, P. E., Red-Horse, K.
  2021

- **New Research Is Shining Light on How Collateral Arteries Form in the Heart: a Future Therapeutic Direction?** *Current cardiology reports*
  Red-Horse, K., Das, S.
  2021; 23 (4): 30

- **Dach1 Extends Artery Networks and Protects Against Cardiac Injury.** *Circulation research*
  Raftrey, B., Williams, I. M., Rios Coronado, P. E., Fan, X., Chang, A. H., Zhao, M., Roth, R. K., Trimm, E., Racelis, R., D'Amato, G., Phansalkar, R., Nguyen, A., Chai, et al

2021

- **Single-Cell RNA-seq Unveils Unique Transcriptomic Signatures of Organ-Specific Endothelial Cells.** *Circulation*
  Paik, D. T., Tian, L., Williams, I. M., Rhee, S., Zhang, H., Liu, C., Mishra, R., Wu, S. M., Red-Horse, K., Wu, J. C.
  2020

- **Single-cell maps of the human heart** *NATURE*
  Phansalkar, R., Red-Horse, K.
  2020; 577 (7792): 629–30

- **Single-cell maps of the human heart** *NATURE*
  Phansalkar, R., Red-Horse, K.
  2020; 577 (7792): 629–30

- **Wnt Activation and Reduced Cell-Cell Contact Synergistically Induce Massive Expansion of Functional Human iPSC-Derived Cardiomyocytes.** *Cell stem cell*
  Buikema, J. W., Lee, S. n., Goodyer, W. R., Maas, R. G., Chirikian, O. n., Li, G. n., Miao, Y. n., Paige, S. L., Lee, D. n., Wu, H. n., Paik, D. T., Rhee, S. n., Tian, et al
  2020; 27 (1): 50–63.e5

- **Whole-body tracking of single cells via positron emission tomography.** *Nature biomedical engineering*
  Jung, K. O., Kim, T. J., Yu, J. H., Rhee, S. n., Zhao, W. n., Ha, B. n., Red-Horse, K. n., Gambhir, S. S., Pratx, G. n.
  2020

- **Veins and Arteries Build Hierarchical Branching Patterns Differently: Bottom-Up versus Top-Down.** *BioEssays : news and reviews in molecular, cellular and developmental biology*
  Red-Horse, K., Siekmann, A. F.
  2019; 41 (3): e1800198

- **A Unique Collateral Artery Development Program Promotes Neonatal Heart Regeneration.** *Cell*
  Das, S., Goldstone, A. B., Wang, H., Farry, J., D'Amato, G., Paulsen, M. J., Eskandari, A., Hironaka, C. E., Phansalkar, R., Sharma, B., Rhee, S., Shamskhou, E. A., Agalliu, et al
  2019

- **Distinct origins and molecular mechanisms contribute to lymphatic formation during cardiac growth and regeneration.** *eLife*
  Gancz, D. n., Raftrey, B. C., Perlmoter, G. n., Marín-Juez, R. n., Semo, J. n., Matsuoka, R. L., Karra, R. n., Raviv, H. n., Moshe, N. n., Addadi, Y. n., Golani, O. n., Poss, K. D., Red-Horse, et al
  2019; 8

- **Characterization of Brain Dysfunction Induced by Bacterial Lipopeptides That Alter Neuronal Activity and Network in Rodent Brains** *JOURNAL OF NEUROSCIENCE*
  Kim, K., Zamaleeva, A. I., Lee, Y., Ahmed, M., Kim, E., Lee, H., Pothineni, V., Tao, J., Rhee, S., Jayakumar, M., Inayathullah, M., Sivanesan, S., Red-Horse, et al
  2018; 38 (50): 10672–91

- **Characterization of brain dysfunction induced by bacterial lipopeptides that alter neuronal activity and network in rodent brains.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Kim, K., Zamaleeva, A. I., Woo Lee, Y., Ahmed, M. R., Kim, E., Lee, H., Raveendra Pothineni, V., Tao, J., Rhee, S., Jayakumar, M., Inayathullah, M., Sivanesan, S., Red-Horse, et al
  2018

- **Large-Scale Single-Cell RNA-Seq Reveals Molecular Signatures of Heterogeneous Populations of Human Induced Pluripotent Stem Cell-Derived Endothelial Cells.** *Circulation research*
  Paik, D. T., Tian, L., Lee, J., Sayed, N., Chen, I. Y., Rhee, S., Rhee, J., Kim, Y., Wirka, R. C., Buikema, J. W., Wu, S. M., Red-Horse, K., Quertermous, et al
  2018

- **Endothelial deletion of Ino80 disrupts coronary angiogenesis and causes congenital heart disease.** *Nature communications*
  Rhee, S. n., Chung, J. I., King, D. A., D'amato, G. n., Paik, D. T., Duan, A. n., Chang, A. n., Nagelberg, D. n., Sharma, B. n., Jeong, Y. n., Diehn, M. n., Wu, J. C., Morrison, et al
  2018; 9 (1): 368

- **Single-cell analysis of early progenitor cells that build coronary arteries.** *Nature*

Su, T. n., Stanley, G. n., Sinha, R. n., D'Amato, G. n., Das, S. n., Rhee, S. n., Chang, A. H., Poduri, A. n., Raftrey, B. n., Dinh, T. T., Roper, W. A., Li, G. n., Quinn, et al

2018

- **DACH1 stimulates shear stress-guided endothelial cell migration and coronary artery growth through the CXCL12-CXCR4 signaling axis** *GENES & DEVELOPMENT*
  Chang, A. H., Raftrey, B. C., D'Amato, G., Surya, V. N., Poduri, A., Chen, H. I., Goldstone, A. B., Woo, J., Fuller, G. G., Dunn, A. R., Red-Horse, K.
  2017; 31 (13): 1308–24
- **Coronary Artery Development: Progenitor Cells and Differentiation Pathways.** *Annual review of physiology*
  Sharma, B., Chang, A., Red-Horse, K.
  2017; 79: 1-19
- **Cellular plasticity in cardiovascular development and disease.** *Developmental dynamics*
  Das, S., Red-Horse, K.
  2017
- **Alternative Progenitor Cells Compensate to Rebuild the Coronary Vasculature in Elabela- and Apj-Deficient Hearts.** *Developmental cell*
  Sharma, B. n., Ho, L. n., Ford, G. H., Chen, H. I., Goldstone, A. B., Woo, Y. J., Quertermous, T. n., Reversade, B. n., Red-Horse, K. n.
  2017
- **Endothelial cells respond to the direction of mechanical stimuli through SMAD signaling to regulate coronary artery size.** *Development (Cambridge, England)*
  Poduri, A. n., Chang, A. H., Raftrey, B. n., Rhee, S. n., Van, M. n., Red-Horse, K. n.
  2017; 144 (18): 3241–52
- **Endothelial APLNR regulates tissue fatty acid uptake and is essential for apelin's glucose-lowering effects.** *Science translational medicine*
  Hwangbo, C. n., Wu, J. n., Papangeli, I. n., Adachi, T. n., Sharma, B. n., Park, S. n., Zhao, L. n., Ju, H. n., Go, G. W., Cui, G. n., Inayathullah, M. n., Job, J. K., Rajadas, et al
  2017; 9 (407)
- **MicroRNA 139-5p coordinates APLNR-CXCR4 crosstalk during vascular maturation** *NATURE COMMUNICATIONS*
  Papangeli, I., Kim, J., Maier, I., Park, S., Lee, A., Kang, Y., Tanaka, K., Khan, O. F., Ju, H., Kojima, Y., Red-Horse, K., Anderson, D. G., Siekmann, et al
  2016; 7
- **Pericytes are progenitors for coronary artery smooth muscle.** *eLife*
  Volz, K. S., Jacobs, A. H., Chen, H. I., Poduri, A., McKay, A. S., Riordan, D. P., Kofler, N., Kitajewski, J., Weissman, I., Red-Horse, K.
  2015; 4
- **Genetic targeting of sprouting angiogenesis using Apln-CreER.** *Nature communications*
  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, et al
  2015; 6: 6020-?
- **Genetic targeting of sprouting angiogenesis using Apln-CreER.** *Nature communications*
  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, et al
  2015; 6: 6020-?
- **The sinus venosus contributes to coronary vasculature through VEGFC-stimulated angiogenesis** *DEVELOPMENT*
  Chen, H. I., Sharma, B., Akerberg, B. N., Numi, H. J., Kivela, R., Saharinen, P., Aghajanian, H., McKay, A. S., Bogard, P. E., Chang, A. H., Jacobs, A. H., Epstein, J. A., Stankunas, et al
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- **The sinus venosus contributes to coronary vasculature through VEGFC-stimulated angiogenesis.** *Development*
  Chen, H. I., Sharma, B., Akerberg, B. N., Numi, H. J., Kivelä, R., Saharinen, P., Aghajanian, H., McKay, A. S., Bogard, P. E., Chang, A. H., Jacobs, A. H., Epstein, J. A., Stankunas, et al
  2014; 141 (23): 4500-4512
- **Oxygen regulates human cytotrophoblast migration by controlling chemokine and receptor expression** *PLACENTA*
  Schanz, A., Red-Horse, K., Hess, A. P., Baston-Buest, D. M., Heiss, C., Kruessel, J. S.
  2014; 35 (12): 1089-1094

- **VEGF-C and aortic cardiomyocytes guide coronary artery stem development** *JOURNAL OF CLINICAL INVESTIGATION*
  Chen, H. I., Poduri, A., Numi, H., Kivela, R., Saharinen, P., McKay, A. S., Raftrey, B., Churko, J., Tian, X., Zhou, B., Wu, J. C., Alitalo, K., Red-Horse, et al
  2014; 124 (11): 4899-4914

- **Developmental Heterogeneity of Cardiac Fibroblasts Does Not Predict Pathological Proliferation and Activation** *CIRCULATION RESEARCH*
  Ali, S. R., Ranjbarvaziri, S., Talkhabi, M., Zhao, P., Subat, A., Hojjat, A., Kamran, P., Mueller, A. M., Volz, K. S., Tang, Z., Red-Horse, K., Ardehali, R.
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- **Developmental heterogeneity of cardiac fibroblasts does not predict pathological proliferation and activation.** *Circulation research*
  Ali, S. R., Ranjbarvaziri, S., Talkhabi, M., Zhao, P., Subat, A., Hojjat, A., Kamran, P., Müller, A. M., Volz, K. S., Tang, Z., Red-Horse, K., Ardehali, R.
  2014; 115 (7): 625-635

- **Human induced pluripotent stem cell-derived cardiomyocytes as an in vitro model for coxsackievirus b3-induced myocarditis and antiviral drug screening platform.** *Circulation research*
  Sharma, A., Marceau, C., Hamaguchi, R., Burridge, P. W., Rajarajan, K., Churko, J. M., Wu, H., Sallam, K. I., Matsa, E., Sturzu, A. C., Che, Y., Ebert, A., Diecke, et al
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- **Human induced pluripotent stem cell-derived cardiomyocytes as an in vitro model for coxsackievirus B3-induced myocarditis and antiviral drug screening platform.** *Circulation research*
  Sharma, A., Marceau, C., Hamaguchi, R., Burridge, P. W., Rajarajan, K., Churko, J. M., Wu, H., Sallam, K. I., Matsa, E., Sturzu, A. C., Che, Y., Ebert, A., Diecke, et al
  2014; 115 (6): 556-566

- **Exploring the world of human development and reproduction** *INTERNATIONAL JOURNAL OF DEVELOPMENTAL BIOLOGY*
  Red-Horse, K., Drake, P. M., Fisher, S.
  2014; 58 (2-4): 87-93

- **Subepicardial endothelial cells invade the embryonic ventricle wall to form coronary arteries** *CELL RESEARCH*
  Tian, X., Hu, T., Zhang, H., He, L., Huang, X., Liu, Q., Yu, W., He, L., Yang, Z., Zhang, Z., Zhong, T. P., Yang, X., Yang, et al
  2013; 23 (9): 1075-1090

- **Radial Construction of an Arterial Wall** *DEVELOPMENTAL CELL*
  Greif, D. M., Kumar, M., Lighthouse, J. K., Hum, J., An, A., Ding, L., Red-Horse, K., Espinoza, F. H., Olson, L., Offermanns, S., Krasnow, M. A.
  2012; 23 (3): 482-493

- **Coronary arteries form by developmental reprogramming of venous cells** *NATURE*
  Red-Horse, K., Ueno, H., Weissman, I. L., Krasnow, M. A.
  2010; 464 (7288): 549-U100

- **Lymphatic vessel dynamics in the uterine wall** *PLACENTA*
  Red-Horse, K.
  2008; 29: S55-S59