Stanford

Lay Teng Ang

Assistant Professor of Urology

CONTACT INFORMATION

- **Administrative Contact**

  Valerie Park - Administrative Associate

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Bio

BIO

As a stem cell biologist, I aim to understand the mechanisms through which stem cells differentiate into progressively specialized cell types and to harness this knowledge to artificially generate pure populations of desired cell types from stem cells. My work over the past ten years has centered on pluripotent stem cells (PSCs, which include embryonic and pluripotent stem cells), which can generate any of the hundreds of diverse cell types in the body. However, it has been notoriously challenging to guide PSCs to differentiate into a pure population of a given cell type. Current differentiation strategies typically generate heterogeneous cell populations unsuitable for basic research or clinical applications. To address this challenge, I mapped the cascade of branching lineage choices through which PSCs differentiate into various endodermal and mesodermal cell types. I then developed effective methods to differentiate PSCs into specific lineages by providing the extracellular signal(s) that specify a given lineage while inhibiting the signals that induce the alternate fate(s), enabling the generation of highly-pure human heart and bone (Loh & Chen et al., 2016; Cell) and liver (Loh & Ang et al., 2014; Cell Stem Cell) from PSCs. My laboratory currently focuses on differentiating human PSCs into liver progenitors (Ang et al., 2018; Cell Reports) and blood vessel cells (Ang et al., 2022; Cell).

I earned my Ph.D. jointly from the University of Cambridge and A*STAR and was subsequently appointed as a Research Fellow and, later, a Senior Research Fellow at the Genome Institute of Singapore. I then moved my laboratory to Stanford University as a Siebel Investigator and Instructor at the Stanford Institute for Stem Cell Biology & Regenerative Medicine. In 2024, I am jointly appointed in the Stanford Department of Urology and Stem Cell Institute as an Assistant Professor.

I am an Additional Ventures Catalyst to Independence Fellow, Bladder Cancer Advocacy Network Career Development Awardee, Faculty Women’s Forum’s Inspiring Early Academic Career Award recipient, and Stanford-HBMC Recognizing Individuals for Support and Empowerment Award recipient. I have mentored over 31 trainees and currently mentor seven lab members, including two postdoctoral fellows, one research assistant, two CIRM interns, and one undergraduate intern.

ACADEMIC APPOINTMENTS

- Assistant Professor, Urology
- Member, Bio-X

- Member, Cardiovascular Institute
- Member, Institute for Stem Cell Biology and Regenerative Medicine

HONORS AND AWARDS

- Career Development Award, Bladder Cancer Advocacy Network (2025)
- Inspiring Early Academic Career Award, Stanford Faculty Women's Forum (2025)
- RISE (Recognizing Individuals for Support and Empowerment) Award, Stanford-HBMC (2025)
- Catalyst to Independence Award, Additional Ventures (2022-Current)
- Siebel Investigatorship, Stanford Institute for Stem Cell Biology & Regenerative Medicine (2018-Current)
- Outstanding Partnership Award, Genome Institute of Singapore (2015)
- A*STAR-Cambridge Scholarship and Fellowship, Agency for Science, Technology, and Research (2008-2015)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Steering Committee, Faculty Women’s Forum (FWF) (2025 - present)
- Member, American Heart Association (2022 - present)
- Member, Stanford Maternal & Child Health Research Institute (2018 - present)
- Member, Institute for Stem Cell Biology & Regenerative Medicine (2018 - present)
- Member, Stanford Cardiovascular Institute (2018 - present)

PROFESSIONAL EDUCATION

- B.A., National University of Singapore , Bioengineering (2007)
- Ph.D., University of Cambridge , Stem Cell Biology (2013)

Teaching

COURSES

2025-26

- Regenerative Medicine Seminar Series: STEMREM 250 (Aut, Win, Spr)
- Stem Cell Biology and Regenerative Medicine Journal Club: STEMREM 280 (Aut, Win, Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Man Kin Wong, Shaoyan Zhang

Postdoctoral Research Mentor

Man Kin Wong

Publications

PUBLICATIONS

- **Human vein-to-artery endothelial cell fate transition is driven by VEGF/ERK activation and PI3K inhibition.** *Development (Cambridge, England)*
  Amir Ugokwe, Z., Pyke, A. L., Trimm, E., Chakraborty, M., Fan, X., Lay Teng, A., Loh, K. M., Red-Horse, K.
  2026
- **Reprogramming Stars #28: Stem Cell-Based Approaches to Build Blood Vessels and Liver Tissue-An Interview with Dr. Lay Teng Ang.** *Cellular reprogramming*

Ang, L. T., Lopes, M., Pereira, C. F.
2026: 21524971261449506

- **Regulation of endothelial cell chromatin availability and transcription factor activity during arterial-venous specification.** *Development (Cambridge, England)*
  Chavkin, N. W., Nelson, E. A., Bradecamp, G., Aragon, J., Ang, L. T., Loh, K. M., Hirschi, K. K.
  2026

- **Marburg and Sudan viruses elicit divergent interferon responses and cytokine storm signaling in Egyptian rousette bat macrophages.** *Frontiers in immunology*
  Yordanova, I. A., Arnold, C. E., Corrales, N., Guito, J. C., Lander, A., Ang, L. T., Towner, J. S., Prescott, J. B.
  2025; 16: 1686343

- **A human arteriovenous differentiation roadmap reveals vein developmental mechanisms and vascular effects of viruses.** *bioRxiv : the preprint server for biology*
  Ang, L. T., Zheng, S. L., Liu, K. J., Masaltseva, A., Winters, J., von Creytz, I., Jha, S. K., Yin, Q., Qian, C., Xiong, X., Dailamy, A., Xi, E., Alcocer, et al
  2025

- **Chronic cerebral hypoperfusion induces venous dysfunction via EPAS1 regulation in mice.** *Nature communications*
  Wazny, V. K., Mahadevan, A., Nguyen, N., Wee, H., Vipin, A., Lam, T., Tay, K. Y., See, J. X., Sandhu, G., Leow, Y. J., D'Agostino, G., Graf, M., Sivakumar, et al
  2025; 16 (1): 6302

- **A microfluidic platform for anterior-posterior human endoderm patterning via countervailing morphogen gradients in vitro.** *iScience*
  Engel, L., Liu, K. J., Cui, K. W., de la Serna, E. L., Vachharajani, V. T., Dundes, C. E., Zheng, S. L., Begur, M., Loh, K. M., Ang, L. T., Dunn, A. R.
  2025; 28 (3): 111744

- **Protocol for the generation of HLF+ HOXA+ human hematopoietic progenitor cells from pluripotent stem cells.** *STAR protocols*
  Zheng, S. L., Fowler, J. L., Chen, J. Y., Li, C., Lin, E., Nguyen, A. T., Chen, A., Daley, G. Q., Ang, L. T., Loh, K. M.
  2025; 6 (1): 103592

- **Protocol for efficient generation of human artery and vein endothelial cells from pluripotent stem cells.** *STAR protocols*
  Loh, K. M., Zheng, S. L., Liu, K. J., Yin, Q., Amir-Ugokwe, Z. A., Jha, S. K., Qi, Y., Wazny, V. K., Nguyen, A. T., Chen, A., Njunkeng, F. M., Cheung, C., Spiekerkoetter, et al
  2024; 6 (1): 103494

- **Inflammatory risk contributes to post-COVID endothelial dysfunction through anti-ACKR1 autoantibody.** *Life science alliance*
  Lee, E., Nguyen, N., Young, B. E., Wee, H., Wazny, V., Lee, K. L., Tay, K. Y., Goh, L. L., Chioh, F. W., Law, M. C., Lee, I. R., Ang, L. T., Loh, et al
  2024; 7 (7)

- **Human macrophages infected with Egyptian Rousette bat-isolated Marburg virus display inter-individual susceptibility and antiviral responsiveness.** *Npj viruses*
  Yordanova, I. A., Lander, A., Wahlbrink, A., Towner, J. S., Albariño, C. G., Ang, L. T., Prescott, J. B.
  2024; 2 (1): 19

- **Lineage-tracing hematopoietic stem cell origins in vivo to efficiently make human HLF+ HOXA+ hematopoietic progenitors from pluripotent stem cells.** *Developmental cell*
  Fowler, J. L., Zheng, S. L., Nguyen, A., Chen, A., Xiong, X., Chai, T., Chen, J. Y., Karigane, D., Banuelos, A. M., Niizuma, K., Kayamori, K., Nishimura, T., Cromer, et al
  2024

- **Monolayer platform to generate and purify primordial germ-like cells in vitro provides insights into human germline specification.** *Nature communications*
  Vijayakumar, S., Sala, R., Kang, G., Chen, A., Pablo, M. A., Adebayo, A. I., Cipriano, A., Fowler, J. L., Gomes, D. L., Ang, L. T., Loh, K. M., Sebastiano, V.
  2023; 14 (1): 5690

- **Building human artery and vein endothelial cells from pluripotent stem cells, and enduring mysteries surrounding arteriovenous development.** *Seminars in cell & developmental biology*
  Loh, K. M., Ang, L. T.
  2023

- **Variation in CFHR3 determines susceptibility to meningococcal disease by controlling factor H concentrations** *AMERICAN JOURNAL OF HUMAN GENETICS*
  Kumar, V., Pouw, R. B., Autio, M., Sagmeister, M. G., Phua, Z., Borghini, L., Wright, V. J., Hoggart, C., Pan, B., Tan, A., Binder, A., Brouwer, M. C., Pinnock, et al
  2022; 109 (9): 1680-1691

- **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

- **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

- **Controversies surrounding the origin of hepatocytes in adult livers and the in vitro generation or propagation of hepatocytes.** *Cellular and molecular gastroenterology and hepatology*
  Qian Pek, N. M., Liu, K. J., Nichane, M. n., Ang, L. T.
  2020

- **Efficient Differentiation of Human Pluripotent Stem Cells into Liver Cells.** *Journal of visualized experiments : JoVE*
  Loh, K. M., Palaria, A., Ang, L. T.
  2019

- **A critical look: Challenges in differentiating human pluripotent stem cells into desired cell types and organoids.** *Wiley interdisciplinary reviews. Developmental biology*
  Fowler, J. L., Ang, L. T., Loh, K. M.
  2019: e368

- **A Roadmap for Human Liver Differentiation from Pluripotent Stem Cells** *CELL REPORTS*
  Ang, L., Tan, A., Autio, M. I., Goh, S., Choo, S., Lee, K., Tan, J., Pan, B., Lee, J., Lum, J., Lim, C., Yeo, I., Wong, et al
  2018; 22 (8): 2190–2205

- **Isolation and 3D expansion of multipotent Sox9+ mouse lung progenitors.** *Nature methods*
  Nichane, M., Javed, A., Sivakamasundari, V., Ganesan, M., Ang, L. T., Kraus, P., Lufkin, T., Loh, K. M., Lim, B.
  2017; 14 (12): 1205-1212

- **Evaluating the regenerative potential and functionality of human liver cells in mice** *DIFFERENTIATION*
  Tan, A., Loh, K. M., Ang, L.
  2017; 98: 25–34

- **An atlas of transcriptional, chromatin accessibility, and surface marker changes in human mesoderm development** *SCIENTIFIC DATA*
  Koh, P. W., Sinha, R., Barkal, A. A., Morganti, R. M., Chen, A., Weissman, I. L., Ang, L. T., Kundaje, A., Loh, K. M.
  2016; 3

- **Mapping the Pairwise Choices Leading from Pluripotency to Human Bone, Heart, and Other Mesoderm Cell Types** *CELL*
  Loh, K. M., Chen, A., Koh, P. W., Deng, T. Z., Sinha, R., Tsai, J. M., Barkal, A. A., Shen, K. Y., Jain, R., Morganti, R. M., Shyh-Chang, N., Fernhoff, N. B., George, et al
  2016; 166 (2): 451-467

- **Ex uno plures: molecular designs for embryonic pluripotency.** *Physiological reviews*
  Loh, K. M., Lim, B., Ang, L. T.
  2015; 95 (1): 245-295

- **Efficient endoderm induction from human pluripotent stem cells by logically directing signals controlling lineage bifurcations.** *Cell stem cell*
  Loh, K. M., Ang, L. T., Zhang, J., Kumar, V., Ang, J., Auyeong, J. Q., Lee, K. L., Choo, S. H., Lim, C. Y., Nichane, M., Tan, J., Noghabi, M. S., Azzola, et al
  2014; 14 (2): 237-252

- **Graded Nodal/Activin Signaling Titrates Conversion of Quantitative Phospho-Smad2 Levels into Qualitative Embryonic Stem Cell Fate Decisions** *PLOS GENETICS*
  Lee, K., Lim, S., Orlov, Y., Yit, L., Yang, H., Ang, L., Poellinger, L., Lim, B.
  2011; 7 (6): e1002130

- **Pluripotency factors regulate definitive endoderm specification through eomesodermin** *GENES & DEVELOPMENT*
  Teo, A., Arnold, S. J., Trotter, M. W. B., Brown, S., Ang, L., Chng, Z., Robertson, E. J., Dunn, N., Vallier, L.
  2011; 25 (3): 238-250

PRESENTATIONS

- Generating human artery ECs, vein ECs, and mesenchymal cells from pluripotent stem cells: lessons from developmental biology - Gordon Research Conference Angiogenesis
- Converting human pluripotent stem cells into highly-pure hepatocytes to study BSL4 viruses - Cold Spring Harbor Cell Fate Conversions
- Converting human pluripotent stem cells into highly-pure hepatocytes - Stanford Diabetes Research Center-NORC