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PERSONAL STATEMENT

I am a stem cell biologist interested in investigating epigenetic mechanisms influencing cell type specificity and cell plasticity. I use various high throughput experimental and computational approaches to examine how these fundamental cellular properties impact mammalian tissue development, disease, and regeneration. During my graduate training in the laboratory of Dr. Larry Jameson at Northwestern University, I developed a model system to differentiate embryonic stem (ES) cells into the steroidogenic lineage. Using this system, I studied how the steroidogenic master regulator SF-1 influences stepwise activation of chromatin and transcriptional networks essential for this differentiation. As a postdoctoral fellow in Dr. Ramesh Shivdasani's lab at the Dana-Farber Cancer Institute and Harvard Medical School, I investigated fundamental epigenetic control mechanisms in tissue development and homeostasis, particularly in the intestine using mouse genetic models. By studying multiple adult tissues, my work revealed a general principle by which Polycomb Repressive Complex (PRC2) achieves tissue-specific gene silencing in post-embryonic cells. In the intestinal epithelium, my work uncovered the chromatin basis of stem cell identity and captured dynamic switching of chromatin signatures during tissue regeneration. Extending on this work, I have further revealed developmental chromatin states that maintain tissue specific embryonic memory in adult cells and allow reactivation of fetal gene networks in adult tissue. Starting in 2020, I established my independent laboratory at the University of Southern California's Keck School of Medicine, where our group builds upon my expertise in epigenetics, cell plasticity, and computational biology. Going forward we aspire to decipher how chromatin organization during development establishes cell identity, how failure of epigenetic controls contributes to disease, and how epigenome engineering may aid efficient tissue regeneration.

EDUCATION AND PROFESSIONAL EXPERIENCE

B.E. Chemical Engineering, Shivaji University, Kolhapur, India	1996-2000
M.S. Biological Sciences, Illinois Institute of Technology	2001-2003
Research Associate, University of Illinois College of Medicine	2003-2005
Ph.D. Biological Sciences, Dr. Larry Jameson's laboratory, Northwestern University	2005-2011
Postdoctoral Research Fellow, Dr. Larry Jameson's laboratory, Northwestern University	2011-2012
Postdoctoral Research Fellow, Dr. Ramesh Shivdasani's laboratory, Dana Farber Cancer Institute, Harvard Medical School	2013-2017
Instructor in Medicine, Dana Farber Cancer Institute, Harvard Medical School	2017-2019
Assistant Professor of Stem Cell Biology and Regenerative Medicine	2020-present

PEER-REVIEWED ARTICLES

- 1) **Jadhav U**, Manieri E, Nalapareddy K, Madha S, Chakrabarti S, Wucherpfennig K, Barefoot M, Shivdasani RA. Replicational Dilution of H3K27me3 in Mammalian Cells and the Role of Poised Promoters. *Molecular Cell* 2020; 78(1):141-151.
- 2) Murata K, **Jadhav U**, Madha S, van Es J, Dean J, Cavazza A, Wucherpfennig K, Michor F, Clevers H, Shivdasani RA. Ascl2-Dependent Cell Dedifferentiation Drives Regeneration of Ablated Intestinal Stem Cells. *Cell Stem Cell* 2020; 26(3):377-390.

- 3) **Jadhav U**, Cavazza A, Banerjee KK, Xie H, O'Neill NK, Saenz-Vash V, Herbert Z, Madha S, Orkin SH, Zhai H, Shivdasani RA. Extensive recovery of embryonic enhancer and gene memory stored in hypomethylated enhancer DNA. **Molecular Cell** 2019; 74(3):542-554.
- 4) Banerjee KK, Saxena M, Kumar N, Chen L, Cavazza A, Toke NH, O'Neill NK, Madha S, **Jadhav U**, Verzi MP, Shivdasani RA. Enhancer, transcriptional, and cell fate plasticity precede intestinal determination during endoderm development. **Genes Dev** 2018; 32(21-22):1430-1442.
- 5) Malhotra N, Leyva-Castillo JM, **Jadhav U**, Barreiro O, Kam C, O'Neill NK, Meylan F, Chambon P, von Andrian UH, Siegel RM, Wang EC, Shivdasani RA, Geha RS. ROR α -expressing T regulatory cells restrain allergic skin inflammation. **Science Immunology** 2018; 2;3(21).
- 6) Saxena M, San Roman AK, O'Neill NK, Sulahian R, **Jadhav U**, Shivdasani RA. Transcription factor-dependent 'anti-repressive' mammalian enhancers exclude H3K27me3 from extended domains. **Genes Dev** 2018; 31:2391-2404.
- 7) **Jadhav U**, Saxena M, O'Neill NK, Saadatpour A, Yuan GC, Herbert Z, Murata K, Shivdasani RA. Dynamic reorganization of lineage-restricted open chromatin during dedifferentiation of specified intestinal crypt cells into stem cells. **Cell Stem Cell** 2017; 21:65-77.
- 8) **Jadhav U**, Nalapareddy K, Saxena M, O'Neill NK, Pinello L, Yuan GC, Orkin SH, Shivdasani RA. Acquired tissue-specific promoter bivalency is a basis for PRC2 necessity in adult cells. **Cell** 2016; 165:1389-1400.
- 9) Kim TH, Saadatpour A, Guo G, Saxena M, Cavazza A, Desai N, **Jadhav U**, Jiang L, Rivera MN, Orkin SH, Yuan GC, Shivdasani RA. Single-Cell Transcript Profiles Reveal Multilineage Priming in Early Progenitors Derived from Lgr5(+) Intestinal Stem Cells. **Cell Reports** 2016; 16:2053-60.
- 10) Sulahian R, Chen J, Arany Z, **Jadhav U**, Peng S, Rustgi AK, Bass AJ, Srivastava A, Hornick JL, Shivdasani RA. SOX15 governs transcription in human stratified epithelia and a subset of esophageal adenocarcinomas. **Cell Mol Gastroenterol Hepatol** 2015; 1:598-609.
- 11) **Jadhav U**, Jameson JL. Steroidogenic factor-1 (SF-1)-driven differentiation of murine embryonic stem (ES) cells into a gonadal lineage. **Endocrinology** 2011; 152:2870-82.
- 12) Ezhilarasan R, **Jadhav U**, Mohanam I, Rao JS, Gujrati M, Mohanam S. The hemopexin domain of MMP-9 inhibits angiogenesis and retards the growth of intracranial glioblastoma xenograft in nude mice. **Int J Cancer** 2009; 124:306-15.
- 13) **Jadhav U**, Ezhilarasan R, Vaughn SF, Berhow MA, Mohanam S. Dietary isothiocyanate iberin inhibits growth and induces apoptosis in human glioblastoma cells. **J Pharmacol Sci** 2007; 103:247-51.
- 14) **Jadhav U**, Ezhilarasan R, Vaughn SF, Berhow MA, Mohanam S. Iberin induces cell cycle arrest and apoptosis in human neuroblastoma cells. **Int J Mol Med** 2007; 19:353-61.
- 15) **Jadhav U**, Mohanam S. Response of neuroblastoma cells to ionizing radiation: modulation of *in vitro* invasiveness and angiogenesis of human microvascular endothelial cells. **Int J Oncol** 2006; 29:1525-31.
- 16) **Jadhav U**, Chigurupati S, Lakka SS, Mohanam S. Inhibition of matrix metalloproteinase-9 reduces *in vitro* invasion and angiogenesis in human microvascular endothelial cells. **Int J Oncol** 2004; 25:1407-14.
- 17) Joshi S, Dhopeshwarkar R, **Jadhav U**, Jadhav R, D'souza L, Dixit J. Continuous ethanol production by fermentation of waste banana peels using flocculating yeast. **Indian J Chem Technol** 2001; 8:153-156.

REVIEWS AND EDITORIALS

- 1) **Jadhav U**, Shivdasani RA. Dissecting cell lineages: from microscope to kaleidoscope. **Cell** 2019; 176(5):949-951 [Preview]
- 2) **Jadhav U**, Shivdasani RA. Natural selection, crypt fitness, and Pol III dependency in the intestine. **Cell Mol Gastroenterol Hepatol** 2016; 2:714-715. [Editorial]
- 3) **Jadhav U**, Harris RM, Jameson JL. Hypogonadotropic hypogonadism in subjects with DAX1 mutations. **Mol Cell Endocrinol** 2011, 346(1-2):65-73. [Review]

GRANTS AND FUNDING

Coordinate roles of histone H3K27me3 and DNA methylation in intestinal homeostasis and tumorigenesis, NIH Research Scientist Development Award (K01)

Role: PI 2018-2022

Role of histone H3K27me3 mark in intestinal homeostasis

National Research Service Awards (NRSA) for Individual Postdoctoral Fellows (F32)

Role: PI 2014-2017

HONORS AND AWARDS

Highest Standards of Academic Achievement Award for Master of Science in Biology
Illinois Institute of Technology, Chicago

2003

University Rank Holders List (6th among 180 Chemical Engineering graduates)
Shivaji University, India

2000

Best original work award for undergraduate research and thesis work
National Technical Symposium ChEMIT, Pune, India.

2000

PRESENTATIONS

- 1) University of Michigan, Ann Arbor (Invited speaker) 2017
- 2) Cold Spring Harbor Laboratory, Symposium on Stem Cell Biology 2017
- 3) Harvard Stem Cell Institute, Annual Retreat 2017
- 4) Harvard Digestive Diseases Center 2014
- 5) Illinois Symposium on Reproductive Sciences in Health and Disease 2010
- 6) Endocrinology seminars at Northwestern University 2010

PROFESSIONAL MEMBERSHIPS

International Society for Stem Cell Research

2017-present

Society for the Science of Reproduction

2008-2011

American Association for Cancer Research

2004-2005

TRAINEES

Rotation Students

Aidan Moriarty

Biomedical and Biological Sciences, 2020

Maile Werner

Biomedical and Biological Sciences, 2020

Tuo Shi

Biomedical and Biological Sciences, 2020

Former Trainees

Yun Jee Kang

M.D. Harvard-MIT Program in Health Sciences and Technology, 2017

Megan Barefoot

Visiting student, Harvard Stem Cell Institute, 2015