Sandeep Paul, Ph.D.

Los Angeles, CA
213 500 4659
paul.sandeep@gmail.com
www.linkedin.com/in/sandeeppaul1

Summary

Highly motivated and skilled cell, molecular, and developmental biologist with deep expertise in developing pre-clinical models, in vitro, and in vivo techniques to study tissue injury and regeneration, stem cell activation, cell fate specification, cell lineage, and plasticity resulting in 6 publications.

>4 years of therapeutic research for rare skeletal dysplasias resulting from TRPV4 mutations.

>12 years of expertise in project conceptualization, experimental planning, execution, data analysis, managing collaborative projects, technical writing, and supervising technicians and students.

>14 years of proficiency in microscopy including brightfield, fluorescent, confocal, spinning disc, and 2-photon microscopy, as well as live imaging and image processing.

> 12 years of histology experience including all aspects of tissue processing (FFPE/cryo-embedded/fresh frozen) and sectioning, of normal and pathological human, mouse, and zebrafish tissues and staining with H&E and special stains such as trichrome and Pentachrome stains.

>1.5 years of experience working in a fast-paced, multi-tasking environment, working on multiple priorities simultaneously at a biotech startup developing and standardizing protocols for spatial transcriptomics.

Professional Experience

Scientist, Spatial Genomics, Inc. **Jan. 2022 – Aug. 2023**
Pasadena, California

- Established spatial transcriptomics assays on various human and mouse tissues including the pancreas, thyroid, cerebellar organoids, and various cancers (human) in fresh frozen, fixed frozen, and FFPE samples, establishing academic-industrial partnerships and commercial instrument launch.
- Collaborated with mechanical engineers, software developers, and bioinformaticians on developing the Spatial Genomics instrument “Gene PS”.
- Established a histology platform by purchasing and installing equipment, developing SOPs, and training team members.

Project Scientist, Human Genetics **Nov. 2017 - June 2021**
University of California Los Angeles

- Worked on developing therapies for skeletal dysplasia resulting from mutations in Ca^{++} channel TRPV4 by collaborating with pharmacologists at UCLA.
- Generated stable transgenic cell lines expressing equimolar amounts of WT: mutant TRPV4 Ca^{++} channel sub-units, along with gCaMP Ca^{++} reporter modulators.
- Established an HTS Ca^{++} flux assay in a collaborative effort.
- Utilized CRISPR-Cas9 for single-base editing in zebrafish.
- Validated single-cell RNA sequencing with FISH in mammalian growth plate.

Postdoctoral Fellow, Regenerative Biology **June 2010 – Jan. 2017**
University of Southern California, Los Angeles

- Identified an evolutionarily conserved mechanism of Hedgehog signaling driving periosteal stem cells to trans-differentiate into a hybrid osteochondral state, forming cartilage callus responsible for bone regeneration.
- Discovered in vivo reprogramming of terminally differentiated hypertrophic chondrocytes via partial dedifferentiation followed by lineage switch to cell types constituting endochondral bone.
- Established a novel cartilage regeneration model using genetics, histology, microscopy, and gene expression analysis to identify stem cell populations and repair mechanisms.
- Formed cross-functional collaborations with clinicians and geneticists, securing multiple grants.
- Wrote manuscripts and grants and contributed to several NIH grants from the lab.
- Supervised undergrad and graduate students, and technicians.

Scientific Researcher, Muscle Regeneration **Nov. 2003 – Nov. 2009**
Karlsruhe Institute of Technology, Karlsruhe, Germany

- Developed a zebrafish skeletal muscle regeneration model and used microarray analysis to identify *xirp1* as a modulator of muscle repair resulting in a peer-reviewed publication.
- Performed ENU-induced mutagenesis screen and identified mutants with defective musculature; performed in-depth characterization of one such mutant.

Education

Ruperto Carola University, Heidelberg, Germany **June 2009**

Ph.D. Dissertation: “Developing a zebrafish model of muscle regeneration.”

Davi Ahilya University, Indore, India

M.Sc. Thesis: "Generating a genetic recombinant of rp298-GAL4 and *Notch*^{ts} in Drosophila" **July 2001**

Skills

Fwd & Rev Genetics	Spatial Transcriptomics	Small animal handling
Loss and gain of function	NGS Sample Preparation	Survival Surgery
Conditional KO & KD	Histology (FF & FFPE)	Microdissection
Generating transgenic cells/ animals	H&E, Trichrome staining	Confocal Microscopy
Genetic Lineage Tracing (Cre/Lox)	IHC/IF & ISH	Live Imaging
Molecular Biology & cloning	smFISH/RNAscope	Image Processing
Genome editing	Bio-informatics	Ca^{++} flux Assay

Selected Publications

1. Giovannone*, D., **Paul, S.***, Schindler, S., Arata, C., Farmer, D.T., Patel, P., Smeeton, J., Crump, J.G., 2019. Programmed conversion of hypertrophic chondrocytes into osteoblasts and marrow adipocytes within zebrafish bones. **Elife** 8. https://doi.org/10.7554/eLife.42736

2. **Paul, S.**, Crump, J.G., 2016. Lessons on skeletal cell plasticity from studying jawbone regeneration in zebrafish. **Bonekey** Rep 5, 853. https://doi.org/10.1038/bonekey.2016.81

3. Askary, A.*, Smeeton, J.*, **Paul, S.**, Schindler, S., Braasch, I., Ellis, N.A., Postlethwait, J., Miller, C.T., Crump, J.G., 2016. Ancient origin of lubricated joints in bony vertebrates. **Elife** 5. https://doi.org/10.7554/eLife.16415

4. **Paul, S.***, Schindler, S.*, Giovannone, D., de Millo Terrazzani, A., Mariani, F.V., Crump, J.G., 2016. Ihha induces hybrid cartilage-bone cells during zebrafish jawbone regeneration. **Development** 143, 2066–2076. https://doi.org/10.1242/dev.131292

5. Askary, A., Mork, L., **Paul, S.**, He, X., Izuhara, A.K., Gopalakrishnan, S., Ichida, J.K., McMahon, A.P., Dabizljevic, S., Dale, R., Mariani, F.V., Crump, J.G., 2015. Iroquois Proteins Promote Skeletal Joint Formation by Maintaining Chondrocytes in an Immature State. **Dev Cell** 35, 358–365. https://doi.org/10.1016/j.devcel.2015.10.004

6. Otten, C., van der Ven, P.F., Lewrenz, I., **Paul, S.**, Steinhagen, A., Busch-Nentwich, E., Eichhorst, J., Wiesner, B., Stemple, D., Strahle, U., Furst, D.O., Abdelilah-Seyfried, S., 2012. Xirp proteins mark injured skeletal muscle in zebrafish. **PLoS One** 7, e31041. https://doi.org/10.1371/journal.pone.0031041

* equal contribution