



## Dr Partha Pratim Das

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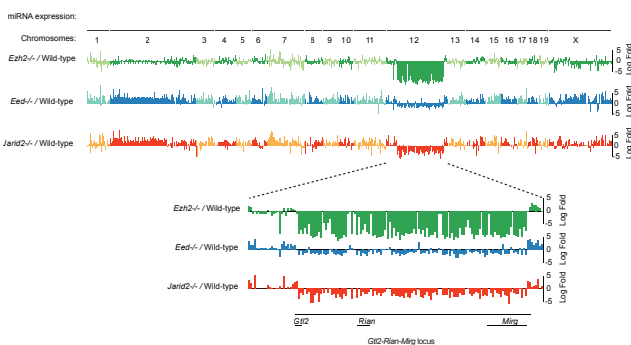
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Our laboratory research interest focuses on how transcription factors (TFs) and epigenetic regulators, along with small RNAs and long non-coding RNAs (lncRNAs) regulate gene expression programs in embryonic stem cells (ESCs), neural stem cells and differentiated cells under normal and pathological conditions, such as, cancers and neurodegenerative diseases. We use various experimental approaches and cutting edge techniques/technologies including – Cell and Molecular Biology, Biochemistry, CRISPRs, CRISPR screens (using sgRNAs to target all the genes in the genome, epigenetic regulators and regulatory elements), ChIPs, ChIP-sequencing, RNA-seq, WGS, ATAC-seq, RRBS, ChIA-PET, 3C, 4C, Hi-C, proteomics, bioinformatics and computational biology to understand the gene regulation under physiological conditions and diseases.

### Research Projects

1. Dissect the role of histone demethylases (HDMs) in transcriptional regulatory network in mouse ESCs
2. Investigating substrate specificity and redundancy of HDMs, and their role in controlling gene expression programs in mouse ESCs and development
3. Examining the functions of regulatory elements (Enhancers and Super-enhancers) in ESCs
4. Investigating the role of regulatory elements in human medulloblastoma, a paediatric brain cancer
5. Examining the role of genetic and epigenetic regulation in neural stem cells, brain development and neurodegenerative diseases



Differential expression of miRNAs (chromosome wise) from Ezh2<sup>-/-</sup>, Eed<sup>-/-</sup> and Jarid2<sup>-/-</sup> mESCs of PRC2 complex (small RNA-seq)

### Selected significant publications:

1. Xie H, Peng C, Huang J, Li BE, Kim W, Smith EC, Fujiwara Y, Qi J, Cheloni G, **Das PP**, Nguyen M, Li S, Bradner JE, Orkin SH. 2016. Chronic myelogenous leukemia initiating cells require Polycomb group protein EZH2. *Cancer Discovery* pii: CD-15-1439
2. **Das PP**, Hendrix DA, Apostolou E, Buchner AH, Canver MC, Beyaz S, Ljuboja D, Kuintzle R, Kim W, Karnik R, Shao Z, Xie H, Xu J, De Los Angeles A, Zhang Y, Choe J, Jun DL, Shen X, Gregory RI, Daley GQ, Meissner A, Kellis M, Hochedlinger K, Kim J, Orkin SH. 2015. PRC2 is required to maintain expression of the maternal *Gt2-Rian-Mirg* locus by preventing de novo DNA methylation in mouse embryonic stem cells. *Cell Reports* 12(9):1456-70.
3. **Das PP**, Shao Z, Beyaz S, Apostolou E, Pinello L, Los Angeles AD, O'Brien K, Atsma JM, Fujiwara Y, Nguyen M, Ljuboja D, Guo G, Woo A, Yuan GC, Onder T, Daley GQ, Hochedlinger K, Kim J, Orkin SH. 2014. Distinct and combinatorial functions of Jmjd2b/Kdm4b and Jmjd2c/Kdm4c in mouse embryonic stem cells identity. *Molecular Cell* 53(1): 32-48.
4. Guo G, Luc S, Marco E, Lin TW, Peng C, Kerényi MA, Beyaz S, Kim W, Xu J, **Das PP**, Neff T, Zou K, Yuan GC, Orkin SH. 2013. Mapping the hematopoietic hierarchy by single cell analysis of the cell surface repertoire. *Cell Stem Cell* 13(4): 492-505.
5. **Das PP**, Bagijn MP, Goldstein LD, Woolford JR, Lehrbach NJ, Sapetschnig A, Buhecha HR, Gilchrist MJ, Howe KL, Stark R, Matthews N, Berezikov E, Ketting RF, Tavare S, Miska EA. 2008. Piwi and piRNAs act upstream of an endogenous siRNA pathway to suppress Tc3 transposon mobility in the *Caenorhabditis elegans* germline. *Molecular Cell* 31(1): 79-90.