

## Investigating Regulatory Functions of SOX2 and OCT4 in Lineage-Specific Gene Expression During Early Fibroblast Reprogramming

**Ashlyn Christopher**

Student, CS Academy International, 241, VLB Engineering College Road, Kovaipudur, Coimbatore, Tamil Nadu, India

### Abstract

Induced pluripotent stem cells (iPSCs) hold immense potential in the fields of regenerative medicine, disease modeling, and cancer therapy. However, the molecular processes driving their reprogramming remain less understood. Transcription factors SOX2 and OCT4 act as central regulators of pluripotency, guiding fibroblasts through reprogramming. While most studies emphasize the fully reprogrammed iPSC state, little is known about how differentiation-associated genes behave during early transitional stages. To address this gap, this study analyzed microarray data from the GSE28868 dataset, focusing on SOX2 and OCT4 effects on GATA4, CD34, and PAX6 at 24, 48, and 72 hours post-induction.

Gene expression and fold changes were compared across timepoints and visualized using heatmaps and line graphs. With patterns suggesting the effects of SOX2 and OCT4 on differentiation markers and regulators being indirect. These findings affirm the indispensability of SOX2 and OCT4 in early reprogramming and highlight the need for further research to enhance safety in cancer and stem-cell-based procedures.

### Keywords

Genetics, Cellular Studies, Reprogramming, Pluripotency, Lineage Priming.

