

Gene expression during the first three days of human development



After fertilization of the egg cell, the embryonal development starts with its individual transcriptome activation accompanied by the degradation of maternal transcripts, to be followed later with new waves of transcriptional activation. In order to understand these critical steps of human preimplantation development, we have performed single-cell transcriptome sequencing of 348 cells, oocytes, zyogtes and single blastomeres from 4-cell and 8-cell embryos, obtained by informed consent as donations after in vitro fertilization treatments. After strict quality controls, data from 274 single cells were analyzed. Comparison of the timed series of human development identified the first transcribed genes, including previously uncharacterized transcripts, and allowed the identification of critical regulators of early genome activation. These data constitute a resource for understanding the earliest steps of human embryonal development and provide new genes of interest for pluripotent stem cell technologies.

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Date: Thursday November 27th, 2014 Time: 4PM Place: Medical Sciences Building Room 2173