Direct Reprogramming of Adult Human Fibroblasts to Functional Neurons under Defined Conditions.

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Public Summary:
Human induced pluripotent stem cells (hiPSCs) have been generated by reprogramming a number of different somatic cell types using a variety of approaches. In addition, direct reprogramming of mature cells from one lineage to another has emerged recently as an alternative strategy for generating cell types of interest. Here we show that a combination of a microRNA (miR-124) and two transcription factors (MYT1L and BRN2) is sufficient to directly reprogram postnatal and adult human primary dermal fibroblasts (mesoderm) to functional neurons (ectoderm) under precisely defined conditions. These human induced neurons (hiNs) exhibit typical neuronal morphology and marker gene expression, fire action potentials, and produce functional synapses between each other. Our findings have major implications for cell-replacement strategies in neurodegenerative diseases, disease modeling, and neural developmental studies.

Scientific Abstract:
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