

Small molecules enable cardiac reprogramming of mouse fibroblasts with a single factor, Oct4.

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Public Summary:

It was recently shown that mouse fibroblasts could be reprogrammed into cells of a cardiac fate by forced expression of multiple transcription factors and microRNAs. For ultimate application of such a reprogramming strategy for cell-based therapy or in vivo cardiac regeneration, reducing or eliminating the genetic manipulations by small molecules would be highly desirable. Here, we report the identification of a defined small-molecule cocktail that enables the highly efficient conversion of mouse fibroblasts into cardiac cells with only one transcription factor, Oct4, without any evidence of entrance into the pluripotent state. Small-molecule-induced cardiomyocytes spontaneously contract and exhibit a ventricular phenotype. Furthermore, these induced cardiomyocytes pass through a cardiac progenitor stage. This study lays the foundation for future pharmacological reprogramming approaches and provides a small-molecule condition for investigation of the mechanisms underlying the cardiac reprogramming process.

Scientific Abstract:

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