
1,5-Disubstituted benzimidazoles that direct cardiomyocyte differentiation from mouse embryonic stem cells.

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Public Summary:

Cardiomyopathy is the leading cause of death worldwide. Despite progress in medical treatments, heart transplantation is one of the only current options for those with infarcted heart muscle. Stem cell differentiation technology may afford cell-based therapeutics that may lead to the generation of new, healthy heart muscle cells from undifferentiated stem cells. Our approach is to use small molecules to stimulate stem cell differentiation. Herein, we describe a novel class of 1,5-disubstituted benzimidazoles that induce differentiation of stem cells into cardiac cells. We report on the evaluation in vitro for cardiomyocyte differentiation and describe structure-activity relationship results that led to molecules with drug-like properties. The results of this study show the promise of small molecules to direct stem cell lineage commitment, to probe signaling pathways and to develop compounds for the stimulation of stem cells to repair damaged heart tissue.

Scientific Abstract:

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