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High efficient differentiation of (embryonic) stem cells into cardiac myocytes: introduction of a new inducer

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Stem cell-derived cardiac myocytes have been transplanted in experimental settings to replace lost myocardial tissue, and this has been shown to improve myocardial function in animal experiments. Stem cell-derived cardiomyocytes in particular, either of embryonic or bone marrow cell origin, will be the main source of cells that will be used for transfer therapy for myocardial infarction in future. However, the efficiency of differentiation of (embryonic) stem cells into cardiomyocytes is so low that can not saturate the need for the cell transfer therapy currently. Therefore, getting enough cardiomyocytes for transplantation use is a key issue to be solved. In the present study several compounds were examined as inducers for cardiomyocyte differentiation from embryonic stem cells (ESC) and bone marrow cells (BMC) *in vitro*. Experiments were classified into three group: negative control (without reagents) group, positive (5′-Azacytidine) control group, and cardiomyogenin group. In control experiments there was only small part of BMC and ESC differentiated into cardiomyocytes (less 10% and 5%, respectivly); in 5′-Azacytidine positive control group, the differentiation ratio of cardiomyocytes was about 28% and 12 %, repectively; while, in cardiomyogenin group, the cardiomyocyte differentiation ratio was as high as about 96% in BMC and 70% in ESC, respectively. These results demonstrate that cardiomyogenin increases the differentiation ratio of cardiomyocyte remarkably, and it can be as a novel and efficient inducer for cardiomyocyte differentiation from both ES and BM cells.

Keywords: stem cell; differentiation; induction; cardiomyogenin

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