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hAFSC expressing a specific panel of stem cell markers give rise to fully differentiate cardiomyocytes

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Human amniotic fluid-derived stem cells (hAFSC) represent a novel class of multipotent stem cells sharing characteristics of both embryonic and adult stem cells. In fact, hAFSC proliferate rapidly, are able to differentiate into cells of all the three embryonic germ layers, but do not form teratoma. It has been already reported that hAFSC have a cardiac potential, but a high variability between hAFSC donors in differentiation efficiency has been described. Aim of this study was to phenotypically identify the hAFSC able to differentiate into mature cardiomyocytes. hAFSCs from 10 different donors were characterized for the immunophenotypic expression of stemness markers and then cultured in differentiatve conditions. hAFSC differed for both stemness markers expression and for differentiation efficiency. Only the hAFSC expressing specific stem cell antigens were able to differentiate into a homogeneous population of cells that highly express cardiac cytoskeletal proteins and the structural and functional sarcoplasmatic reticulum proteins. Our results demonstrate that only hAFSC showing a specific stem cell pattern phenotype can fully differentiate into myocytes giving rise to a homogenous population characterized by cardiac-specific molecular, structural, and functional properties.

Keywords

Human amniotic fluid-derived stem cells; stem cell pattern phenotyper; cardiac differentiation.