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Cardiomyocytes derived from human cardiopoietic amniotic fluids

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Human amniotic fluid (hAF) cells share characteristics of both embryonic and adult stem cells. They proliferate rapidly and can differentiate into cells of all embryonic germ layers but do not form teratomas. Embryoid-bodies obtained from hAF have cardiac differentiation potential, but terminal differentiation to cardiomyocytes (CMs) has not yet been described. Our purpose was to promote cardiac differentiation in hAF cells. Cells were exposed to inducing factors for up to 15 days. Only the subset of hAF cells expressing the multipotency markers SSEA4, OCT4 and CD90 (CardiopoieticAF cells) responded to the differentiation process by increasing the expression of the cardiac transcription factors Nkx2.5 and GATA4, sarcomeric proteins (cTnT, α -MHC, α -SA), Connexin43 and atrial and ventricular markers. Furthermore, up to 90% of differentiated cells were positive for the calcium pumps CACNA1C and SERCA2a, with approximately 30% of CardiopoieticAF-derived CM-like cells responding to caffeine or adrenergic stimulation. Some spontaneous beating foci were also observed. In conclusion, we demonstrated that CardiopoieticAF cells can differentiate into a morphologically homogenous population of CM-like cells, characterized by cardiac-specific molecular, structural, and functional properties, that are useful for the development of *in vitro* models of genetic cardiac disorders, for drug discovery and testing, and for the regenerative medicine.

Biography

Barbara Ghinassi is assistant professor in University of Chieti-Pescara in Italy and she has completed his PhD from University of Chieti-Pescara and her post doc from Mount Sinai School of Medicine in New York. She has been awarded with international grants and she has published 21 papers in reputed journals, most of them as first or senior author and has been serving as an editorial board member of impacted journals.

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