ABSTRACT

Heart is the first organ to develop, accompanied with complex signaling interaction during embryogenesis. Cellular mechanisms and mutations of specific genes related to various cardiovascular disorders have not been well studied. Stem cell research discloses a new avenue of cell based regeneration to repair cardiac infarction. The mechanism of cardiomyocyte differentiation from undifferentiated naïve cells is still not clear. Thus, this study is aimed towards deciphering the cardiogenic process using cardiomyocytes derived from human mesenchymal stem cells (MSCs) and understanding the role of Wnt inhibition in maintaining Wnt biphasic regulation during cardiac differentiation. Further, the role of Wnt in cancer stem cells (CSCs) were studied using CSCs derived from human glioma cell lines. The effect of Wnt antagonist, secreted frizzled related protein 4 (sFRP4), in self-renewal and chemosensitization of CSCs were studied. The downstream mechanism of sFRP4 and its role in modulating multiple pathways were also investigated. Hence, this research gives a glimpse of the role epigenetic mediators in cardiac differentiation and the regulation of this process by Wnt mediators which provides a valuable lead to cell-based therapy for cardiac disorders. Additionally, the effect of the Wnt antagonist sFRP4 in the chemosensitization of CSCs is also studied which paves the way for the for the development novel therapeutic strategies.

Key words: Epigenetic, Cardiac Differentiation, Wnt signaling, Wnt modulators and Glioblastoma