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The potential of the tongue in cardiomyocyte regeneration**Matthew El-Azzi**

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The human heart has traditionally been considered a terminally differentiated quiescent organ having minor regenerative potential. Since early development of the tongue occurs in close proximity to the primordial heart, the question thus arises; can the tongue be utilized to regenerate cardiomyocytes after insults such as myocardial infarctions? The muscles of the tongue originate from the first four brachial arches in the embryo, which includes derivation from cranial neural crest cells and occipital-somites, as well as a third input of cells from the primordial heart. Recent studies have demonstrated similarities in transcription factors involved in the commitment and differentiation of myocytes. Some of which, are presented below.

CSX/NKX2.5: Is a transcription factor thought to be the earliest marker for heart precursors; however it has also been shown to be present in early embryonic development of the tongue. It has been shown that in *nkx2.5* transgenic mice, half of the tongue and digastric muscle cells were derivatives of the *Nkx2.5* progenitors.

GATA4: GATA4 and *Nkx2.5* interact physically and synergistically to activate cardiac transcription, suggesting functional convergence of two critical cardiac pathways.

BMP & *Isl1*: BMPs and FGFs co-operate at the early developing stage to maintain the rapid enlargement of the tongue, by promoting proliferation and inhibiting differentiation.

TBX1: *Tbx1* is important in 1st pharyngeal arch specification and in normal development of the heart. The role of transcription factors such as *Tbx1* has been shown to assist in creating major regulatory nodes in transcription circuitry.

Increasingly *in vitro* studies are proving to be promising, however limitations still exist in *in vivo* findings and thus further study of TDSCs is necessary. The potential of the tongue for cardiomyocyte regeneration is indeed promising.

Biography

El-Azzi has completed his Doctor of Dental Medicine (DMD) degree from The University of Sydney, Australia. His interests lie in the links between dentistry and cardiology, namely the link between orofacial and cardiac muscle development and regeneration. He currently works in private practice with special interests in surgical and implant dentistry. He is also passionate about mission work in underprivileged communities, where he leads a team of dentists in providing aid to Philippines and Vanuatu, annually.

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