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Expression of Human Telomerase Reverse Transcriptase Associates With Cardiomyocyte Regeneration in Human Cardiomyopathy

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Although a post-mitotic paradigm has been challenged and cardiac plasticity is expanding, the magnitude of cardiac renewal and the underlying mechanism are not fully clear. We aimed to uncover the role of hTERT, key catalytic subunit of telomerase, in the regeneration of end-stage failing human hearts by morphological, morphometrical and molecular approaches. Our results described that: (1) Cellular hTERT was expressed in the dividing myocytes, determined by double-labeling of hTERT with mitosis-specific phosphorylation of histone H3. The number of hTERT-expressing myocytes correlated positively with the mitotic indices of cardiomyocytes in human cardiomyopathy (r square=0.47, p=0.0002). (2) hTERT expression correlated inversely with the incremental extent of cardiac fibrosis (r square=0.80, p=0.002). (3) Diminished cardiac hTERT correlated with the lower relative telomerase bioactivity (r square=0.72, p=0.0165) and the shorter telomere length (p=0.002). Our results suggest a link between hTERT expression and cardiomyocyte mitoses and substantiate the attenuated hTERT expression in cycling myocytes is fundamental to the detereioration of pathologic cardiac remodeling, which may underlie the loss of myocardial cellularity and functionality in human cardiomyopathy.