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Epigallocatechin gallate reverses cTnI low expression induced age related heart diastolic dysfunction through histone acetylation modification

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Cardiac diastolic dysfunction (CDD) is the most common form of cardiovascular disorders, especially in elderly people. Cardiac troponin I (ctni) plays a critical role in the regulation of cardiac function, especially diastolic function. Our previous studies showed that ctni low expression induced by histone acetylation modification might be one of the causes that result in diastolic dysfunction in aging hearts. This study was designed to investigate whether epigallocatechin-3-gallate (EGCG) would modify histone acetylation events to regulate ctni expression and then improve cardiac functions in aging mice. Our study shows that EGCG improved cardiac diastolic function of aged mice after 8 weeks treatment. Low expression of ctni in the aging hearts was reversed through EGCG treatment. EGCG inhibited the expression of histone deacetylase 1 (HDAC) and HDAC3, and the binding levels of HDAC1 in the proximal promoter of ctni. Acetylated lysine 9 on histone H3 (ach3k9) levels of ctni's promoter were increased through EGCG treatment. Additionally, EGCG resulted in an ascent of the binding levels of transcription factors GATA4 and Mef2c with ctni's promoter. Together, our data indicate that EGCG may improve cardiac diastolic function of aging mice through up-regulating ctni by histone acetylation modification. These findings provide new insights into histone aceytlation mechanisms of EGCG treatment that may contribute to the prevention of CDD in aging populations.

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