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# The two isomers of HDTIC compounds from Astragali Radix slow down telomere shortening rate via attenuating oxidative stress and increasing DNA repair ability in human fetal lung diploid fibroblast cells.

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## Abstract

4-Hydroxy-5-hydroxymethyl-[1,3]dioxolan-2,6'-spirane-5',6',7',8'-tetrahydro-indolizine-3'-carbaldehyde (HDTIC)-1 and HDTIC-2 are two isomers extracted from Astragalus membranaceus (Fisch) Bunge Var. mongholicus (Bge) Hsiao. Our previous study had demonstrated that they could extend the lifespan of human fetal lung diploid fibroblasts (2BS). To investigate the mechanisms of the HDTIC-induced delay of replicative senescence, in this study, we assessed the effects of these two compounds on telomere shortening rate and DNA repair ability in 2BS cells. The telomere shortening rates of the cells cultured with HDTIC-1 or HDTIC-2 were 31.5 and 41.1 bp with each division, respectively, which were much less than that of the control cells (71.1 bp/PD). We also found that 2BS cells pretreated with HDTIC-1 or HDTIC-2 had a significant reduction in DNA damage after exposure to 200 microM H(2)O(2) for 5 min. Moreover, the 100 microM H(2)O(2)-induced DNA damage was significantly repaired after the damaged cells were continually cultured with HDTIC for 1 h. These results suggest that HDTIC compounds slow down the telomere shortening rate of 2BS cells, which is mainly due to the biological properties of the compounds including the reduction of DNA damage and the improvement of DNA repair ability. In addition, the slow down of telomere shortening rate, the reduction of DNA damage, and the improvement of DNA repair ability induced by HDTIC may be responsible for their delay of replicative senescence.