

Telomere Erosion-Induced Mitotic Catastrophe in Chinese Hamster Don Cells

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Telomere erosion is the earliest chromatin modification in cells entering the apoptotic regime. The purpose of this investigation was to demonstrate that loss of telomeric DNA was involved in the induction of mitotic catastrophe and cell death of Chinese hamster Don cells that were grown continuously without subculturing for several days. Don, which is a diploid male Chinese hamster-derived cell line, was grown without sub-culturing for one to four days at 37°C and then harvested for cytological preparations. Our results indicate that: (1) the frequency of metaphases with structural chromosome anomalies was significantly increased ($P < 0.01$) in aged cells (three days old) as compared to the control (one day old); (2) the mitotic index was considerably decreased in aged cell cultures (0.13%) as compared to the control (3.64%); (3) aged cells showed a higher incidence (7.6%) of endoreduplicated metaphases at 72 h as compared to control cells (4.9%); (4) four-day-old Don cells showed significantly reduced telomeric signals in interphase nuclei as compared to control cells, and; (5) more apoptotic cells were present in four-day-old cultured cells (40.6%) than in one day old control cells (4.3%). These results and indicate that telomere reduction is the root cause of mitotic catastrophe and that cell death in aged Don cells occurs due the loss of telomeric signals.

Key Words) *telomere erosion, mitotic catastrophe, Don cells, apoptosis, fluorescence in situ hybridization*