Heteroplasmic mutation of mitochondrial DNA D-loop and 4977-bp deletion in human cancer cells during mitochondrial DNA depletion

李良明

Lee Hsin-Chen;Hsu Li-Sung;Yin Pen-Hui;Lee Liang-Ming;Chi Chin-Wen

摘要

Abstract

Somatic mutations in mitochondrial DNA (mtDNA) have been demonstrated in various human cancers. Many cancers have high frequently of mtDNA with homoplasmic point mutations, and carry less frequently of mtDNA with large-scale deletions as compared with corresponding non-cancerous tissue. Moreover, most cancers harbor a decreased copy number of mtDNA than their corresponding non-cancerous tissue. However, it is unclear whether the process of decreasing in mtDNA content would be involved in an increase in the heteroplasmic level of somatic mtDNA point mutation, and/or involved in a decrease in the proportion of mtDNA with large-scale deletion in cancer cells. In this study, we provided evidence that the heteroplasmic levels of variations in cytidine number in np 303-309 poly C tract of mtDNA in three colon cancer cells were not changed during an ethidium bromide-induced mtDNA depleting process. In the mtDNA depleting process, the proportions of mtDNA with 4977-bp deletion in cybrid cells were not significantly altered. These results suggest that the decreasing process of mtDNA copy number per se may neither contribute to the shift of homoplasmic/heteroplasmic state of point mutation in mtDNA nor to the decrease in proportion of mtDNA with large-scale deletions in cancer cells. Mitochondrial genome instability and reduced mtDNA copy number may independently occur in human cancer.