Biomarkers of DNA damage in patients with end-stage renal disease: mitochondrial DNA mutation in hair follicle.

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Abstract

BACKGROUND: DNA damage was noted in patients with end-stage renal disease (ESRD). Mitochondrial DNA (mtDNA) mutations have been proposed as a genomic biomarker in the process of human ageing, degenerative diseases and carcinogenesis. METHODS: Polymerase chain reaction (PCR) techniques were applied to detect mtDNA deletions in hair follicles, an appendage of skin, from 162 patients with ESRD. RESULTS: The incidences of the 4977 bp deletion of mtDNA in hair follicles were found to increase with age in normal control and ESRD patients. As compared with normal subjects, ESRD patients had 3.5, 2.3, 2.7, 2.3 and 1.4 times higher incidences of the 4977 bp deletion of mtDNA in the age groups of 20-30, 31-40, 41-50, 51-60 and 61-70 years, respectively. Moreover, the difference in the proportion of mtDNA with the 4977 bp deletion was statistically significant between ESRD patients and normal subjects >50 years of age. CONCLUSION: We suggest that the 4977 bp deletion of mtDNA in hair follicles may serve as one of the tissue biomarkers of genetic instability of the mitochondrial genome in ESRD patients.