

Mutacje mitochondrialnego DNA w rozwoju nowotworów głowy i szyi

Mitochondrial DNA mutations in the pathogenesis in the head and neck squamous cell carcinoma

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Summary

Data reported until today suggested a pivotal role of nuclear DNA mutations in the process of carcinogenesis. Recently more and more authors claim that disruption of mitochondrial DNA should not be excluded from this analysis. mtDNA have been reported in many cancers of head and neck region. Mitochondrial D-loop has been proven to be mutation hot - spot with majority of mutations in the positions 303 to 315 of poly-C tract. Data show that 37% of patients with pre-malignant lesions and 62% with carcinoma in situ are positive for mtDNA mutations. Moreover mutations in genes encoding ND2, ND5, COIII, CYTB, and ATP6 were observed in 17% of patients. Mutations in mitochondrial rRNA genes occurred in similar number of cases. Neoplastic cells undifferentiation and disease progression is accompanied by multiplication of mtDNA number and increased mtDNA content. mtDNA content correlates with the stage of the disease. mtDNA mutations facilitate cell proliferation and inhibit apoptosis by increasing the production of reactive oxygen species (ROS). Cells harbouring mutated mtDNA have increased proliferation rate, as increased ROS concentration may act as an endogenous growth factor.