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Parkin isoforms expression in lung adenocarcinoma

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PARK2, also known as parkin, is a gene mutated in autosomal recessive juvenile parkinsonism and it has been shown to exhibit E3 ubiquitin ligase activity. However it seems to fulfill also a wide spectrum of protective functions. Recent studies have demonstrated that parkin is an important regulator of process that maintain mitochondrial quality and it is also implicated in proteasomal degradation of toxic substrates. This gene has been also shown to be genetically altered and/or aberrantly expressed in a wide variety of human cancers including lung cancer (Cesari et al., 2003; Veeriah S. et al., 2010). Although many alternatively spliced isoforms have been identified, until now studies have been focused on the full-length isoform (D'Agata and Cavallaro, 2004). To characterize the role of parkin isoforms in lung tumorigenesis we analyzed their expression pattern in human lung adenocarcinomas. These data were correlated to their expression pattern either in human lung epithelial carcinoma (A549) or in human normal bronchial epithelial (BEAS-2B) cell lines. Western blot and immunofluorescence analyses were performed by using two antibodies recognizing different domains of the full length protein.

Immunoblots showed that lung adenocarcinomas express parkin isoforms of 50, 37 and 20 kDa. Their expressions were significantly increased in A549 as compared to BEAS-2B, suggesting that parkin isoforms might be involved in cancer progression. In order to characterize some functions of these isoforms, both cell lines were cultured in complete medium or serum starved medium and treated with the proteasome inhibitor MG132 or with carbonyl cyanide 3- clorophenylhydrazone (CCCP), a uncoupling agent that dissipates the mitochondrial membrane. Data obtained revealed that each treatment affects pattern expression of parkin isoforms. These results suggest that some parkin isoforms might be molecular markers of lung adenocarcinoma.

References

[1] Cesari et al. (2003) Parkin, a gene implicated in autosomal recessive juvenile parkinsonism, is candidate tumor suppressor gene on chromosome 6q25-q27. PNAS 100(10): 5956-59-61.
[2] Veeriah S. et al. (2010) Somatic mutations of the Parkinson's disease-associated gene PARK2 in glioblastoma and other human malignancies. Nat Genet. 42(1):77-82.
[3] D'Agata and Cavallaro (2004) Parkin transcript variants in rat and human mrain. Neurochem Res 29: 1715-1724.

Keywords
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