

The Mechanism of Protein Kinase C in relation to ATPase family AAA-domain Containing Protein 3A in Head and Neck Squamous Cell Carcinoma

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Abstract

One of the most important challenges of cancer treatment is inhibition of the metastasis of head and neck squamous cell carcinoma (HNSCC). HNSCC is a form of squamous cell carcinoma (SCC) that is localized in the mucosal linings of the nose, mouth, and throat areas. HNSCC has a mortality rate of 350,000 deaths per year and approximately 630,000 new patients are diagnosed annually. The ATPase family AAA-domain containing protein 3A (ATAD3A) is a nuclear-encoded mitochondrial enzyme that has been identified to be highly expressed and associated with poor survival in HNSCC patients. ATAD3A is involved in various cellular processes including mitochondrial dynamics, cell growth, cholesterol metabolism, and communication between endoplasmic reticulum and mitochondria. Although ATAD3A has been shown to act as a crucial regulator promoting head and neck cancer cell invasion and metastasis, the precise mechanism by which ATAD3A is upregulated in HNSCC cells is largely unknown. In this study, we elucidate for the first time that Protein Kinase C (PKC) enhances tumor-promoting activity in HNSCC cells through regulating ATAD3A expression levels. The study uncovers the biological effects of PKC regulation in HNSCC cells, providing a strong rational basis for the design of novel therapeutic regimens by inhibition of ATAD3A in order to eventually increase cure rate in patients with HNSCC.

Key words: ATAD3A, PKC, HNSCC, gene regulation, metastasis