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The actin cytoskeleton and the nuclear translocation of -catenin in human oesophageal squamous carcinoma cell lines

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Abstract

In addition to its crucial role in cell adhesion, β-catenin is also known to augment gene expression by forming a complex with lymphoid enhancer factor/T-cell factor in the nucleus. Unregulated β-catenin expression and/or its increased nuclear presence can lead to abnormal cell proliferation, tumour invasion and metastasis. Pertinent is the fact that the actin cytoskeleton is central to the translocation of several nuclear proteins. This study investigated whether the actin cytoskeleton influences the nuclear translocation of β-catenin in human oesophageal squamous cell carcinoma (HOSCC), a metastatic disease of common occurrence in South Africa. Disruption of the actin cytoskeleton of five moderately differentiated HOSCC cell lines, with cytochalasin D (cytoD), showed that the nuclear β-catenin level was unaltered in SNO, WHCO1 and WHCO5, but decreased in WHCO3 and WHCO6. CytoD treatment did not affect the cytoplasmic/membrane β-catenin level in these cell lines. Further examination of the possible association between the actin cytoskeleton and nuclear β-catenin translocation, required the design and stable transfection, of a vector containing full-length human β-catenin cDNA into one of the HOSCC lines. Stimulation of exogenous β-catenin expression in transfected WHCO1 cells did not increase cellular β-catenin level, nor did the stimulation of endogenous β-catenin expression with DMSO. In most cases (SNO, WHCO1 and WHCO5) the nuclear distribution of β-catenin in HOSCC is independent of a functional actin cytoskeleton, nonetheless there are some exceptions (WHCO3 and WHCO6). The observed variation within the HOSCC lines is possibly due to specific underlying event/s particular to the cell line. The stable level of β-catenin expression could be a consequence of regulatory pathways in WHCO1 compensating for the induced imbalance of β-catenin expression.