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RBBP6 isoform 3 plays a role in cell cycle regulation and carcinogenesis in cervical cancer

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Cervical cancer is rated the second most common malignant tumor globally, and is etiologically highly linked to the human papillomavirus. South Africa is reported to have the highest incidence of cervical cancer in the world. It is the most common cancer in Black (31.2%) and Colored (22.9%) South African women. The DWNN domain is a novel ubiquitin-like cell death-related protein, that only makes up RBBP6 isoform 3 and RBBP6 isoform 1 and 2 also contain a zinc finger, RING finger, Rb-binding domain, p53- binding domain and Nuclear Localization Signal (NLS) downstream of the DWNN domain. This research was aimed at determining a consensus of gene expression pattern of the RBBP6 in cervical cancer both at mRNA and protein levels using ISH/FISH; ICC, RT-PCR and Western blotting. It was also of interest to determine the involvement of RBBP6 in cell cycle regulation and apoptosis. In this study, there was no detectable localization of the RBBP6 mRNAs in the tumor islands. The normal tissue showed few labeled cells. These results are in agreement with prior studies, which reported that cervix expresses low levels of RBBP6. In the cervical tumors, although tumor cells lacked RBBP6 mRNA, some cells in tissue located between the tumor islands were RBBP6 positive. It was found that cervical cancer cells (HeLa) do express the DWNN domain-containing RBBP6 gene products, at least at the mRNA level as demonstrated by FISH and RT-PCR. In this cell line RBBP6 exhibited both nuclear and cytoplasmic localization in mitotic cells (rearrangement of chromosomes as a marker for mitosis, with visible metaphase and anaphase) showing up-regulation of the RBBP6. Localization of DWNN-containing proteins in HeLa cells showed RBBP6 proteins *in situ* in HeLa cells and mitotic Hela cells at telophase showing increased lRBBP6 levels. RBBP6 isoform 3 was also shown to cause cell cycle arrest at G2/M and its diminished expression resulted in cell cycle progression. We have also shown that RBBP6 isoform 3 plays a role in cell cycle regulation and carcinogenesis in cervical cancer. These studies have shown that RBBP6 isoform 3 has great potential as a therapeutic target for cervical cancer biomarker and drug development.

Speaker Biography

Professor Zodwa Dlamini is the Deputy Vice Chancellor Research, Innovation & Engagements at Mangosuthu University of Technology and a Professor of Molecular and Functional Genomics. She was previously the Deputy Executive Dean at UNISA. She is also the current Vice-Chairperson of the South African Medical Research Council Board. She obtained her BSc and BSc.Hons. in Biochemistry from the University of the Western Cape, MSc from the University of Natal and PhD from the University of Natal. Her research interests include the "omics" technologies including the use of bioinformatics to provide unprecedented possibilities to identify the underlying molecular basis of cancer.

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