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The NUCKS – A novel tumor biomarker

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Abstract

Nuclear ubiquitous casein and cyclin-dependent kinases substrate (NUCKS) is a nuclear DNA binding protein occurring in almost all types of human cells, adult and fetal tissues. The *nucks* gene is located on human chromosome 1q32.1 and consists of six introns and seven exons. It has all the features of being a housekeeping gene. Although its biological function is still poorly understood, the structural similarities to the high-mobility group A (HMGA) proteins suggest that it may play a role in regulation of chromatin activity and its structure. The HMGA proteins modulate DNA structure altering transcription of several genes by either facilitating or impeding binding of transcription factors. The abundance of NUCKS in fast growing cells as well as the overexpression of *nucks* mRNA in ovarian carcinoma suggests that it might be involved in facilitating and maintaining activity of transcription of some genes during rapid proliferation and in cancer. The NUCKS was studied in detail using a variety biochemical and cell biological methods. These analyses however did not relate the occurrence of the protein to histological grade or with a particular cell type. Therefore we analyzed the occurrence of NUCKS in breast carcinoma. Using proteomic methods we demonstrated that NUCKS is highly overexpressed in carcinoma of no special type (previously, invasive ductal carcinoma). We have also observed high expression of NUCKS in different skin lesions, including squamous- and basal-cell carcinoma, keratoacanthoma and solar keratosis. Immunohistochemical analysis confirmed these findings and also revealed abundant expression of NUCKS. In another study we found that NUCKS is also overexpressed after oxidative stress induction, e.g. following in vitro photodynamic therapy. With the present report we would like to suggest the NUCKS as a new possible biomarker of tumor malignancy.