Cancer Biology and the Nuclear Envelope [Recent Advances May Elucidate Past Paradoxes /

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Monografía

"Nuclear envelope (NE) defects have been linked to cancer biology since the mid-1800s, but it was not until the last few years that we have begun to understand these historical links and to realize that there are myriad ways that the NE impacts on tumorigenesis. The NE is a complex double membrane system that encloses the genome while providing structural support through the intermediate filament lamin polymer and regulating protein/mRNA trafficking and signaling between the nucleus and cytoplasm via the nuclear pore complexes (NPCs). These functions already provide some mechanisms for NE influences on cancer biology, but work in the past few years has elucidated many others. Lamins and many recently identified NE transmembrane proteins (NETs) have been now shown to function in DNA repair, regulation of cell cycle and signaling, apoptosis, cell migration in metastasis, and nuclear architecture and morphology. This volume presents a comprehensive overview of the wide range of functions recently identified for NE proteins and their relevance in cancer biology, providing molecular mechanisms and evidence of their value as prognostic and diagnostic markers, and suggesting new avenues for the treatment of cancer. Indeed some of these recent links are already yielding promising therapies, such as the current clinical trial of selective inhibitors of the nuclear export factor exportin in certain types of leukemia, melanoma and kidney cancer.".

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Contenido: Section I: History and use of the nuclear envelope in cancer prognosis: Overview and perspective -- Cancer and the nuclear envelope, a history and perspective -- The role of the nuclear lamina in cancer and apoptosis -- The diagnostic pathology of the nuclear envelope in human cancers -- Nuclear morphometry, epigenetic changes, and clinical relevance in prostate cancer -- "To be or not to be in good shape": diagnostic and clinical value of nuclear shape irregularities in thyroid and breast cancer -- SectionII: The nuclear envelope in cell cycle regulation and signaling -- pRb and lamins in cell cycle regulation and aging -- Lamina-associated polypeptide (LAP)2aand other LEM proteins in cancer biology -- NETs and cell cycle regulation -- Nuclear envelope regulationof signaling cascades -- Section III: Nuclear envelope regulation of the genome -- Nuclear envelope - connecting structural genome organization to regulationof gene expression -- Studying lamins in invertebrate models -- Lamin organization of chromosome positioning -- Section IV: Functions of the NPC incancer -- NPC proteins linked in cancer overview -- Roles of the nucleoporin Tpr in cancer and aging.-Ran GTPase in nuclearenvelope formation and cancer metastasis -- Wnt signaling proteins associate with the nuclear pore complex: implications for cancer -- Section V: The nuclear envelope in DNA damage and stress responses -- DNA damage and lamins -- Repo-Man at the intersection of chromatin remodeling, DNA repair, nuclear envelope organization and cancer progression -- Lamines and oxygen stress damage in cell proliferation.-Section VI: The nuclear envelope link to cell migration and metastasis -- Nuclear mechanics in cancer -- Nuclear envelope in nuclear positioning and cell migration -- Nesprins in cell stability and migration -- Connecting the nucleus to the cytoskeleton for nuclear positioning and call migration -- Section VII: Towards a molecular explanation of prognostic links to the nuclear envelope -- Nuclear envelope invaginations and cancer -- Mechanisms of nuclear size regulation in model systems and cancer -- Control of nuclear size by NPC proteins -- Dolamins influence disease progression in cancer?.

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