KI-67 AS A MARKER OF TUMOR CELL PROLIFERATIVE ACTIVITY

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Ki-67 protein, also known as MKI-67, is a cellular marker of proliferation widely used in immunohistochemistry. It is closely associated with cell proliferation and serves as an important indicator of the growth activity of tumor cells. During interphase, the Ki-67 antigen is detected only in the cell nucleus, whereas during mitosis most of the protein relocates to the surface of chromosomes.

Ki-67 protein is expressed during all active phases of the cell cycle (G1, S, G2, and mitosis), but it is absent in resting cells (G0 phase). Its cellular concentration significantly increases during progression through the S phase of the cell cycle. Therefore, Ki-67 is considered an excellent marker for determining the growth fraction of a given cell population.

In breast cancer, Ki-67 helps identify the highly proliferative subgroup of estrogen receptor-positive tumors that may benefit more from adjuvant chemotherapy. The proportion of Ki-67-positive tumor cells, known as the Ki-67 labeling index, is frequently associated with the clinical course of malignant neoplasms. Its prognostic significance has been extensively studied and confirmed in prostate carcinoma, breast carcinoma, brain tumors, nephroblastoma, and neuroendocrine tumors. Numerous univariate and multivariate analyses have demonstrated the relationship between Ki-67 expression, patient survival, and tumor recurrence.

Ki-67 is evaluated as the percentage of positively stained tumor cell nuclei and is used diagnostically to determine the biological aggressiveness of malignant tumors in humans. The proliferative activity is commonly classified as follows: less than 10% indicates low proliferative activity, 10–20% indicates moderate activity, and greater than 20% indicates high proliferative activity. These results are important for assessing the prognostic factors of cancer and predicting disease progression.