

Tissue Section Image Analysis of the Breast Neoplasms: Evidence of False Aneuploidy

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Abstract Two methods have emerged for measuring the DNA content of paraffin-embedded tissue using image cytometry: (1) analysis of thin sections, and (2) analysis of nuclei extracted from thick sections. These methods were evaluated using 31 breast tumors for which paraffin-embedded material was available. Cases selected represented 11 diploid, 11 tetraploid, and 9 aneuploid tumors. Results generated using image cytometry methods were compared with those obtained using flow cytometry. For thin sections, the tissue correction feature of the CAS 200 Image Cytometer was used to estimate the DNA content of whole nuclei from measurements made on sectioned nuclei. DNA histograms were generated from tissue sections cut at the same microtome setting (5 μm) before and after software corrections of 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, and 7.5 μm . A comparison of flow cytometry and thin-section image analysis in the absence of tissue correction showed 90% concordance for diploid, 27% concordance for tetraploid, and 77% concordance for aneuploid tumors. The ploidy estimated on thin sections by at least one of the correction values was discordant in 72% of diploid, 91% of tetraploid, and 78% of aneuploid tumors. For cell nuclei extracted from paraffin, excellent agreement was found between flow and image cytometry ($r = 0.933$). It was concluded that in most cases, cell nuclei extracted from paraffin are preferable to tissue sections for ploidy analysis of breast tumors using image cytometry.

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