DNA Ploidy Analysis: Prognostic Significance in Tumor Aggression

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It is well known that carcinogenesis is a result of accumulated genetic and epigenetic alterations that may lead to chromosomal instability. Gross genomic aberration influences cancer progression. The patients with diploid tumor have better survival in comparison with those with aneuploid tumor. DNA ploidy status and the DNA index (DI) of aneuploid tumor are associated with the histological subtypes.

DNA ploidy profile of the tumor is frequently used as an important prognostic factor in determining cumulative incidence of tumor recurrence, progression-free survival and overall survival as well as to identify a subgroup of cancer patients in need of adjuvant therapy. DNA ploidy measurements are now widely utilized in the diagnosis of human tumors. Abnormal DNA content is a useful adjunct in the assessment, cytological diagnosis, and their potential for predicting disease outcome of human tumors such as Breast, Ovary, Endometrium, Prostate, Gastric, Kidney and Thyroid amongst others.

Flow cytometry and image analysis have established the importance of DNA ploidy in assessing the biological activity of tumor and the prognostic difference between diploid and non-diploid tumors. However, image cytometry is now considered superior in identifying aneuploid subpopulations than flow cytometry based on widely reported findings on DNA ploidy. Image cytometry facilitates eliminating or discarding cut nuclei and duplets from the analysis and can also be grouped in different clusters so that reference cells do not interfere in DNA ploidy analysis of tumor resulting in more accurate results.

Quantitation of DNA ploidy pattern can be achieved by high fidelity DNA histograms by utilizing image cytometry with a computer-aided image analysis system that measure optical density of DNA on Feulegen-stained frozen or paraffin-embedded tissue sections.

ScyTek’s Blue Feulgen Staining Kit (DPK500) is designed to identify deoxyribonucleic acid (DNA) in cell nuclei. After staining, the cells may be quantitatively evaluated for DNA content visually or using commercially available imaging systems. This kit is designed for cytological specimens prepared from cytocentrifuge preparations, cell smears, cell imprints, disaggregated tissue, or whole tissue.

References:

Products

Continuing in our firm belief that high quality reagents can be produced and delivered at reasonable pricing, ScyTek Laboratories offers the following products for DNA Ploidy Analysis. All components have undergone extensive in-house validation to provide consistent, high intensity results with virtually no lot-to-lot variability.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>Contents</th>
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<tbody>
<tr>
<td>DPK500</td>
<td>Blue Feulgen DNA Ploidy Analysis Staining Kit</td>
<td>2 x500ml Ready-To-Use Liquid Stain</td>
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<tr>
<td></td>
<td></td>
<td>10 vials of Decolorizer</td>
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<td>10 vials of Rinse Buffer</td>
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Product Reference Images

Cytocentrifuge procedure
Aneuploid cell marked with arrow
(Original Magnification x400)

Tissue stain procedure
(Original Magnification x200)

Histogram showing DNA ploidy pattern in normal human diploid cells and aneuploid tumor

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