

## Technical Bulletin

### 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 Feulgen-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:

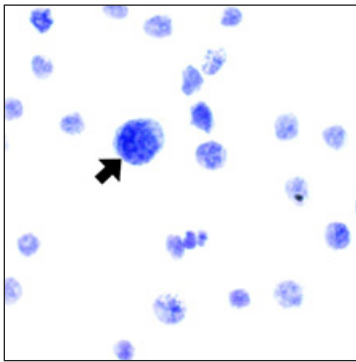
1. Pradhan M, Abeler VM, Davidson B, et al. DNA ploidy heterogeneity in endometrial carcinoma: comparison between curettage and hysterectomy specimens. *Int J Gynecol Pathol* 2010;29:572-578.
2. Wik E, Trovik J, Iversen OE, et al. Deoxyribonucleic acid ploidy in endometrial carcinoma: a reproducible and valid prognostic marker in a routine diagnostic setting. *Am J Obstet Gynecol* 2009;201:603-607.
3. Mangili G, Montoli S, De Marzi P, et al.,. The role of DNA ploidy in postoperative management of stage I endometrial cancer. *Ann Oncol* 2008;19:1278-1283.
4. Pradhan M, Abeler VM, Danielsen HE, et al. Image cytometry DNA ploidy correlates with histological subtypes in endometrial carcinomas. *Mod Pathol* 2006;19:1227-1235.
5. Terada K, Mattson D, Goo D, Shimizu D. DNA aneuploidy is associated with increased mortality for stage I endometrial cancer. *Gynecol Oncol* 2004;95:483-487.
6. Santala M, Talvensaaari-Mattila A. DNA ploidy is an independent prognostic indicator of overall survival in stage I endometrial endometrioid carcinoma. *Anti cancer Res* 2003;23:5191-5196.
7. Susini T, Rapi S, Massi D, et al. Preoperative evaluation of tumor ploidy in endometrial carcinoma: an accurate tool to identify patients at risk for extrauterine disease and recurrence. *Cancer* 1999;86:1005-1012.
8. Podratz KC, Wilson TO, Gaffey TA, et al. Deoxyribonucleic acid analysis facilitates the pretreatment identification of high-risk endometrial cancer patients. *Am J Obstet Gynecol* 1993;168:1206-1213.
9. Kærn J, Wetteland J, Tropé CG, et al. Comparison between flow cytometry and image cytometry in ploidy distribution assessments in gynecologic cancer. *Cytometry* 1992;13:314-321.
10. Greene D R., Taylor S R, Wheeler TM, Scardino PT. DNA Ploidy by Image Analysis of Individual Foci of Prostate Cancer:A Preliminary Report. *Cancer Res.* 1991; 51; 4084-89.

## Products

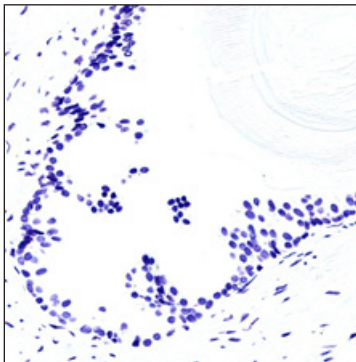
Continuing in our firm belief that high quality reagents can be produced and delivered at reasonable pricing. ScyTek Laboratories offers the following products for DNA Ploidy Analysis. All components have undergone extensive in-house validation to provide consistent, high intensity results with virtually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

Catalog Number	Description	Contents
DPK500	Blue Feulgen DNA Ploidy Analysis Staining Kit	2 x500ml Ready-To-Use Liquid Stain
		10 vials of Decolorizer
		10 vials of Rinse Buffer

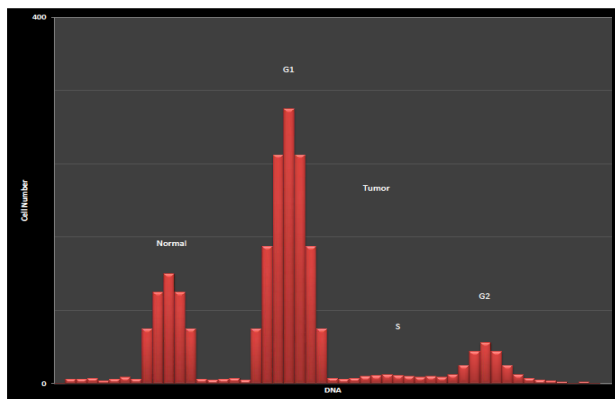
## Product Reference Images



**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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