CLINICAL APPLICATION OF FLOW CYTOMETRIC DNA PLOIDY TO THE ANALYSIS OF CANINE TUMORS

Takashi NOMURA

Department of Veterinary Surgery,
Faculty of Veterinary Medicine,
Hokkaido University, Sapporo 060, Japan.

The assay of nuclear DNA content by flow cytometry was used to examine normal tissues and tumor proliferative activity. Canine transmissible venereal sarcoma (CTVS) was used as a growing tumor model. The correlation between the presence of DNA aneuploidy in the tumors as measured by flow cytometry, and clinical parameters in dogs with surgically excised tumors at the Veterinary Hospital of Hokkaido University, was investigated to evaluate tumor malignancy.

Propidium iodine (PI) fluorescence intensity in the cell nuclei obtained from normal tissue decreased when the time for fixation with 10 % neutral buffered formalin was extended from 1 to 7 days. Following this, no change was observed for a month period. A digestion time of 30 to 120 minutes was suitable for the tissue using 0.5 % pepsin, however PI fluorescence intensity decreased with prolonged digestion.

Under the above conditions, 2 peaks appeared on the histograms of the progressive and regressive stages of CTVS analyzed by flow cytometry. Coefficients of variation of PI fluorescence intensity varied with the growth of tumors and was maximum during the first half of the steady stage of tumor growth. This suggests that tumor proliferative activity was able to be estimated by flow cytometry because each stage of tumor growth can be charactreized by its own DNA histogram.

In clinical cases, the presence of DNA aneuploidy was related to clinical malignancy. However, the coefficient of variation and DNA index were not related to tumor malignancy.

From these results, flow cytometric DNA ploidy analysis of canine tumors could be a useful adjunct to other clinical parameters, in the diagnosis of malignancy. Further studies are necessary using flow cytometry for tumor ploidy analysis.