Feulgen-DNA cytofluorometry on the component cells of cochlea by serial section method

Norio Yasuda, Shinhichi Hamada, Tetsuro Takamatsu, Kazuo Nakanishi, and Setsuya Fujita
Dept. Patho. kyoto Pref. Univ. Med.

The component cells of cochlea are one of the most difficult object to study by Feulgen-DNA cytofluorometry, because they are very small and covered with hard temporal bone. We tried to find out a new method and devised serial section method.

On the section paralleled with modiolus, we found it easy to perform DNA-cytofluorometry of the component cells of cochlea,because of charactaristic figure of each cells and scattered nuclei. Then 3-micron serial sections on the same slide glass prepared from water-miscible methacrylate-embedded tissue were stained with azocarmin G and acriflavin-Feulgen. After post-irradiation, amounts of Feulgen-DNA of all fragments of aimed nucleus on several serial sections were measured and summed up to that of whole aimed nucleus.

According to the Feulgen-DNA cytofluorometry by this serial section method, all the hair cells of Guinea Pig cochlea showed typical diploid G1 amount of DNA.

Serial section method enables us to carry out Feulgen-DNA cytofluorometry on the same cells in comparison with morphological changes in the same section.

Cytofluorometric DNA-determinations on Human Heart Muscle Cells – Differentiation of DNA-ploidy Pattern between Subendo- and Middle Myocardium –

Takamatsu,T.,Nakanishi,K.and Fujita,S.
Department of Pathology, Kyoto Prefectural University of Medicine, Kyoto

It has been accepted that oxygen tension is lower in the deep regions of the ventricular wall as compared with superficial ones which paralleled the blood flow gradient. In order to study influence of this nonhomogenous oxygen tension in polyploidization of human heart muscle cells, the cytofluorometric DNA-determination is performed on smears of cells isolated from the subendo- and middle myocardium of the left ventricular wall which are stained with acriflavine-Feulgen reaction after azocarmin G-blocking stain.

The DNA-ploidy pattern obtained from subendomyocardium shows more pronounced polyploidization with increasing tetraploid and octaploid nuclei and appearance of 16C-ploid nuclei than one of middle myocardium even in adult hearts of normal weight. But this phenomenon seems to start from childhood such as young as 9 year-old.

The lower oxygen tension might promote the polyploidization of human heart muscle cells.

DNA cytofluorometry on smears of biopsied gastric mucosa

Nakanishi,K., Hamada,S., Yasuda,N., Takamatsu,T. and Fujita,S.

Department of Pathology, Kyoto Prefectural University of Medicine

We have reported that it is useful for diagnosis of gastric cancer to identify polyploid cells or aneuploid cells by DNA cytofluorometry.
By using biopsied gastric mucosa, we examined the relationship between polyploidization-dependent diagnosis by DNA cytofluorometry and morphological diagnosis by cytological or histological findings.
Materials and Methods: DNA cytofluorometry was carried out on smear specimens of biopsied gastric mucosa and the results of DNA cytofluorometry were compared with Group classification on H.E. stained sections and Class classification on Papanicolaou stained smears which were prepared from the same materials that were used for DNA cytofluorometry.
Results: Polyploid cells were identified on cancer regions diagnosed as Class V and Group V. No polyploid cells were detected on non-cancerous regions diagnosed as Class I to III and Group I to III.

Regulation by Steroid Hormones in the Proliferation and Differentiation of Uterine Adenocarcinoma cells

Satoshi Saito, Masayuki Satoh, Tatsuo Miura, Morimasa Matsuda, Shigeki Nunokawa and Iwao Nishiya
Department of Obstetrics and Gynecology, Iwate Medical University, Morioka 020 Japan

Steroid hormones are essential for the regulation of cell growth and defferentiation of adenocarcinoma cells of endometrium. With recent progress, laser-based flow microfluorometry(FMF) makes it possible to do quantitative measurement of nuclear DNA and RNA content on monodisperse cell population. In this paper, we describe some results which evaluated the influences of steroid hormones on cultured endometrial cell, after propidium iodide. Results are as follows;

1. Progesterone had effects that it showed increase of DNA and/or RNA content after 48 hours contact in therapeutic dosage.
2. Following primed effects by estradiol-17B in physiological concentration ($5x10^{-8}$M/ml) among 36 hours, it showed a remarkable increase in the S-phase cell population in addition of high concentration progesterone in 48 hours.
3. In the other hand, it was recognized that the effects of Estradiol-17B ($5x10^{-5}$M/ml) was simullaneously promoted by the primed administration of the high concentration ($5x10^{-5}$M/ml) of progesterone.