

Elements survey in human endometrium using the dual-photon X-ray microanalyser on scanning electron microscopy

—— particular concern to the phase differences in proliferative and secretory ones ——

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An elemental analysis in human endometrium for the first step of further endometriosis investigation has been done by author for this decade. For this college staffs I disclosed a brief explanation of what an elemental analysis¹⁾ is and the meaning of the endometrium²⁾ not only in gynecology clinic but also in daily life.

Endometrium reveals the most distinct different features histologically in 2 weeks of all organs being included male one. In proliferate phase endometrial gland tends to show tubular pattern which seems to be reasonable to the results of proliferative activity. Two weeks after the proliferative phase ovulation occurs and thereafter secretory phase appears i.e. glands alter their own structures to so called saw tooth pattern through the microscope. Again histological findings are far different between these 2 phases and moreover those come and go in 2 weeks interval as I showed in this previous bulletin²⁾.

From standpoint of cell biology former researcher tried the histochemistry if they would show or represent the endometrial function. Following is the big work done by Boutselis et al³⁾. Over 40 years before histochemical analysis was done by him through the technique of histochemistry using various substances such as glycogen, glucose-6 phosphatase and so on and finally couldn't find any distinct differences between these 2 phases.

This time the author took a look upon endometrial morphological differences from the standpoint of elemental contents particularly in endometrial surface glandular epithelium. First of all that elemental statistical differences between 2 phases in my cases existed was a remarkable finding and astonishing. Recently element analysis has been tried by this author and he's been sure that this method would benefit on endometrium study even further to the endometriosis research.

Putting into concrete shape, elemental analysis on the proliferative endometrium is shown on this journal vol.35 in 2000⁴⁾. Proliferative endometrium is important in endometriosis survey because endometriotic gland almost in 100% cases reveals figure like proliferative phase. Pb and Cu element values were distinct of all 4 elements nevertheless accompanied with rather big standard deviation. What would be the meaning of this fact distinct specifically in 2 of 4 elements?

When one had this data only in proliferative phase, one might think that this is definitely because of the

Table 1. Nucler cytoplasmic ratios of glandular epithelium in the endometrium by dual photon X-ray microanalysis on scanning electron microscope

Element	Pb	Cl	U	Cu
N/C ratio (Mean \pm SD)				
Proliferative phase (n=4)	@1.95 \pm 0.96	1.09 \pm 0.19	0.83 \pm 0.58	@1.53 \pm 0.83
Secretory phase (n=7)	0.91 \pm 0.13	1.17 \pm 0.28	0.98 \pm 0.22	0.93 \pm 0.12

*N/C, nuclear cytoplasmic

@N/C ratio of Pb and Cu only in proliferative phase showed significant differences statistically ($P < 0.05$), nevertheless Cl and U both revealed not significant in both phases

grid which has the raw endometrium on it, being composed of Cu. What about Pb? You would consider this is because staining solution contains big amount of Pb. Of course this is not the exact amount survey of element, but is the matter of rations in nucleus against cytoplasm. So the meaning of this phenomenon is profoundly obscure, dealing with nuclear/ cytoplasmic correlation. Another data was also a big surprise that in secretory phase 7 cases were studied⁵⁾ through this same method denying that above mentioned bigger ratios in 2 of 4 elements should not be due to the grid nor staining solution. Again among these 4 elements no distinct differences were found in secretory phase. Consequently this time these 2 groups of data were put together and analysed statistically.

In this occasion that one compares 2 phases i.e. proliferative and secretory phase on the exact same grid and almost the same staining method, one could find clear differences between the two (Table 1). Pb and Cu are the 2 which showed differences of rations even in 2 times in Pb. From these author presumes that this is the definite differences in proliferative activity in proliferative phase of the endometrium. Why? Regretfully nobody knows the answer, because there is not any other report on this matter by this element analysis, so far as I have known or heard from the world journal in these 2 decades.

Following would be needless to say. It has been said that electron spectroscopic imaging (ESI)⁶⁾ is far more attractive in the element analysis in biological field in its detective ability. Nevertheless the author would stick to my EDX (Energy dispersive X-ray) analysis, because he is familiar with this EDX and so convenient to analyse the data of endometriosis which is my last and most important theme in my life comparing to those of the endometrium.

References

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(Dec. 2, 2004.)