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LETTER TO THE EDITOR

POLYAMINES IN RELATION TO HUMAN BENIGN BREAST RECTAL OVARIAN AND ENDOMETRIAL TUMOUR

Sir,

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It is evident that di and polyamines are intimately related to growth processes (1–3). Actively dividing mammalian cells contain higher levels of polyamines than slowly growing or quiscent cells (4,5). Polyamine levels rise in different malignancies (6,7). On the other hand, activity of Diamine oxidase (DAO; EC 1.4.3.6) increases in human carcinomatous growths as well as in experimental neoplasms (8). HeLa cell proliferation increases with addition of DAO in tissue culture, although DAO degrades putrescine released from cells (9). Alpha–difluromethylornithine (DFMO), an inhibitor of polyamine biosynthesis also did not inhibit proliferation of cells in rat brain tumour (10); moreover, DFMO can selectively suppress putrescine (11). Further, metastasis of cancer is inhibited by injection of putrescine (12) and polyamine deprivation prevents the development of tumour induced immune suppression (13). In view of these conflicting reports, the present investigation was planned to analyse the polyamine concentrations of different benign tumours as compared to their concentration in surrounding tissues.

Pieces of human benign tumours confirmed histopathologically along with their adjacent control tissues were collected in separate vials (Borosil) from Gynecology and Surgery Department of Institute of Postgraduate medical Education and Research (PG Hospital, Calcutta) for carrying out the present experiment. Putrescine, cadaverine, spermidine and spermine were separated by high voltage electrophoresis cabinet with a regulated power supply by the method of Herbst *et al* (14).

The result of the present experiment has been presented in Table I, showing diamines (putrescine and cadaverine) and polyamines (spermidine and spermine) concentrations of different benign tumours in respect to their corresponding control tissues. Results are expressed as means ± SEM. A paired t-test was used to determine the statistical significance of the data. It can be seen that concentration of diamines and polyamines were significantly high in all types of benign cases in comparison to their adjacent control tissues.

The results of the present investigation clearly indicate a significant elevation of diamines namely putrescine and cadaverine and polyamines – spermidine and spermine in human breast, rectal, ovarian and endometrial tumour respectively in comparison to their adjacent control tissues.

TABLE I : Di and polyamine concentrations in tissues of patients suffering from breast, rectal, ovarian and endometrial tumours.

Type of Benign cases	*Age (years)*	*Concentration of di and polyamine μ mol/g tissue (means ± SEM)*			
		Putrescine	*Cadaverine*	*Spermidine*	*Spermine*
Breast tumour	40–55	62.74 ± 5.37* (35.72 ± 4.62)	32.89 ± 2.45** (17.90 ± 4.29)	22.01 ± 1.78* (14.37 ± 1.33)	22.50±1.62* (13.72±1.09)
Rectal Cyst	43–56	5900 ± 5.23* (32.01 ± 4.70)	30.29 ± 1 51* (20.40 ± 2:09)	21.96 ± 1.40** (16.53 ± 1.29)	20.90±1.25* (13.70±1.20)
Ovarian tumour	45–58	20.21 ± 1.34* (14.80 ± 1.00)	20.97 ± 1.38* (14.71 ± 1.02)	18.93 ± 1.32* (14.09 ± 0.61)	19.85±1.09* (13.97±1.16)
Uterine fibroid	37–55	26.21 ± 1.10** (22.34 ± 0.82)	21.92 ± 1.23* (16.85 ± 1.01)	25.49 ± 1.97* (13.97 ± 1.68)	18.17±1.02* (11.89±1.31)

* P<0.001
** P<0.01
Figures in parenthesis are corresponding control values
No. of cases (n) = 6 for each of the above cases

We had demonstrated earlier that an unèquivocal rise of diamines, polyamines and DAO activity occur in different carcinomatous growths (15–17). A similar observation was made in our laboratory in experimental animals treated with a potent chemical carcinogen, dimethylbenzanthracene (DMBA) (18). It was explained that rise in concentration of biogenic amines and DAO activity were due to an increased synthesis of them in carcinomatous growths as high rate of cell multiplication are generally associated with high levels of polyamines (4). Since Ornithine decarboxylase (ODC; EC4.1.1.17) is responsible for polyamine biosynthesis (1,5), it appears that there exists a definite relation between polyamine biosynthesis, ODC and DAO activity (8,19). The rise in both di and polyamine concentration in benign tumour sin the present experiment also appears to be due to increased synthesis of them, like in carcinomatous growths, although is lesser than in malignant growths, we have observed earlier.

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