POLYAMINES AND CANCER*

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A number of studies have shown the presence of elevated levels of polyamines, or their derivatives, in rapidly growing tissues. The accumulation of the polyamines in these tissues appear to coincide with the cell proliferation rate. Reports from various laboratories have stated that tumor cells contain increased levels of polyamines, thus suggesting that these compounds are rapidly produced by malignant cells.

Interest in the polyamines became more intense after the reports by Russell et al. (1, 2) that polyamines are elevated in the urine of cancer patients. Those reports indicated that increased amounts of urinary polyamines were excreted by nearly all untreated patients with diagnosed cancer, and that surgical removal of the tumor mass produced a definite decrease in the excretion of polyamines.

These initial observations pointed to the possible use of the urinary polyamines as "biologic markers" which could be used to measure the success of chemotherapy or surgery for the treatment of cancer, or to assess the tumor burden of patients prior to treatment.

A relatively large number of cancer patient urine samples have been analyzed by this laboratory, with drastic changes of the polyamine levels noted in patients with Burkitt's lymphoma. These changes have coincided with changes in tumor mass following chemotherapy.

Although information on the normal urinary excretion of polyamines is available, no information had been obtained on the fecal excretion of polyamines.

A thorough study of the bacterial flora was conducted with subjects ingesting normal, low and high meat diets as described earlier. These fecal samples which had been characterized bacterially were analyzed for polyamines.

Tabor and Tabor (3) have observed that polyamines are important to cell growth. Putrescine and spermidine are the two major polyamines in E. Coli, with putrescine and methionine functioning as precursors for spermidine synthesis. Inouye and Pardee (4) have shown that polyamines affect cell division, and data have been presented that indicate putrescine deficient mutants are drastically slowed in cell growth in the absence of exogenous polyamines.

Data will be presented from the analyses of fecal polyamines excreted by subjects ingesting normal, low meat, and high meat diets, and preliminary statistical analyses of the data will be discussed.

REFERENCES


