

## UKRAIN AND ITS EMERGING ROLE AS AN ANTINEOPLASTIC AGENT IN SYSTEMIC MALIGNANCIES

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I read with great interest the recent article by Bozeman et al. [1]. Ukrain may inhibit tumor progression in a number of other systemic malignancies.

Ukrain modulates secreted protein acidic and rich in cysteine (SPARC) expression in renal cell carcinomas [2]. As a result it has a negative impact on the invasiveness of these tumors. An inhibitory effect is also seen on matrix metalloproteinase-9 expression in the renal carcinoma cells. In fact, there have been reports of complete resolution of metastatic renal tumors following adjunctive administration of Ukrain [3]. Similarly, Ukrain attenuates Bcl-2 levels and accentuates Bax levels thereby augmenting and promoting apoptosis in prostate carcinomas [4]. It also increases the cleaved PARP levels and augments the expression of FasL. Ukrain also enhances the T-helper lymphocyte/T-suppressor lymphocyte ratio inside the carcinoma thus further augmenting its anti-proliferative activity [5]. Ukrain also enhances apoptosis in the prostate carcinoma cells as is evident by up-regulation of p27 [6]. As a result there is increased accumulation of carcinomatous cells in the G2/M phase.

Ukrain administration is accompanied by attenuation of leucine as well as glutamine levels in bladder carcinomas [7]. Ukrain has a negative impact on transport of active free amino acids into the tumor. As a result intra-tumoral gluconeogenesis is attenuated thus decreasing tumor growth. Ukrain also facilitates surgical interventions such as mastectomy as the margins become more clearly defined. Similarly, Ukrain augments apoptosis in glioblastomas. It mediates this effect by up-regulation of “glial fibrillary acidic” protein function [8]. Ukrain also has a negative impact on SPARC expression in the glioblastoma cells [9].

The above examples clearly illustrate the significant anti-neoplastic effects of Ukrain on systemic tumors and the need for further studies in this regard.

### REFERENCES

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