Withania somnifera and its emerging anti-neoplastic effects

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To the Editor,

I read with great interest the recent article by Minhas et al. (2012). *Withania* may exert a number of anti-proliferative effects besides its protective role in SLE.

Withaferin A and withanolide are both extracted from *Withania*. Of these, withaferin A is the most potent though withanolide also exhibits growth inhibiting activity (Choudhary et al. 2010). These anti-proliferative effects are clearly seen in NCI-H460 lung cancer cell lines (Yadav et al. 2010). Similarly, when applied to lung cancer cell lines, *Withania* augments the anti-neoplastic effects of chemotherapeutic agents such as paclitaxel (Senthilnathan et al. 2006). *Withania* extracts appear to have an immunomodulatory effect and enhance paclitaxel-induced inhibition of cell proliferation. Witharin also appears to be a radio sensitizer as it increases radio sensitivity of tumors and thereby enhances the apoptotic effects of radiotherapy (Muralikrishnan et al. 2010).

Withania extracts appear to inhibit proliferation in HCT-15 colon cancer cell lines. For instance, it attenuates azoxymethane-induced colon cancer by modulating the levels of immunoglobulins G, A, and M and by exerting direct anti-proliferative effects (Mathur et al. 2004).

1-oxo-5beta, 6beta-epoxy-witha-2-enolide derived from *Withania* root has shown efficacy in the management of ultraviolet-B-induced dermatological carcinomas (Devi et al. 1996). *Withania* also appears to play a role in

chemoprevention of skin malignancies. For instance, extracts from *Withania* roots have been shown to prevent the development of 7,12-dimethylbenz[a]anthracene (DMBA)-induced skin cancers (Prakash et al. 2002).

The above examples clearly illustrate the anti-proliferative effects of *Withania* and the need for further studies in this regard.

Conflict of interest No conflicts of interest.

References

- Choudhary MI, Hussain S, Yousuf S, Dar A, Mudassar, Atta-ur-Rahman (2010) Chlorinated and diepoxy withanolides from *Withania somnifera* and their cytotoxic effects against human lung cancer cell line. *Phytochemistry* 71:2205–2209
- Devi PU, Akagi K, Ostapenko V, Tanaka Y, Sugahara T (1996) Withaferin A: a new radiosensitizer from the Indian medicinal plant *Withania somnifera*. *Int J Radiat Biol* 69:193–197
- Mathur S, Kaur P, Sharma M et al (2004) The treatment of skin carcinoma, induced by UV B radiation, using 1-oxo-5beta, 6beta-epoxy-witha-2-enolide, isolated from the roots of *Withania somnifera*, in a rat model. *Phytomedicine* 11:452–460
- Minhas U, Minz R, Das P, Bhatnagar A (2012) Therapeutic effect of *Withania somnifera* on pristane-induced model of SLE. *Inflammopharmacology* 20:195–205
- Muralikrishnan G, Dinda AK, Shakeel F (2010) Immunomodulatory effects of *Withania somnifera* on azoxymethane induced experimental colon cancer in mice. *Immunol Invest* 39:688–698
- Prakash J, Gupta SK, Dinda AK (2002) *Withania somnifera* root extract prevents DMBA-induced squamous cell carcinoma of skin in Swiss albino mice. *Nutr Cancer* 42:91–97
- Senthilnathan P, Padmavathi R, Banu SM, Sakthisekaran D (2006) Enhancement of antitumor effect of paclitaxel in combination with immunomodulatory *Withania somnifera* on benzo(a)pyrene induced experimental lung cancer. *Chem Biol Interact* 159:180–185
- Yadav B, Bajaj A, Saxena M, Saxena AK (2010) In vitro anticancer activity of the root, stem and leaves of *Withania somnifera* against various human cancer cell lines. *Indian J Pharm Sci* 72:659–663

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