

## LETTER to the EDITOR

# Anti-Cancer Natural Products Inducing Cross-talk between Apoptosis and Autophagy Mutual Proteins to Regulate Cancer Cell Death: Design of Future Green Anticancer Therapies

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### Dear Editor

The present letter concerns anti-cancer natural products inducing cross-talk between apoptosis and autophagy mutual proteins to regulate cancer cell death for future cancer green therapeutic approaches. The course of cancer advancement has always been attributed to the defectiveness in cell death mechanisms (Du et al., 2013; Hematulin et al., 2014). These defects act as a shield in protecting tumor cells from drugs and therapies, all at the same time, maintaining a longer life span and prompting their dispersion procedures. Autophagy and apoptosis safeguards cells from cellular damages and maintains proliferation and homeostasis by deporting outgrowth and controlling differentiation of pernicious cells. The autophagic proteins are conventionally found in hindering apoptosis whereas vice versa accounts had been reported for apoptotic-intermediates in preventing autophagic responses.

Under specific conditions, autophagy and apoptosis can be instigated in a congruous or interdependent manner through manipulation of their mutual proteins. Targeting those mutual proteins that crosstalk between autophagy and apoptosis to regulate tumor cell death is crucial for the successful design of future anticancer therapies. To counterbalance, microRNA (miRNA) are required in modulating the expression of these interplaying components that may set off both autophagy and apoptosis in cancer cells. However, critical drawbacks in the development of miRNA-based therapeutic alone seem laborious and a long drawn out story.

Resolving these gaps, we suggests that we need to target and focuses on the green chemopreventive agents, also known as natural medicinal plants which is rich in dietary phytochemicals with various medicinal properties and accepted for their miraculous action in managing malignance of cancer cells. Interestingly, almost all the literature refers to the property of natural products in inducing autophagy and apoptosis in cancer (Safarzadeh et al., 2014; Wang and Feng, 2015). Moreover, a number of natural agents capable of switching these interplaying proteins to maximize cancer cell death through the partnership of autophagy and apoptosis have been reported (Delmas et al., 2011; Xu et al., 2013). By doing so, we will be able to chart the missing links between these machinery proteins, green chemopreventive agents and miRNAs. The role of green natural chemopreventive agents in autophagy

and apoptosis will expand the existing knowledge on miRNAs hence construct a devising road to a tactical anti-cancer therapy with minimized adverse effects. As natural products are an essential source in discovery of lead compounds of anticancer drug, studies on the role of natural product anti-cancer agents that induce cross-talk between apoptosis and autophagy mutual proteins to regulate cancer cell death as a design of future green anticancer therapies continue to be necessary.

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### References

- Delmas D, Solary E, Latruffe N (2011). Resveratrol, a phytochemical inducer of multiple cell death pathways: apoptosis, autophagy and mitotic catastrophe. *Curr Med Chem*, **18**, 1100-21.
- Du P, Cao H, Wu HR, et al (2013). Blocking Bcl-2 leads to autophagy activation and cell death of the HEPG2 liver cancer cell line. *Asian Pac J Cancer Prev*, **14**, 5849-54.
- Hematulin A, Ingkaninan K, Limpeanchob N, Sagan D (2014). Ethanolic extract from *Derris scandens* Benth mediates radiosensitization via two distinct modes of cell death in human colon cancer HT-29 cells. *Asian Pac J Cancer Prev*, **15**, 1871-7.
- Safarzadeh E, Sandoghchian Shotorbani S, Baradaran B (2014). Herbal medicine as inducers of apoptosis in cancer treatment. *Adv Pharm Bull*, **4**, 421-7.
- Wang N, Feng Y (2015). Elaborating the role of natural products-induced autophagy in cancer treatment: achievements and artifacts in the state of the art. *Biomed Res Int*, **2015**, 934207.
- Xu M-Y, Lee DH, Joo EJ, Son KH, Kim YS (2013). Akebia saponin PA induces autophagic and apoptotic cell death in AGS human gastric cancer cells. *Food Chem Toxicol*, **59**, 703-8.

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