

Letter to Editor

Regulating Mitochondrial Biogenesis: from Herbal Remedies to Phytomedicine for Cancer Prevention

Asian Pac J Cancer Prev, **16** (17), 8015

Dear Editor

Mitochondria are well-adapted endosymbiotic intracellular organelles, acting as the energy supplier for survival and proliferation of cells under aerobic conditions. Moreover, cellular proliferation largely depends on the total number of mitochondria, governed by the process of mitochondrial biogenesis (Davila and Zamorano, 2013; Yoboue et al., 2014).

Presently it has been observed that mitochondrial biogenesis is associated with cancer through the modulation of various cancer associated proteins. Thus it can be considered that mitochondrial biogenesis can serve as an appropriate novel target for cancer therapy.

Medicinal plants have played important roles in protecting humans from various diseases throughout the world since time immemorial. Many of the modern drugs existing in clinical use today are of medicinal plant origin (Ping et al., 2013). Therefore, targeting mitochondrial biogenesis could be a promising novel therapeutic approach in preventing cancer. In addition, evaluating the effects of medicinal plants extracts which regulating the mitochondrial biogenesis in cancer prevention intended to be used in humans is of greatest significance as green therapeutic approaches. Cancer patients experience a variety of side effects such as loss or disfigurement of breasts, discolored skin, alopecia, weight loss or gain, arm swelling, bone marrow suppression, gastrointestinal toxicity, immunosuppression, etc (Yamamoto and Iwase, 2012; Ji et al., 2014; Chang et al., 2014). These raises concern about the potential toxic effects resulting from the short-term and long-term use of such anticancer drugs.

Hence, how to reduce adverse effects of anticancer drugs, in the same time it must be safe to consume and improve the quality of life have aroused more and more attention in recent time. The general public, patients and consumers are primarily interested in fast access to safe and efficient drugs. Based on their long-term use by humans one might expect medicinal plants used in traditional medicine to have low toxicity could be the best option to reduce the side effects of anticancer drugs. Thus, we suggest the usage of green herbal remedies that regulating mitochondrial biogenesis as phytomedicine in cancer prevention and this can be considered to be the direction for future research.

Acknowledgements

This work was partly supported by HIR MoE Grant UM.C/625/1/HIR/MOHE/MED/16/5, UM.C/625/1/HIR/MOE/DENT/09 and UMRG (No. RG454-12HTM).

References

- Chang O, Choi EK, Kim IR, et al (2014). Association between socioeconomic status and altered appearance distress, body image, and quality of life among breast cancer patients. *Asian Pac J Cancer Prev*, **15**, 8607-12.
- Davila AF, Zamorano P (2013). Mitochondria and the evolutionary roots of cancer. *Phys Biol*, **10**, 26008.
- Ji ZQ, Huang XE, Wu XY, et al (2014). Safety of *Brucea javanica* and cantharidin combined with chemotherapy for treatment of NSCLC patients. *Asian Pac J Cancer Prev*, **15**, 8603-5.
- Ping KY, Darah I, Chen Y, Sasidharan S (2013). Cytotoxicity and genotoxicity assessment of *Euphorbia hirta* in MCF-7 cell line model using comet assay. *Asian Pac J Trop Biomed*, **3**, 692-6.
- Yamamoto Y, Iwase H (2012). Management for treatment-induced adverse reaction-chemotherapy. *Nihon Rinsho*, **70**, 672-6.
- Yoboue ED, Mougeolle A, Kaiser L, et al (2014). The role of mitochondrial biogenesis and ROS in the control of energy supply in proliferating cells. *Biochim Biophys Acta*, **1837**, 1093-8.

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