Letter to Editor

The Use of Dandelion for Treating Various Types of Cancers

Siu Kan Law[1*], Dawn Ching Tung Au[1], Albert Wing Nang Leung[2], Chuanshan Xu[3]

[1]Faculty of Science and Technology, The Technological and Higher Education Institute of Hong Kong, Tsing Yi, Hong Kong
[2]School of Graduates Studies Lingnan University, Tuen Mun, Hong Kong
[3]Key Laboratory of Molecular Target and Clinical Pharmacology, State Key Laboratory of Respiratory Disease, School of Pharmaceutical Sciences & Fifth Affiliated Hospital, Guangzhou Medical University, Guangzhou, China

*Corresponding Author: Dr. Siu Kan Law, Faculty of Science and Technology, The Technological and Higher Education Institute of Hong Kong, Tsing Yi, Hong Kong. Email: siukanlaw@vtc.edu.hk.

Please cite this article as: Law SK, Au DCT, Leung AWN, Xu C. The Use of Dandelion for Treating Various Types of Cancers. Herb. Med. J. 2023; 8(1):59-60.

Dear Editor

Dandelion is a traditional Chinese herb that belongs to the "*Asteraceae*" family. It is primarily produced in the Chinese provinces of Shaanxi, Hebei, and northeastern areas. The taste of dandelion is sweet, slightly bitter, and cold. As it has been stated in the traditional Chinese medicine (TCM) theory, its functions are to clear heat, resolve toxin as well as swelling, and eliminate binds in the clinical applications of an upper respiratory tract and urinary tract infections, acute bronchitis, and inflammatory as well as cancers diseases (1).

Growing evidence has revealed that dandelion was capable of exhibiting anti-inflammatory activity. Ovadje P *et al*. reported an aqueous dandelion root extract (DRE) consisting of bioactive phytochemicals such as α-amyrin, β-amyrin, lupeol, and taraxasterol that selectively induced the cell death of colon cancer cells by more than 95% but with no toxicity to normal cells (2). Nguyen C *et al*. indicated that DRE extract could exhibit selective anticancer activity. It enhanced the induction of apoptosis and significantly reduced the tumor burden in prostate cancer xenograft models (3). Zhu H *et al*. reported that DRE could specifically and effectively suppress the proliferation, as well

as migration via targeting lncRNA colon cancer-associated transcript-1 (CCAT1) in human gastric cells without inducing toxicity in normal cells (4). Rehman G *et al*. discovered that the methanolic extracts of DRE could promote the phosphorylation level of AMP-Activated Protein Kinase Pathway (AMPK) on HepG2 cells. The dandelion could control AMPK for the antiproliferative activity of cancer cells (5). Trinh N *et al*. demonstrated that the impact of DRE on the proliferation of breast cancer stem cells (BCSC) inducted cells death, expression of genes of death receptor signaling pathways, and production of reactive oxygen species (ROS) by BCSCs (6).

In general, the mechanism of DRE for treating cancer remarkably increased the tumor necrosis factor (TNF)-alpha and interleukin (IL)-1alpha production (7). DRE caused the collapse of the mitochondrial membrane potential, resulting in pro-death autophagy (8). It also dampened the PI3K-AKT signaling pathway which regulated the levels of p-PI3K, p-AKT, and p-mTOR for enhancing the immune response (9).

The clinical studies of DRE as a natural agent in fighting cancer are ongoing. It is believed that Dandelion root might kill 98% of cancer cells within 48 hours, but confirmation of this phenomenon requires further investigation (10). Basically, the European

Commission and the British Herbal Pharmacopoeia give a guideline with the dosage for adults that are considered as safe, i.e. 0.75 to 1.0 grams daily of the DRE (11). Some individuals may undergo side effects such as heartburn, diarrhea, upset stomach, and irritated skin (12).

Conclusion

All of the above-mentioned information reveal that dandelion is a potential candidate for treating several types of cancers. Nevertheless, further studies should be conducted on the dosage, clinical trials, and safety assessments in the xenograft models of human cancer which is central to the screening and evaluation of dandelion as an anticancer agent. Besides, there are some other remedies in traditional Chinese medicines, including curcumin, resveratrol, and berberine that can also cause the destruction of cancer cells by these mechanisms that are worth investigation.

Acknowledgments

None.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Sweeney B, Vora M, Ulbricht C, Basch E. Evidence-based systematic review of dandelion (Taraxacum officinale) by natural standard research collaboration. J Herb Pharmacother. 2005;5(1):79-93.
2. Ovadje P, Ammar S, Guerrero JA, Arnason JT, Pandey S. Dandelion root extract affects colorectal cancer proliferation and survival through the activation of multiple death signalling pathways. Oncotarget. 2016;7(45):73080-100.
3. Nguyen C, Mehaidli A, Baskaran K, Grewal S, Pupulin A, Ruvinov I, et al. Dandelion Root and Lemongrass Extracts Induce Apoptosis, Enhance Chemotherapeutic Efficacy, and Reduce Tumour Xenograft Growth *In Vivo* in Prostate Cancer. Evid Based Complement Alternat Med. 2019;2019:2951428.
4. Zhu H, Zhao H, Zhang L, Xu J, Zhu C, Zhao H, Lv G. Dandelion root extract suppressed gastric cancer cells proliferation and migration through targeting lncRNA-CCAT1. Biomed Pharmacother. 2017;93:1010-1017.
5. Rehman G, Hamayun M, Iqbal A, Khan SA, Khan H, Shehzad A, Khan AL, Hussain A, Kim HY, Ahmad J, Ahmad A, Ali A, Lee IJ. Effect of Methanolic Extract of Dandelion Roots on Cancer Cell Lines and AMP-Activated Protein Kinase Pathway. Front Pharmacol. 2017;8:875.
6. Trinh N, Dang N, Tran D, Pham P. Taraxacum officinale dandelion extract efficiently inhibited the breast cancer stem cell proliferation. Biomed. Res. Ther. 2016;3(7):733-41.
7. Koo HN, Hong SH, Song BK, Kim CH, Yoo YH, Kim HM. Taraxacum officinale induces cytotoxicity through TNF-alpha and IL-1alpha secretion in Hep G2 cells. Life Sci. 2004;74(9):1149-57.
8. Ovadje P, Chochkeh M, Akbari-Asl P, Hamm C, Pandey S. Selective induction of apoptosis and autophagy through treatment with dandelion root extract in human pancreatic cancer cells. Pancreas. 2012;41(7):1039-47.
9. Ren F, Wu K, Yang Y, Yang Y, Wang Y, Li J. Dandelion Polysaccharide Exerts Anti-Angiogenesis Effect on Hepatocellular Carcinoma by Regulating VEGF/HIF-1α Expression. Front Pharmacol. 2020;11:460.
10. Ovadje P, Ammar S, Guerrero JA, Arnason JT, Pandey S. Dandelion root extract affects colorectal cancer proliferation and survival through the activation of multiple death signalling pathways. Oncotarget. 2016;7(45):73080-100.
11. Wirngo FE, Lambert MN, Jeppesen PB. The Physiological Effects of Dandelion (Taraxacum Officinale) in Type 2 Diabetes. Rev Diabet Stud. 2016;13(2-3):113-31.
12. Martinez M, Poirrier P, Chamy R, Prüfer D, Schulze-Gronover C, Jorquera L, Ruiz G. Taraxacum officinale and related species-An ethnopharmacological review and its potential as a commercial medicinal plant. J Ethnopharmacol. 2015;169:244-62.