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### Health benefits of Lingzhi through evidence-based study

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Lingzhi, also known as *Ganoderma* or Reishi, is a traditional Chinese medicine (TCM) and has been used for health care and medicinal purpose for centuries in oriental countries. The most attractive characters of Lingzhi are its immunomodulatory and anti-tumor activities. In our lab, the anti-cancer effects and mechanisms of *Ganoderma tsugae* (GT), one of the Lingzhi species locally cultivated in Taiwan, were investigated. First, the quality of the GT extracts (GTE) was evaluated by both chemical (e.g., TLC, HPLC, ESI-MS, etc.) and biological fingerprinting methods. The biological fingerprinting was performed using the PhytomicsQC platform (Tilton *et al.*, Chinese Medicine 2010, 5:30). Both chemical and biological fingerprinting results from 3 different batches of GTE revealed a very similar pattern, showing that the GTE were in good quality. Then, GTE was found to have growth inhibition effects on a variety of human cancer cells, including colon, epidermoid, ovary, lung and many others. The inhibition of cancer cell proliferation by GTE was through the PI3K/Akt signaling pathway. We also indicated that GTE caused cancer cell cycle arrest via regulating cell cycle-specific proteins expression and induced apoptosis via activating mitochondria/caspase pathway. Moreover, GTE could also decrease cancer cell motility and angiogenic activity. Interestingly, GTE had chemosensitization effect against cancer cells. In addition, the animal study on tumorigenesis in nude mice revealed shrinkage of tumor masses. Meanwhile, there were no significant damaging effects observed from the study group of nude mice by blood routine (biochemical and hematological profiles) and pathology examinations. Taken together, our results provide insightful understanding of using the TCM Lingzhi for the healthcare and treatment of a variety of human cancers.