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Anti-tumor and immunomodulatory effects of Cordyceps militaris polysaccharide fraction

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Statement of the problem: Although standard therapeutic protocols for cancer have been improved, it is still imperative to investigate novel anti-tumor strategies for eliminating cancer cells with little toxicity to normal cells. It is generally accepted that natural polysaccharides are capable of immunomodulatory activities. As a traditional Chinese medicine, Cordyceps militaris is widely used for health supplement. This study aims to investigate the anti-tumor and immunomodulatory effects of Cordyceps militaris polysaccharide fraction (CMPF).

Methodology & Theoretical Orientation: The mouse model of S180 sarcoma was established and the effect of CMPF on tumor weight, organ index, and cytokines were examined in S180-bearing mice. The effect of CMPF on carbon clearance ability and DTH reaction of immunosuppressive mice were also investigated. Additionally, the immunomodulatory effect of CMPF and the possible mechanism were studied in macrophages and splenic lymphocytes.

Findings: CMPF had no effect on proliferation of S180 cells in vitro. However, it inhibited tumor growth, increased levels of cytokines TNF-alpha and IL-2, and improved spleen and thymus indexes in S180-bearing mice. When combined with 5-fluorouracil, CMPF exerted synergistic effect and reduced toxicity of 5-fluorouracil. Other in vivo experiment results showed that CMPF enhanced carbon clearance ability and DTH reaction of immunosuppressive mice. On the other hand, in vitro assays revealed that CMPF promoted proliferation of splenic lymphocytes and cytotoxicity of NK cells to YAC-1 cells. CMPF also increased secretion of IL-2, development of cell cycle toward S phase, as well as T cell subpopulation. The phagocytosis function of macrophages and secretion of both NO and TNF-alpha by macrophages were also promoted by CMPF.

Conclusion & Significance: These results indicate that CMPF possesses immunomodulatory effect on multiple immune cells in vitro. CMPF exhibited anti-tumor effect in vivo probably via immunomodulation. CMPF could potentially be used as a functional supplement candidate for tumor therapy.

Biography

Dr. Liyan Song is currently a Professor of Pharmacology in Biotechnological Institute of Chinese Materia Medica, Jinan University, China. She has worked with cancer and immunology studies in the past years. Specially, she is interested in mechanism research involved in cell signaling pathways. Her research team is also engaged in the development of novel antitumor drug, and financially supported by several foundations including Major National Science and Technology Projects/ Significant New Drugs Creation as well as National Natural Science Foundation of China.

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