

Comparison of cytotoxic activity between Korean and European mistletoe lectins

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Cytotoxic lectins (KML-C) were isolated from an extract of Korean mistletoe [*Viscum album* C. (*coloratum*)] by affinity chromatography on a hydrolysed Sepharose 4B column, and the chemical and biological properties of KML-C were examined, partly by comparing them with a lectin (EML-1) from European mistletoe [*Viscum album* L. (*loranthaceae*)]. The hemagglutinating activity of KML-C was inhibited by N-acetyl-d-galactosamine and d-galactose at the minimum concentrations of 6.3 and 12.5 mM/ml, respectively. Further biochemical analyses indicated that KML-C consists of four chains (Mr . 27.5, 30, 31 and 32.5 kDa) which, in some of the molecules, are disulphide-linked, and that the chains of KML-C are distributed over a broad range of isoelectric points (pI), 8.0 to 9.0, whereas the range for EML-1 is 6.6±7.0. A difference was also observed between the N-terminal sequences of KML-C and EML-1. The isolated lectins showed strong cytotoxicity against various human and murine tumor cells, and the cytotoxic activity of KML-C was higher than that of EML-1. Tumor cells treated with KML-C exhibited typical patterns of apoptotic cell death, such as apparent morphological changes and DNA fragmentation, and its apoptosis-inducing activity was blocked by addition of Zn²⁺, an inhibitor of Ca²⁺/Mg²⁺-dependent endonucleases, in a dose-dependent manner. These results suggest that KML-C is a novel lectin related to the cytotoxicity of Korean mistletoe, and that its cytotoxic activity against tumor cells is due to apoptosis mediated by Ca²⁺/Mg²⁺-dependent endonucleases.

Keywords : Korean mistletoe; Lectin; Antitumor activity; Cytotoxicity; Apoptosis