

Curcumin: a double hit on malignant mesothelioma.

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Malignant mesothelioma is an asbestos-related malignancy with a dismal prognosis and poor therapeutic strategies. Malignant mesothelioma originates from the mesothelial cells that line the pleural cavity, pericardium and peritoneum. Patients have the poor median survival rate at 9–12 months from time of diagnosis and therapeutic interventions are limited to chemotherapy, surgery, radiation, immunotherapy, targeted molecular therapy and gene therapy.

Hence, there is an urgent need for effective compounds as incidence and mortality of malignant mesothelioma in less developed countries with economically disadvantaged populations is on the rise. Although Curcumin has been identified as a potential candidate in various cancer types, little research has explored its role in malignant mesothelioma.

Objective:

To evaluate the cytotoxic effects of Curcumin in malignant mesothelioma cell killing via induction of pyroptosis and reactive oxygen species (ROS) production.

Various cells were evaluated for cell viability, total RNA, Caspase-1 activity, proteins like high mobility group box 1 (HMGB1), and inflammatory mediators like IL-1 β , IL-18 and ROS.

Results:

A significant inhibition of growth of malignant mesothelioma cells when treated with Curcumin doses of 40 and 50 μ M for 48 and 72 h

Malignant mesothelioma cells treated with Curcumin resulted in significantly increased extracellular (secreted) levels of HMGB1, a marker of cell death, analyzed as a parameter to support the occurrence of pyroptosis

Curcumin showed significant cytotoxicity in HMESO cells through pyroptosis

Treatment of HMESO cells with Curcumin (40 μ M for 48 h) resulted in significantly ($p \leq 0.05$) reduced levels of inflammasome-related gene expression involved in inflammation, NF- κ B, toll like receptors (TLR) and IL-1 pathways

Conclusion:

Cytotoxic effect induced by Curcumin on malignant mesothelioma cells was through pyroptosis and demonstrated anti-inflammatory effect well. Hence, these results suggest that curcumin can be investigated further as a therapeutic agent in malignant mesothelioma.