

CURCUMIN INDUCES AUTOPHAGIC CELL DEATH IN HUMAN PAPILLARY THYROID CARCINOMA BCPAP CELLS

Bao, Jiandong¹; Zhang, Li¹; Tan, Chen¹; Wu, Jing¹; Guan, Haixia²; Yu, Huixin¹

¹Jiangsu Institute of Nuclear Medicine, Key Laboratory of Nuclear Medicine, Ministry of Health, Jiangsu Key Laboratory of Molecular Nuclear Medicine, Wuxi, Jiangsu, China; ²Department of Endocrinology and Metabolism and Institute of Endocrinology, The First Affiliated Hospital of China Medical University, Shenyang, Liaoning, China

Background/Purpose: We previously found that curcumin could inhibit the proliferation and induce apoptosis in thyroid cancer cell lines. In this study, we investigated the ability of curcumin to induce autophagy in thyroid cancer cells.

Methods: Human papillary thyroid BCPAP cancer cells were cultured *in vitro* and cell viability was detected by the MTT assays. Expression of LC3, beclin-1 and p62 were detected by western blot. RFP-LC3 plasmid was transfected into cells, and cells with RFP-LC3-labelled vacuoles were observed by fluorescence microscopy.

Results: Curcumin induced LC3-I to LC3-II-conversion markedly in a dose- and time-dependent manner, which is the hallmark of autophagosome formation and autophagy. Beclin-1 expression is involved in the formation of preautophagosomal structures. Similar to LC3-II, the expression of beclin-1 was increased with the rising dose of curcumin over 24 h in BCPAP cells. It was also found that expression levels of p62 were downregulated. Meanwhile, the formation of RFP-LC3-labelled vacuoles in BCPAP cells was markedly increased 24 h after treatment with 12.5 to 50 μ M of curcumin. Furthermore, the MTT assay showed that curcumin-induced cell death in BCPAP cells was significantly decreased by the autophagy inhibitor 3-MA in a dose-dependent manner. Whereas, combination of curcumin and rapamycin, a MTOR inhibitor that induced autophagy, showed a stronger effect on the enhancement of LC3 conversion and cell death compared to the treatment of rapamycin alone.

Discussion & Conclusion: These results suggest that increased autophagy is responsible for curcumin-induced cell death in human papillary thyroid BCPAP cancer cells.