

A novel copper compound, CuNV110, induces apoptosis in tumor cells by dissociation of the Hsp60-pro-caspase 3 complex

Claudia Campanella^{1,2}, Antonella Marino Gammazza^{1,2}, Celeste Caruso Bavisotto^{1,2}, Dragana Nikolic¹, Antonio Palumbo Piccionello^{2,3}, Giampaolo Barone^{2,3}, Andrea Pace^{2,3}, Giovanni Zummo¹, Francesco Cappello^{1,2}

¹ Department of Experimental Biomedicine and Clinical Neurosciences, University of Palermo, Palermo, Italy

² Euro-Mediterranean Institute of Science and Technology, Palermo, Italy

³ Department STEBICEF, University of Palermo, Palermo, Italy

The biological activity of CuNV110, a novel copper chemical compound, has been recently studied on cancer cells and it has been showed that it reduces the cell viability, in a dose and time dependent manner, and induces cell apoptosis. In this study we evaluated the possible mechanisms by which CuNV110 induces cell apoptosis. In particular we looked at its effects on Hsp60 levels and caspase 3 activation. We used an in vitro model of a pulmonary mucoepidermoid carcinoma (NCI-H292 cells). We found that CuNV110 reduces the cell viability and induces cell apoptosis in a dose/time dependent manner. Then, we found that Hsp60 levels decrease with the increasing concentrations of CuNV110; by contrast, caspase 3 levels increased. Interestingly, we found by immunoprecipitation a complex between Hsp60 and pro-caspase 3 in untreated cells that dissociate with increasing doses of CuNV110. These data demonstrate that CuNV110 can dissociate the anti-apoptotic complex between Hsp60 and pro-caspase 3 in NCI-H292, in turn inducing apoptosis of tumor cells. If confirmed in other cell lines, CuNV110 will be tested as anticancer drug by in vivo models.

Keywords

Respiratory cells, pulmonary cancer, Hsp60, caspase 3, apoptosis.