Mechanism of Apoptotic Action of Colloidal Silver and Bromelain on PC12 Cells

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Purpose: The principle of this study is to identify possible mechanism of apoptotic actions of colloidal silver and bromelain on pheochromocytoma cells (PC12). If colloidal silver and bromelain are tested at optimal solutions (0.01 ppm colloidal silver and 0.1 g/mL bromelain) for causing oxidative stress and caspase-3 activity after eight hours, than colloidal silver and bromelain will express greater amounts of nitric oxide, lipid peroxidation, and caspase-3 activity. This effect is due to silver's antimicrobial effect and bromelain's proteolytic properties. Procedure: PC12 cells will be treated with optimal concentrations of colloidal silver and bromelain for eight hours. The possibility of oxidative stress as an apoptotic mechanism will be analyzed through nitrite production, lipid peroxidation, and addition of glutathione. Caspase-3 activity will be analyzed by spectrophotometric methods. DNA extraction will analyze apoptosis. Conclusion: Analysis of the data provided that, the MTT assay showed the percent viability decreased between 60%-80% suggesting that the cells were undergoing apoptosis after being treated with colloidal silver at 0.01 ppm and bromelain at 0.1 g/mL, after the addition of glutathione the cell viability increased between 30%-70%. The results of lipid peroxidation showed a 20%-30% increase in the solutions. The nitrite assay showed a percent increase between 20%-70%. The first three assays support oxidative stress, however, in addition to oxidative stress, a possible mechanism of apoptosis is caspase-3. Caspase-3 activity compared to control went up between 50%- 230%, indicating that the protein caspase-3 is initiating apoptosis. DNA isolated from colloidal silver and bromelain showed a fragmentation pattern of apoptosis.

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