Cellular and Molecular Analysis of Allicin's Effect on Leukemia Cells

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Allicin is a component in garlic that forms when garlic is chopped. Research has shown that allicin is capable of killing several types of cancer cells, but the mechanism remains unclear. To examine whether allicin is able to kill leukemia cells, K562 leukemia cells were cultured and treated with different concentrations of allicin. The growth and shape of the cells were observed for five days. Allicin prevented cell growth and changed cell shape/size in a dose-dependent manner. The cellular and molecular events triggered in allicin-treated leukemia cells were further examined in a Wright-Giemsa staining and Western blot. The Wright-Giemsa staining of the cells demonstrated that allicin promotes erythroid (red blood cell) differentiation of K562 leukemia cells and that the stage of erythroid differentiation depends on the concentration of allicin. Along with this process, some cells showed membrane blebbing, indicating that they underwent programmed cell death known as apoptosis. The Western blot showed that the amount of Bax, a pro-apoptotic molecule, increased and the amount of Bcl-2, an anti-apoptotic molecule, decreased. These results reveal that allicin can prevent the growth of leukemia cells and induce both erythroid differentiation and apoptosis. Knowing this, allicin could potentially be beneficial for leukemia patients by pushing leukemia cells to become functional red blood cells.

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