

Cytotoxic effects of bromelain and N-acetylcysteine on the gastric carcinoma cell line KATO-III

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Background: Bromelain is the extract of pineapple stem primarily comprised of sulfhydryl containing proteolytic enzymes. N-acetylcysteine (NAC) is also a sulfhydryl-containing compound found in allium plants, asparagus, and red pepper. Biological effects of bromelain and NAC have been studied in some pathologic conditions including cancer. In the present study, we investigated the cytotoxic effects of bromelain and/or NAC on the gastric carcinoma cell line KATO-III *in vitro*.

Methods: KATO-III gastric carcinoma cells were treated with a range of concentrations of bromelain and/or NAC. The effect of the single agent or combination therapy on the growth and proliferation of the cancer cells was determined after 72 hours of treatment using sulforhodamine B assay. A similar method was employed to assess any possible synergism when the treatment was combined with chemotherapy.

Results: We observed that bromelain, at the concentration of 200 µg/ml, and NAC, at the concentration of 25 mM, significantly inhibited the cell proliferation (p-values of <0.0001 and 0.0095, respectively). When combined together, synergistic effects of the combination therapy was evident. In addition, we examined if the treatment was capable of potentiating the cytotoxic effects of chemotherapy. Cytotoxicity of single agent cisplatin, paclitaxel, 5-fluorouracil and vincristine was compared against that of their combination with bromelain/NAC. Our results indicated a higher potency of each drug when used in combination with bromelain/NAC.

Conclusion: In the present study, we showed that the utility of bromelain and N-acetylcysteine, as single agent or in combination, yields cytotoxic effects in the gastric carcinoma cell line KATO-III and potentiates chemotherapy.

Biography

Afshin Amini completed his doctoral degree in Medicine in 1997. Being interested in cancer research, he was granted a competitive international postgraduate scholarship by the University of New South Wales (Sydney, Australia) in 2012. As a member of Professor Morris's research team at St George Hospital, Afshin is currently involved in some key projects aimed to develop novel approaches to cancer therapy.

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