Identifying the Components in Basil that Protect Lung Cells from Pneumonia

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Basil is well known for its various medicinal properties. For the last 5 years, I have been working on the antimicrobial effect of basil against various strains of bacteria such as E.coli, Streptococcus mutans, S. pneumoniae and K. pneumoniae in my science fair projects. The major breakthrough came when I discovered that basil could protect human lung cells from cell death following infection by a bacteria that causes a life threatening disease such as pneumonia. This year, I tried to identify the components in basil that contribute to this protective effect. I separated proteins from the metabolites in basil using acetone precipitation. Briefly, one volume of basil was incubated with 6 volumes of acetone and kept overnight and centrifuged at high speed (12,000 rpm, 30 minutes). The supernatant was dried and dissolved in medium. The separated components were then used for analysis of cell death due to K. pneumoniae. For this, lung epithelial cells (A549) were cultured in RPMI medium in the presence and absence of basil components. After 24 hours, 10^8 CFU/ml of K. pneumoniae was added to it followed by incubation in a 37°C in a CO2 incubator. The viability of cells was measured using trypan blue dye after 24 hours. I found that in the presence of K. pneumoniae, lung cell viability was reduced to less than 20%, but the presence of protein components prevented this significantly. However, metabolites were unable to prevent cell death due to K. pneumoniae. Thus, it can be concluded that proteins in basil is responsible for its protective action against pneumonia infection in lung cells.

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