The effect of garlic on cell growth and cell division in cultured trophoblast and endothelial cell lines.

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Because of its ability to increase nitric oxide[1], it has been suggested that garlic (Allium sativum, Alliaceae) may help to alleviate pathophysiological conditions such as pregnancies complicated by pre-eclampsia and growth retardation [2]. However, some of the compounds in garlic (eg. allyl disulphide) have been suggested to possess anti-bacterial and anti-cancer properties and therefore may inhibit cell growth. In order to explore this dilemma, we have tested the effect of garlic on tritiated thymidine incorporation in cultured trophoblast and endothelial cell lines.

Garlic extracts were prepared by 1% alcoholic extraction of garlic powder (gm/mL). This was diluted and added to cultures of BeWo cells grown to near confluence in 96-well plates. Ham's F12 medium (Sigma Chemical Co Ltd, Poole, UK) containing 100 units/mL penicillin, 100 μg/mL streptomycin and 10% fetal calf serum was used for culture. After addition of radioactivity ([3H]-thymidine or [3H]-leucine) cells were incubated for different time intervals for up to 24h after which they were washed 6 times with phosphate buffered saline. Cells were solubilized with 0.4M sodium hydroxide, scintillant added and counted [3].

Incubation of choriocarcinoma cell lines, BeWo and Jar and the transformed endothelial cells, ECV304 with garlic inhibited cell growth at high concentrations of garlic whereas low concentration increased cell growth (Fig. 1). This was reflected in tritiated leucine in these cells (results not shown). The decrease in cell DNA synthesis was seen with increasing concentrations of allyl disulphide (Fig. 2). At similar concentrations allyl sulphide showed no significant effects on cell growth in these cells (results not shown).

The ability of garlic to decrease cell growth is probably attributed to the presence of allyl disulphide. The stimulation of nucleic acid synthesis at lower concentrations of garlic needs to be explored. There is a possibility that this increase is secondary to increased polyamine synthesis [4].

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References