

## Dichloroacetate induces different rates of cell death in cancer and noncancer cell lines *in vitro*

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### ABSTRACT

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**Aims and background.** The pyruvate mimetic dichloroacetate (DCA) has been shown to induce cell death in cancer cells. A number of studies *in vitro* and *in vivo* have suggested this molecule may serve as an anticancer agent, but some cells are resistant. Here we wanted to examine the effects of DCA on cancerous and noncancerous cells grown in culture for a prolonged period of exposure and at increasing concentrations.

**Methods.** Six cancer cell lines (A549, SK-HEP-1, HCT116, UPCI:SCC070, HeLa and MES-SA) and three noncancerous lines (RPE, GM03349B and HEK293) were exposed to 0.5 mM DCA for seven days and cell counts were taken every day to determine viability and cell cycle progression. The same cell lines were also exposed to higher doses of DCA up to 10 mM and viability was scored.

**Results.** Five cancer cell lines showed high levels of cell death early in the trial, but three of the lines showed a second delayed increase in cell death at later stages. HCT116 cells were unaffected by 0.5 mM DCA. GM03349B and RPE cells also died when treated with DCA. At high concentrations, all cell lines exhibited high rates of death. No specific cell cycle arrest of the cells was observed.

**Conclusion.** We found that there is considerable difference in the way cancer cells are affected by DCA. Some have populations that are highly resistant to treatment, while others have stronger rates of death only after prolonged exposure. We also found non-cancerous cells are not all resistant to DCA, a significant finding that has not previously been observed in other *in vitro* DCA trials.

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**Key words:** dichloroacetate, cell death, Warburg effect, cell viability, proliferation.

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