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Exploring the anti-tumor effects of medical Cannabis on cancer cells

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Background: Cannabis plants contain more than 150 phytocannabinoids which are presumed to have bioactive properties. Yet, the identification of Cannabis components is usually limited to several species. Recently, the therapeutic potential of these phytocannabinoids has been rediscovered in cancer research as these compounds were found to have palliative effects in oncology. Moreover, there is accumulating evidence showing antitumor effects. In response to phytocannabinoids, several studies showed a regression of different tumors *in vivo*. Further investigations *in vitro* have revealed that they can induce cell death and inhibit proliferation of cancer cells. The concentrations and combinations of various phytocannabinoids determine both medicinal and adverse effects in patients. Therefore, analyzing the chemical content of differing Cannabis plants is of major importance.

Aim: The objective is to assess a variety of Cannabis preparations and to elucidate which factors are responsible for their antitumor effects, in order to better understand how Cannabis may effectively treat cancer.

Methods: We perfected extraction techniques and identified distinct compositions of 12 clinically-used Cannabis strains. We then explored the differential antitumor effects of these Cannabis extracts (differing in cannabinoid compositions) on 12 cancer cell lines.

Results: Results indicated that certain Cannabis extracts have statistically different ($p < 0.0001$) effects on cancer cell survival. In addition, differing cancer cell lines vary in sensitivity to various Cannabis extracts. For example, treatment with one Cannabis extract (4 $\mu\text{g/mL}$) resulted in cancer cell death ranging from 3% to 36% (LNCaP and PC3 cells, respectively). Furthermore, whole Cannabis extracts were found to be more potent at lower concentrations (4 $\mu\text{g/mL}$) in comparison to using pure $\Delta^9\text{THC}$ (8 $\mu\text{g/mL}$) to produce the same amount of cell death when applied to specific cancer cell lines.

Conclusion: Categorizing cancer cells according to their response to medicinal Cannabis will provide valuable information for the development specific Cannabis treatments for subgroups of cancer patients.

Biography

Liran Baram, currently working at the Center for Biological Research, Technion - Israel Institute of Technology finished her BSc, MSc and PhD from Tel Aviv University. Soon after her PhD she joined Israel Institute of Technology for her Post Graduation Studies. Her topic of Interests include Molecular Biology, Cell Culture and Cellular Biology.

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