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Exploring anti-cancer effects of cannabinoids and medicinal mushrooms and their interactions with conventional treatments in breast cancer

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Abstract

Introduction

Growing evidence both in vivo and in vitro suggest that Cannabis-derived substances and medicinal mushrooms (used in traditional medicine practices) have anticancer activity brought about by a wide range of mechanisms that may be cancer type and even subtype specific. In addition, since these botanical substances are commonly used by cancer patients alongside standard medical care understanding possible interactions that may exist between such treatments is important.

In this study we explore the anti-cancer effects of cannabinoids and medicinal mushrooms on various breast cancer subtypes and test interactions with common conventional treatments.

Materials and methods

Anti-cancer efficacy of cannabinoid and mushroom in vitro was evaluated through cell viability and proliferation assays (MTT, BrdU). Four different cell lines, representing different defined subtypes, were tested. Ex Vivo analysis of cancerous tissue from patients was done using cResponse™ platform. This Ex Vivo Organ Culture System, uniquely maintains the tissue's 3D structure and the tumor microenvironment (TME), including stromal cells and the immune system, and thus allows evaluation of drug efficacy in living tumor tissue with an intact TME.

Results and discussion

We show that anti-cancer efficacy of both cannabinoids and mushrooms varies among subtypes. Intriguingly we find that both cannabinoids and mushroom combinations interact with some conventional treatments. For example, synergistic interaction between cannabinoids and Taxol, and interfering interaction between cannabinoids and Tamoxifen. We also demonstrate that combination of cannabinoids has increased activity compared to individual cannabinoids (entourage effect).

Conclusion

Our results strongly suggest that in addition to alleviating treatment related side effects and improving the patient's quality of life cannabinoids and medicinal mushrooms may have effects on the tumor itself. The results also warrant additional analysis in the future to further investigate the potential benefit of combining cannabinoids with specific conventional treatments.

Secondary Topical Categories

Herbals and Supplements