



This occasional section within the journal surveys visions and achievements, often not on the main track of the developing biomedical sciences, but all relating to discoveries and developments of medicinals – both ancient and modern. What they have in common, in one way or another, is providing further background and glances around the edges of the core discipline of pharmacognosy, as it has been and continues to evolve within our times.

Cannabinoids Induce Apoptosis in Cancer Cells

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DOI : 10.5530/pc.2018.1.10

Cannabis sativa is a plant rich in bioactive secondary compounds including terpenoids, flavonoids and a diversity of cannabinoids. Whilst *C. sativa* is best known for its psychotropic effects, it also has long been used in folk medicine for a wide variety of therapeutic purposes. However, the anticancer effects of this plant remain relatively unexplored. A recent study has highlighted the potential of *C. sativa* and isolated cannabinoids against a large panel of cancer cells. Interestingly, the cannabinoids acted via cannabinoid receptors as well as via nonspecific pathways to induce apoptosis in cancer cells, whilst at the same time protecting normal cells.¹ Notably, the cannabinoids also displayed potent anticancer activity against tumours which were highly resistant to conventional chemotherapies. Furthermore, several studies have also reported that cannabinoids can function as “sensitisers”, increasing the efficacy of some conventional cancer therapies. Both cannabidiol (CBD) and cannabidiol-dimethylheptyl (CBD-DMH) synergise γ -irradiation in HL-60 leukaemia cells.^{2,3} Similarly, THC sensitises leukaemia cells to several cytotoxic drugs.⁴ Co-treatment of human glioma carcinoma cells with temozolomide

(TMZ) and THC displayed far greater cytotoxicity towards the cancer cells than either component did alone. However, all of these studies were performed *in vitro*. Few clinical trials have examined the effects of cannabinoids, alone or in combinations, on human cancers. Further studies are required before cannabinoids are a viable clinical option.

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Chestnut Leaf Extract Blocks *Staphylococcus Aureus* Virulence

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DOI : 10.5530/pc.2017.4.20

A study from a research group in Atlanta USA which was recently published in PLoS One, has reported a novel method for the treatment of some antibiotic resistant bacteria.¹ The group tested a chestnut leaf extract, rich in ursine and oleanene derivatives, against *Staphylococcus aureus*. Whereas conventional antibiotic therapies aim to either kill bacteria, or to block their growth, the Emory University study instead screened the extracts for the ability to inhibit the virulence and pathogenicity of the bacterium. The extract was not cytotoxic to the pathogen, nor was it harmful to beneficial bacteria. Therefore, its use as a therapeutic drug does not upset the microbiome balance of the recipient. However, the extracts reduces the bacterium's ability to produce the toxins which cause tissue damage. Interestingly, these extracts were equally as effective against

methicillin resistant strains (MRSA) as against other strains. Furthermore, the bacteria do not seem to develop resistance to the extract and as its use would reduce the necessity for other antibiotic therapies, it would not further contribute to the growing problem of the development of antibiotic resistant bacterial strains. Whilst much is yet to be determined about the antibacterial mechanism of the chestnut extract, it appears to inhibit quorum sensing.

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