

22nd European Nutritional Science Congress

November 26-27, 2018 | Barcelona, Spain

Cruciferous vegetables and palmitoylcarnitine, a pro-inflammatory mediator in prostate cancer

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Dietary consumption of *Cruciferous* vegetables like broccoli has been associated with a reduced risk of prostate cancer and the underlying mechanisms are still under investigation. Research studies have suggested that this can be attributed to the biological activity of sulforaphane, bioactive compounds derived from glucosinolates that accumulate in these vegetables. Studies have also found that the dietary intake of sulforaphane is able to significantly reduce plasma levels of acylcarnitines in subjects with moderate risk of developing cardiovascular diseases. Palmitoylcarnitine (palcar) is a C16:00 acylcarnitine, an intermediate compound in lipid metabolism accumulated in plasma as a result of insufficient integration of fatty acid β oxidation with the TCA cycle due to high levels of oxidative stress which inhibits TCA cycle enzymes. Because it has been reported that metabolism is disrupted in prostate cancer, and that palcar has been found to induce Ca^{2+} influx that may linked with an inflammatory phenotype, we investigated whether palcar would accumulate in prostate tissue and whether they would have an inflammatory consequence. Firstly, we found that there was a significant increase in acylcarnitines generally in prostate cancer tissue compared to non-cancerous tissue. Secondly, we found that palcar induces rapid Ca^{2+} influx in the prostate cancer cell line PC3 cells and induces secretion of the pro-inflammatory interleukin-6 cytokine. Thus, we suggest that one way by which cruciferous vegetables may reduce the risk of prostate cancer is by reducing oxidative stress which reduces palcar level in plasma and tissues which in turn reduces inflammation.

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