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## The effect of seaweed derived polyphenols on inflammation and oxidative stress *in vivo* - The SWAFAX study

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Cardiovascular disease (CVD) is currently the leading cause of death worldwide<sup>(1)</sup>. Epidemiological evidence has shown a positive effect of polyphenol intake on CVD risk<sup>(2)</sup>. Seaweed is a rich source of polyphenolic compounds, which can comprise 5 to 15% of the dried weight<sup>(3)</sup>. Some studies suggest that the potential antioxidant and anti-inflammatory benefits of seaweed-derived polyphenols may yield highly bioactive components with commercial potential for food and pharma applications<sup>(4)</sup>. The aim of this randomised, double-blind, placebo controlled, crossover design study was to investigate the biological activity of a food grade seaweed polyphenol extract (CEVA, France) in terms of reducing oxidative damage to DNA, modulation of inflammatory responses and reduction on chronic, low level inflammation *in vivo*.

Volunteers were randomised to receive either a capsule containing 100 mg seaweed extract or a matched placebo daily for an 8 week period, with an 8 week washout period between each treatment. Fasting blood and urine samples were taken from each volunteer at 4 time-points during the study, at baseline and completion of the 2 treatment phases.

80 apparently healthy volunteers (42.7 (SD 7.1) years, BMI 30.2(SD 3.9) kg/m<sup>2</sup>) were recruited onto the study for 24 weeks; n = 78 completed both treatment periods. Blood and urine samples were analysed for an array of outcome measures including DNA damage to lymphocytes (Comet assay), intracellular cytokine activity (flow cytometer) (in preparation), C-reactive protein (CRP), triglycerides and isoprostane levels.

Parameter (n = 78)	Average baseline value (both)	Placebo treatment effect (change from pre)	Seaweedtreatment effect (change from pre)	Sig.
CRP(mg/l) <sup>1</sup>	2.67 (3.90) <sup>3</sup>	0.01 (3.30)	-0.83 (4.9) (31%↓)	NS
Cholesterol (mmol/l)	5.20 (0.77)	-0.06 (0.57)	-0.10(0.57)	NS
Triglycerides (mmol/l)	1.51 (0.94)	0.01 (0.82)	0.04(0.96)	NS
HDL (mmol/l)	1.37 (0.32)	-0.01 (0.15)	-0.03 (0.15)	NS
LDL (mmol/l)	3.16 (0.10)	-0.08 (0.50)	-0.06 (0.50)	NS
DNA damage (basal) %	6.72 (2.48)	0.74 (2.86)	-0.41(3.13)	NS
DNA damage (+H <sub>2</sub> O <sub>2</sub> ) %	34.20 (7.00)	-1.56 (6.60)	-2.03 (6.40)	NS
F <sub>2</sub> Isoprostanes (pg/ml) <sup>2</sup>	392 (219)	-10 (182)	-6 (138)	NS

<sup>1</sup>Outliers removed s11, s16; <sup>2</sup>Analysis performed on n = 40 only; <sup>3</sup>Values are mean (SD); NS = not significant.

There were no significant changes in either the placebo or seaweed treatment group for any of the parameters measured. However, there was a 31% decrease in CRP, although this did not reach statistical significance. The inflammatory markers are yet to be analysed but may provide additional information on the anti-inflammatory potential of a range of novel seaweed extracts that could be further exploited.

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