Effects of fish oil (MaxEPA) supplementation on fatty acid profile and platelet activating factor generation in human buccal mucosal cells

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Platelet activating factor (PAF) has been implicated as a contributing factor in a number of conditions including heart disease, thrombosis, acute inflammation, asthma and systematic anaphylaxis, immune disorders and gastrointestinal ulceration [1]. Diets enriched with marine n-3 fatty acids have been shown to reduce the production of PAF by human monocyte [2]. The present studies were carried out to determine phospholipid fatty acid composition and PAF generation alterations in human buccal mucosal cells following supplementation with fish oil (MaxEPA). Buccal mucosal cells may prove to be a viable tissue for measurement of fatty acid and PAF changes following dietary fat manipulations as collection of these cells is a relatively simple, non invasive and easy method to perform compared to invasive, painful blood collection by conventional venepuncture techniques.

Volunteers (7 males and 7 females) between the age of 18 and 65 were recruited from the University of Newcastle population by advertisement, excluding those on significant weight reduction diets, vitamin supplements, prescription drugs or smokers. Subjects were supplemented with 12 × 1 g MaxEPA capsules, providing collectively 3.6 g n-3 fatty acids per day for a period of four weeks. Buccal cells were collected by scraping with a wooden spatula and mouth rinsing with physiological saline solution at baseline, 1 week, and 4 weeks after MaxEPA supplementation. PAF production by mucosal cells was assessed by stimulation with a calcium ionophore (A23187) using radioimmunoassy. Fatty acid composition was determined by gas chromatography.

Marine n-3 fatty acids were incorporated into buccal mucosal cells, with a significant difference observed at 1 and 4 weeks for 20:5n-3 and at 4 weeks for 22:6n-3. This was accompanied by a decrease in 20:4n-6, with significance reached after 4 weeks. A general trend in PAF production was observed in both stimulated and unstimulated cells, but the difference did not reach a statistical significance ($p < 0.05$). We conclude that buccal mucosal cells are a viable tissue to determine fatty acid changes rapidly following dietary manipulation, and that A23187 may not be the most appropriate stimulant for PAF production in these cells.

	Baseline[1]	1 week[1]	4 weeks[1]
C20:4n-6 (%)	2.52 ± 0.20	2.53 ± 0.28	2.36 ± 0.15 [a]
C20:5n-3 (%)	0.04 ± 0.04	0.35 ± 0.11 [a]	1.32 ± 0.08 [a]
C22:6n-3 (%)	0.36 ± 0.21	0.31 ± 0.15	1.43 ± 0.09 [a]

[1]mean ± SEM. [a]p = < 0.05.

References

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