

Plasma 8-iso-prostaglandin $F_{2\alpha}$ is lower in pigs fed a diet supplemented with n-3 fatty acidsP Quaggiotto¹, R Blake¹, J Falconer³, J Leitch², and ML Garg¹¹Discipline of Nutrition & Dietetics, The University of Newcastle, Callaghan, NSW, 2308²Cardiovascular Unit, John Hunter Hospital, Newcastle, NSW, 2305³Reproductive Medicine, University of Newcastle, NSW, 2308

Isoprostanes are a novel group of compounds produced spontaneously in vivo by non-enzymatic pathways in tissues. Little is known about their in vivo functions but their potencies in pharmacological tests is similar to other prostanoids. *8-iso-PGF_{2α}* is formed by the free radical catalysed peroxidation of arachidonic acid and has been considered a marker of oxidative stress. It is a potent vasoconstrictor of the renal and cerebral circulation mediating its actions via thromboxane A₂ receptors. Dietary n-3 fatty acids have been shown to be beneficial in preventing heart disease but little is known of the mechanism. Substitution of the n-3 fats in the diet reduces the available arachidonic acid for prostaglandin synthesis and alters the balance of prostanoids within the circulation. We have previously shown that circulating thromboxane A₂ is reduced in pigs fed a diet in n-3 fats compared to those fed a diet high in saturated fats. The objective of this study was to determine whether *8-iso-PGF_{2α}* was altered by dietary n-3 fatty acids. The effects of surgery (high oxygenation) and cardiac ischaemia were also examined.

Pigs (4 weeks old, n=5) were fed a standard 2.5% fat diet supplemented with either 5% beef tallow (saturated fats) or 5% fish oil (n-3 fats). After 6 weeks the pigs were anaesthetised and plasma samples collected before and during thoracic surgery. The left anterior descending coronary artery was occluded and samples collected for 10 minutes of coronary ischaemia. Plasma concentrations of *8-iso-PGF_{2α}* were measured by EIA (Cayman Chemicals).

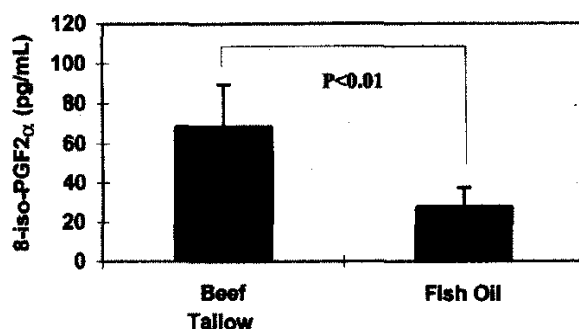


Fig 1. Plasma *8-iso-PGF_{2α}* levels are lower in pigs fed fish oil (n-3 fatty acids) supplemented diets in comparison to those fed a diet supplemented with beef tallow (saturates).

The results are summarised in figure 1. Plasma *8-iso-PGF_{2α}* was found to be significantly ($P < 0.01$) lower in pigs fed a diet supplemented with n-3 fatty acids as compared to a diet high in saturated fats. Surgery induced a 5-7 fold increase in plasma *8-iso-PGF_{2α}* in both dietary groups possibly due to increased oxygenation during anaesthesia. Coronary ischaemia did not alter plasma *8-iso-PGF_{2α}* in either group. These results demonstrate that diet and anaesthesia profoundly affect plasma isoprostanes. This may partly explain the wide variability in the outcome of clinical studies using prostaglandin inhibitors. We suggest that these vasoactive isoprostanooids, which may be produced in significant quantities during surgery even in patients on aspirin therapy, require further study.