

Sex Differences in Vascular Function Following Antioxidant Supplementation

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Objectives: Sex differences in cardiovascular disease risk and progression are well established. Estrogen loss following menopause leads to vascular dysfunction, potentially due to elevations in oxidative stress and subsequent decrements in nitric oxide. It is possible a reduction in oxidative stress utilizing an antioxidant supplement could improve vascular function in older females. **Methods:** Forty-seven young (27 ± 0.5 years, 23 M and 24 F) and 46 older (59 ± 0.7 years, 23 M and 23 F) subjects underwent measures of vascular function following both placebo and antioxidant supplementation in a randomized, double-blind, crossover study. **Results:** Young males displayed higher central and peripheral pressures, stiffer arteries and decreased macrovascular endothelial function when compared to young females, and this was reversed with aging, with females developing stiffer arteries, higher pressures and endothelial dysfunction to match the older male group. Young males were more responsive to AOX and showed improvements in macrovascular function following AOX. In the older group, although both males and females improved FMD% with AOX, females were more responsive and improved significantly more. **Conclusions:** These results demonstrate the potential role of oxidative stress in estrogen loss and subsequent arterial dysfunction, possibly due to reductions in nitric oxide bioavailability.

Table: Pressure and vascular response following placebo and AOX supplementation in Young and Older Adults.

	Young (n=47)				Older (n=46)			
	Males (n=23)		Females (n=24)		Males (n=23)		Females (n=23)	
	Placebo	AOX	Placebo	AOX	Placebo	AOX	Placebo	AOX
bSBP (mmHg) #	126±2*	125±2*	106±2	105±2	128±4	127±3	127±4	125±3
bDBP (mmHg) #	71±1*	69±1*\$	64±1	65±1	76±2	75±2	77±2	77±2
aSBP (mmHg) #	106 ± 1	105 ± 2	93 ± 1	91 ± 2	119 ± 4	118 ± 3	120 ± 4	119 ± 3
cPWV (m/s) #	6.4±0.2	6.1±0.6	5.9±0.2	6.4±0.6	8.1±0.5	8.5±0.4	8.4±0.5	7.4±0.5
Carotid Arterial Compliance (mm ² /kPa) #	1.1±0.8*	1.1±0.6*	1.5±0.8	1.4±0.6	0.95±0.59*	0.91±0.51	0.77±0.59	0.80±0.51

Significance p<0.05, Mean ± SEM. AOX, antioxidant supplementation; bSBP, brachial systolic blood pressure; bDBP, brachial diastolic blood pressure; aSBP, aortic systolic blood pressure; cPWV, central pulse wave velocity.

*significant sex difference

\$ significantly different from placebo

significant age group differences

Figure: Flow Mediated Dilation Following Placebo and AOX supplementation in Young and Older Adults. There were significant differences between age groups at both placebo and AOX condition. *denotes a significant difference between sexes, \$ denotes a significant difference from placebo.

