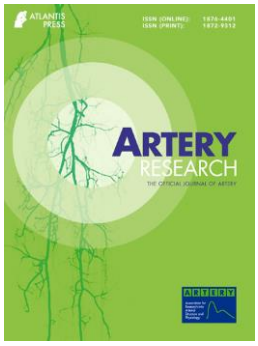

Artery Research

ISSN (Online): 1876-4401 **ISSN (Print): 1872-9312**
Journal Home Page: https://www.atlantis-press.com/journals/artres

PO-14: PULSE WAVE VELOCITY IS INCREASED WITH EXPERIMENTAL SLEEP RESTRICTION IN HEALTHY HUMANS

Jacqueline K. Limberg, Naima Covassin, Michael J. Joyner, Virend K. Somers

To cite this article: Jacqueline K. Limberg, Naima Covassin, Michael J. Joyner, Virend K. Somers (2016) PO-14: PULSE WAVE VELOCITY IS INCREASED WITH EXPERIMENTAL SLEEP RESTRICTION IN HEALTHY HUMANS, Artery Research 16:C, 93–93, DOI: https://doi.org/10.1016/j.artres.2016.08.022

To link to this article: https://doi.org/10.1016/j.artres.2016.08.022

Published online: 7 December 2019

PO-13
SEX DIFFERENCES IN VASCULAR FUNCTION FOLLOWING ANTIOXIDANT SUPPLEMENTATION

R. M. Kappus [1,2], K. Bunsawat [2], J. M. Haus [2], T. Baynard [2], S. A. Phillips [2], M. D. Brown [2], B. Fernhall [2]
[1]*Appalachian State University, Boone, NC, United States*
[2]*University of Illinois at Chicago, Chicago, IL, United States*

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.

PO-14
PULSE WAVE VELOCITY IS INCREASED WITH EXPERIMENTAL SLEEP RESTRICTION IN HEALTHY HUMANS

Jacqueline K. Limberg [1], Naima Covassin [2], Michael J. Joyner [1], Virend K. Somers [2]
[1]*Department of Anesthesiology, Mayo Clinic, Rochester, MN, United States*
[2]*Department of Cardiovascular Diseases, Mayo Clinic, Rochester, MN, United States*

Objectives: Increased carotid-femoral pulse wave velocity is indicative of vascular stiffening of the central arterial tree. Aortic stiffness is a key risk factor for the development of hypertension and cardiovascular disease. Following acute (24-hour) sleep deprivation, healthy adults exhibit an increase in carotid-femoral pulse wave velocity; however, acute sleep deprivation poorly represents sleep patterns observed in everyday life. With this information in mind, we hypothesized a prolonged (9 day) exposure to restricted sleep (4 hours of sleep per night) would result in increases in carotid-femoral pulse wave velocity in healthy humans.
Methods: Seven (3M, 5F) young (23±1 yrs), healthy adults underwent a 4-day period of acclimation followed by 9 days of experimental sleep restriction (4 hours of sleep per night — from 12:30 AM to 4:30 AM). High-fidelity radial arterial pressure waveforms and carotid-femoral pulse wave velocity were assessed using applanation tonometry (SphygmoCor, AtCor Medical). Subjects were studied on Day 2 (Acclimation) and Day 13 (Restriction).
Results: Sleep restriction resulted in an increase in carotid-femoral pulse wave velocity (5.6±0.2 to 5.9±0.2 m/s, $p=0.05$) and a decrease in round trip time (179±8 to 150±11 ms, $p<0.01$) when compared to the acclimation period. A reduction in the Buckberg subendocardial viability ratio (SEVR, indicative of myocardial oxygen supply/demand, $p=0.02$) and an increase in the Pressure-Time Integral Systole (PTI, an index of cardiac load, $p=0.01$) were also observed following sleep restriction.
Conclusions: Prolonged (9-day) exposure to experimental sleep restriction in young healthy humans results in unfavorable changes in central macrovascular function, including an increase in central arterial stiffness and cardiac load. These results may have important implications for the increase in cardiovascular disease risk in individuals experiencing limited sleep.

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

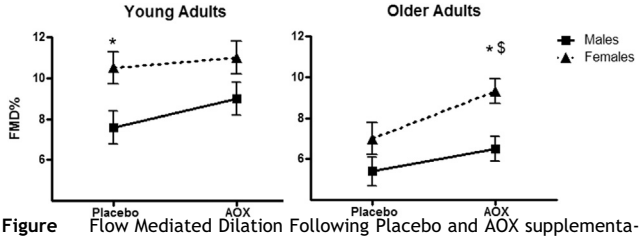

Figure Flow Mediated Dilation Following Placebo and AOX supplementation in Young and Older Adults. There were significant differences between age groups at both placebo and AOX condition. *denotes a significant difference between sexes, $ denotes a significant difference from placebo.

PO-16
BLOOD PRESSURE VARIABILITY AND BARORECEPTOR SENSITIVITY IN NORMOTENSIVE OBESE IN RESPONSE TO AEROBIC EXERCISE

Georgios Grigoriadis, Kanokwan Bunsawat, Bo Fernhall, Tracy Baynard
Integrative Physiology Laboratory, Department of Kinesiology and Nutrition, University of Illinois at Chicago, Chicago, IL, United States

Background: Autonomic dysfunction, with increased sympathetic activity at rest has been reported in obese individuals. Indices of blood pressure variability