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Critical element that improves vascular function in postmenopausal women found

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Researchers studying why arteries stiffen in postmenopausal women have found a specific chemical cofactor that dramatically improves vascular function.

Kerrie Moreau, Ph.D., Associate Professor of Medicine at the University of Colorado School of Medicine, discovered that BH4 or tetrahydrobiopterin plays a key role in arterial health of women. BH4 is a critical cofactor of the enzyme endothelial nitric oxide synthase or eNOS. The two combine to create nitric oxide which is highly beneficial to arterial health.

"Nitric oxide causes arteries to dilate, without it they are more constricted which can lead to arterial stiffening. That stiffening can cause high blood pressure, thickening of the left ventricle and increase the risk for stroke, heart disease and dementia" said Moreau, who works in the Division of Geriatrics at CU School of Medicine. "If there is not enough BH4, the eNOS enzymatic function does not work as well and less nitric oxide is produced. That leads to an increase in free radical formation or oxidative stress. Increased oxidative stress can decrease the amount of nitric oxide and BH4, creating a vicious cycle."

The study will be published in the American Journal of Physiology – *Heart and Circulatory Physiology*.

Moreau, the lead researcher in the study, gave BH4 to estrogen-deficient, postmenopausal women and assessed them three hours later.

She found that dilation of the arteries increased while stiffness decreased. When premenopausal women were given BH4, nothing happened.

Researchers also took two groups of postmenopausal women and gave one group a placebo and the other estrogen patches. They examined the results 48 hours later and discovered those who took estrogen experienced similar effects to those given BH4 while the women who received placebos experienced no changes. When the women who were taking estrogen were also given BH4 there was no further benefit.

"That suggests estrogen may benefit arteries by maintaining BH4 levels," Moreau said. "Having adequate BH4 levels would result in increased nitric oxide and decreased free radicals, promoting vasodilatation and reducing arterial stiffness."

It has been long known that menopause has significant impacts on women's health.

"Menopause is like an accelerated aging process," Moreau said."When women hit menopause you see this dramatic decline in arterial health." Moreau's discovery of the key role BH4 plays in this process sheds more light on the decline in arterial health and why it may not be inevitable.

"As we identify the causes of the vascular health decline we can next intervene with appropriate therapeutic strategies including exercise, diet and/or hormone therapy," she said. "Heart disease is the number one killer of men and women but it is underappreciated in women who need a better understanding of cardiovascular health."

Provided by University of Colorado Denver