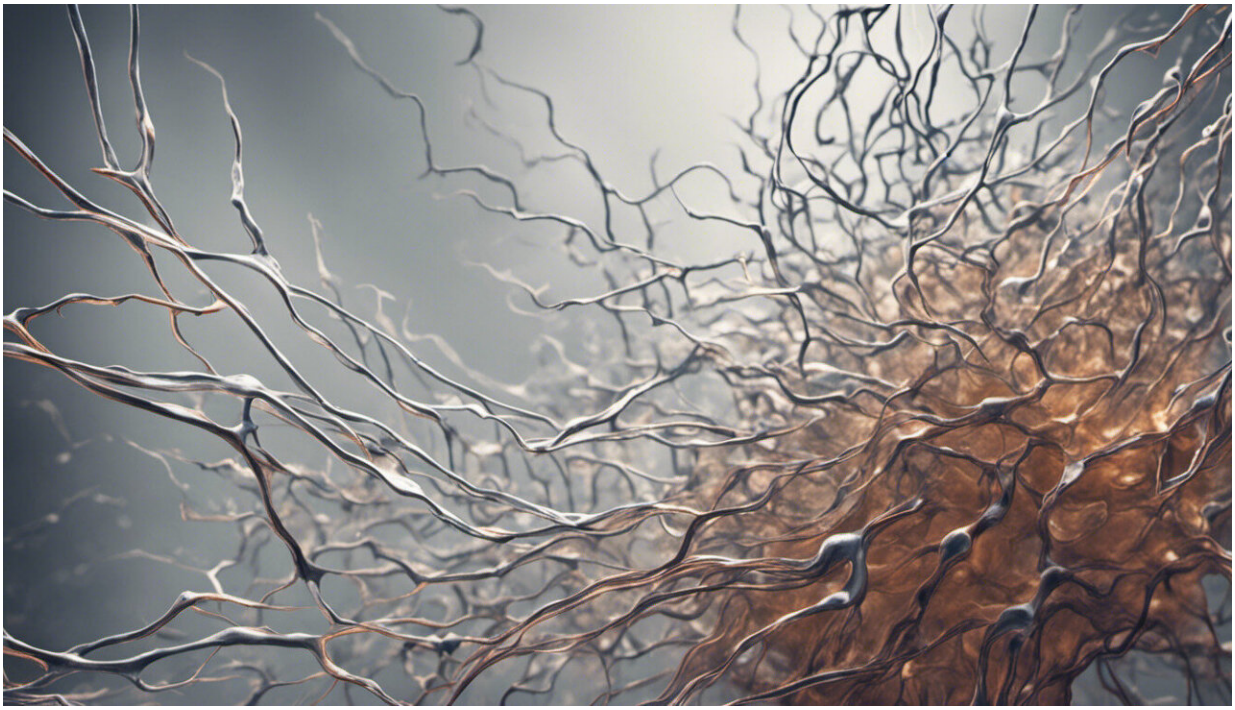
An ancient molecule underlies the mechanism for sleep apnea and vascular problems

June 2 2014, by Helen Dodson



Credit: AI-generated image (disclaimer)

(Medical Xpress)—The underlying mechanism of obstructive sleep apnea that causes damage to blood vessels and contributes to hypertension, stroke, and atherosclerosis has been identified by researchers from Yale and elsewhere. The finding points to potential biomarkers for early diagnosis and treatment of these conditions. The

study appears in *PLOS ONE*.

Obstructive sleep apnea (OSA) is characterized by recurrent upper airway obstruction while sleeping. It affects up to a fourth of all adults and is associated with increased risk of hypertension, stroke, and cardiovascular disease. But until now, the underlying mechanisms were not fully established.

Current evidence suggests, the authors write, that inflammatory processes, oxidative stress, and dysfunction in the inner lining of blood vessels—the endothelium—play roles in the vascular complications of OSA. In addition, endothelial dysfunction is the earliest event in atherosclerosis and plays a pivotal role in all phases of that condition, including plaque rupture.

The researchers studied 37 adults who suffer from OSA. Nearly a third were hypertensive. The capacity of their blood vessels to relax was evaluated by Doppler ultrasonography. YKL-40, an ancient molecule that exists in hard-shell creatures and is highly conserved all the way to humans, was found to be elevated exclusively in OSA patients with endothelial dysfunction and hypertension. The dysregulation of YKL-40 is due, in part, to disruption of vascular endothelial growth factor signaling—a signaling protein that helps to create and repair blood vessels. YKL-40 contributes to fibrosis and wound healing, but higher levels are seen in asthma and other inflammatory disorders, and often correlate with disease severity.

"We believe this study provides potential biomarkers for a constellation of disorders related to obstructive sleep apnea, making early diagnosis and successful treatment much more likely," said senior author Dr. Vahid Mohsenin, professor of medicine in the pulmonary, critical care, and sleep medicine section of Yale School of Medicine, and a fellow at the John B. Pierce Laboratory.

Medical Xpress

More information: Jafari B, Elias JA, Mohsenin V (2014) "Increased Plasma YKL-40/Chitinase-3-Like-Protein-1 Is Associated with Endothelial Dysfunction in Obstructive Sleep Apnea." *PLoS ONE* 9(5): e98629. DOI: 10.1371/journal.pone.0098629

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