

# Daily rhythms in blood vessels may explain morning peak in heart attacks

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It's not just the stress of going to work. Daily rhythms in the activity of cells that line blood vessels may help explain why heart attacks and strokes occur most often in early morning hours, researchers from Emory University School of Medicine have found.

Endothelial cells serve as the interface between the blood and the arteries, controlling arterial tone and helping to prevent clots that lead to strokes and heart attacks, says Ibhar Al Mheid, MD, a postdoctoral cardiology researcher at Emory.

He is scheduled to present his results in a poster session Monday, Nov. 10 at the American Heart Association Scientific Sessions in New Orleans.

"One of the important ways the lining of our blood vessels is maintained is by progenitor cells that come from the bone marrow," Al Mheid says. "These are essentially stem cells that help replace endothelial cells at sites of injury and build new vessels at sites deprived of adequate blood supply. The aim of our research was to look at the circadian pattern of both endothelial function -- the ability of blood vessels to relax -- and the abundance of the progenitor cells."

Working with Arshed Quyyumi, MD, professor of medicine and director of the Emory Cardiovascular Research Group, and colleagues, Al Mheid examined a dozen healthy middle-aged subjects every four hours for 24 hours. They drew blood while the subjects were asleep at 4 a.m. Blood

vessel relaxation is assessed by cuff occlusion, a standard technique in measuring blood pressure – and was not measured at 4 a.m.

The researchers measured the ability of subjects' blood vessels to relax, the abundance of endothelial progenitor cells (EPCs) and their ability to grow in culture. Both the ability of blood vessels to relax and EPCs' ability to grow peaked (roughly 40 percent more than the middle of the day) at midnight, while cell numbers peaked at 8 p.m.

"The lining of our vessels appears to function better at night than in the day. Endothelial function is particularly depressed in the early morning hours," Al Mheid says.

He hypothesizes that an innate circadian timer in the brain, which other scientists have shown to be influenced by light and dark and daily activities, drives the cyclical variations in EPCs and endothelial function.

Source: Emory University

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