MedicalXpress

Body clock found to regulate platelet function

September 9 2011

Researchers at Brigham and Women's Hospital (BWH) have demonstrated that the circadian system, the body's internal clock, regulates human platelet function and causes a peak in platelet activation corresponding to the known morning peak in adverse cardiovascular events. These findings are published in *PLoS ONE* on September 8, 2011.

"Cardiovascular disease is still the number one cause of death in developed countries, and we know major adverse cardiovascular events do not occur at random, but are more frequent in the morning," said lead author Frank Scheer, PhD, Assistant Professor of Medicine at the Division of Sleep Medicine at BWH. "Understanding the underlying factors for this morning peak in adverse events has the potential to address this pattern and decrease the risk."

In this study, the researchers demonstrated that the body clock regulates platelet function and causes a peak in platelet activation corresponding to the morning peak in adverse cardiovascular events such as myocardial infarction and stroke. A high level of platelet activation can lead to adverse cardiovascular events by influencing blood clotting. According to Scheer, this finding mimics the pattern of morning peaks in cardiovascular risk and tells us that platelet function is likely one of the factors that contributes to this morning peak in adverse cardiovascular events.

"Further study is required to test whether this circadian pattern in platelet activation, as demonstrated here in healthy subjects, is shifted in

time or has different rhythm amplitude in people with cardiovascular disease," Scheer said.

The study used a forced desynchrony protocol during which required healthy young subjects to live on a 20-hour day for 12 cycles in a dim-light, time-free, and controlled environment. The design of this protocol allowed the isolation of the effect of the internal circadian timing system on platelet function, independent of effects of the sleep/wake cycle and other behavioral or environmental changes. Platelet function was assessed by flow cytometry and whole blood platelet aggregability.

Advancing the understanding of the underlying mechanisms for this morning peak is expected to have important clinical relevance. "We believe it's likely that there are many other factors that contribute to the peak in adverse cardiovascular events in the morning," said Dr. Scheer. "The next steps in addressing this issue are to further investigate control mechanisms involved in the circadian rhythm in platelet function, the role of the circadian system in other cardiovascular risk factors, and the changes in circadian control of cardiovascular risk factors in vulnerable populations."

Provided by Brigham and Women's Hospital