Marie-Pierre St-Onge, Ph.D, FAHA

Prior clinical intervention studies indicate an increased cardio-metabolic risk due to sleep restriction but causality has been difficult to ascertain due to the acute, short-term nature of the previous studies. The Clinical Science project will be a 6week, randomized, crossover, outpatient sleep restriction (SR) intervention in pre-menopausal and post-menopausal women. The main aims will be to determine whether restricting sleep to a degree that is similar to short sleep duration in epidemiological studies negatively impacts energy balance (diet, physical activity, body composition) and cardio-metabolic risk factors, and to determine whether menopausal status is a key modulator of risk. Women will undergo two experimental phases differing in the amount of time they will be permitted to sleep: either habitual sleep (HS) or sleep restriction (SR = HS minus 1.5 hours). Pre-menopausal and post-menopausal women with a BMI 25-29.9 kg/m2, will be recruited from participants in the proposed Go Red Population Science study. During the HS phase, participants will be asked to follow a fixed bedtime routine based on their screening sleep schedule. During the SR phase, women will be asked to keep their habitual wake time constant but delay their bedtime to achieve a reduction of 1.5 hours in total sleep time. On the first day of each study phase (baseline), participants will come to the Clinical Research Center at Columbia University in the morning after an overnight fast to obtain blood pressure, oral glucose tolerance (insulin resistance), and anthropometric measurements. Body composition will be assessed using magnetic resonance imaging for the primary endpoint of visceral adiposity. An endothelial biopsy will be taken as the source of material for the Go Red Basic Science project. Participants will begin the fixed bedtime routine that night. Baseline measurements will be repeated at endpoint, 6 weeks later. Body weight and waist circumference will be measured weekly and fasting blood samples will be taken at midpoint during the adherence check visit and provided to the Basic Science project. Diet and physical activity will be assessed by food records and actigraphy throughout each sleep phase. Results from this intervention will allow us to firmly establish a role of sleep duration in the causal pathway relating short sleep duration and CVD and verify whether menopausal status modifies the association between sleep and cardiometabolic risk.