

Klein, L. C., Whetzel, C. A., Bennett, J. M., Ritter, F. E., & Granger, D. A. (2006 March). Effects of caffeine and stress on salivary alpha-amylase in young men: A salivary biomarker of sympathetic activity. *Psychosomatic Medicine* 68(1). A-4. [abstract of talk presented at the annual meeting of the American Psychosomatic Society, Denver, CO.] <http://www.psychosomaticmedicine.org/misc/AbstractsForJournal062-9final.pdf>

Please do not cite without permission (full paper in preparation).

EFFECTS OF CAFFEINE AND STRESS ON SALIVARY ALPHA-AMYLASE IN YOUNG MEN: A SALIVARY BIOMARKER OF SYMPATHETIC ACTIVITY

Laura Cousino Klein, Courtney A. Whetzel, Jeanette M. Bennett, Frank E. Ritter, Douglas A. Granger, Penn State University

Alpha-amylase (AA), an enzyme secreted by the salivary glands, may be a marker for sympathetic nervous system (SNS) reactivity to stress. New assay methods allow reliable detection of salivary AA, which provides an opportunity to measure SNS activation in the laboratory without the difficulty of invasive blood drawing procedures or complex psychophysiological recording equipment. To explore the utility of this new biomarker in stress research, the present study examined whether AA levels respond to stress and caffeine (a known sympathomimetic) in 45 healthy men aged 18-30 years (21.2 +/- 0.4 yrs). Participants were daily caffeine consumers, did not use tobacco or nicotine products, were not taking over-the-counter or prescription medications, and did not have health conditions that would affect the dependent measures. Participants arrived at the laboratory at 1 PM where they were administered one of three doses of caffeine: none (placebo), 200 mg caffeine (equivalent to 1-2, 8oz cups of coffee), or 400 mg caffeine (equivalent to 3-4, 8oz cups of coffee). Participants then were asked to complete the mental arithmetic portion of the Trier Social Stress Task for 20 minutes. Saliva samples were collected during baseline (before caffeine and stress) and 15 minutes after the stressor to determine AA responses to the challenge. Blood pressure and heart rate also were measured throughout the study. As expected, blood pressure and heart rate increased in response to stress ($P < 0.05$) and to caffeine ($P < 0.05$). AA levels also increased in response to stress and to caffeine administration ($P < 0.05$). These stress- and caffeine-induced increases in AA were associated with increased heart rate levels ($P < 0.05$). This effect of caffeine and stress on salivary AA, linked with changes in HR, supports the hypothesis that AA is a surrogate biomarker of SNS activation.

CORRESPONDING AUTHOR: L.C. Klein, Ph.D., Biobehavioral Health Department, Penn State, 315 East HHD, University Park, PA 16802 USA