

What saliva says about stress

HAMILTON, ON (26 June 2017)

A salivary gland protein is an effective biological marker of human stress, according to new research led by [Dr. Dean Befus](#), an AllerGen Research Leader and a professor of Pulmonary Medicine at the University of Alberta.

The [research](#), published in June 2017, provides the first evidence that the protein known as calcium-binding protein spermatid specific 1 (CABS1) is readily detectable in human saliva and that its levels are influenced by acute psychological stress and feelings of negative mood or emotional distress. These findings may help to identify new ways to predict, diagnose and eventually treat stress-related conditions.

“We predicted that CABS1 levels would be elevated during stress, so we analyzed its concentrations in humans both in the laboratory and in stressful situations, such as university final exams,” says Dr. Befus, who is also the Astra-Zeneca Canada Inc. Chair in Asthma Research. “Saliva contains a vast array of proteins and bioactive molecules. Typically, the hormone cortisol is used as an indicator of stress but we have found that CABS1 is also a stress-sensitive marker of acute stress, negative mood, and inflammation.”

For the research, Dr. Befus’ team collaborated with psychologist [Dr. Thomas Ritz](#) from Southern Methodist University in Dallas, Texas. Dr. Ritz collected saliva samples and other measures of stress from participants in three separate studies.

In the first study, researchers recorded weekly baseline measurements of CABS1 concentrations in participants’ saliva. In a second study, representing an acute psychological stress, participants were unexpectedly allotted five minutes to prepare an oral presentation on an assigned topic and instructed to deliver the presentation to an expert panel while being videotaped. Following their presentations, participants were asked to also complete a challenging mental arithmetic task. In a third study, representing real-life stress, participants provided data at three assessment points: one at a low-stress period during the middle of the university term when they had no exams or major projects, and two at high-stress periods during final exams at the end of the academic term.

Levels of CABS1 were increased in the saliva of those participants who self-reported negative mood and acute stress, and of those with higher depressive and anxious mood in the preceding week. CABS1 was also associated with markers of inflammatory activity. Certain variants of CABS1 may also be markers of resilience to stress in some individuals.

In an earlier AllerGen-supported study, Dr. Befus and colleagues identified CABS1 as a novel salivary protein and showed in two animal models that it reduced inflammation and anaphylaxis. This new research adds to our understanding of the activity of CABS1 in humans.

“Our findings suggest a sensitivity of CABS1 to acute stress and an association of this protein with self-reports of perceived stress and depressive mood,” says Dr. Befus. “Given the substantial health and economic burden imposed by stress, we believe CABS1 holds promise for monitoring stress and predicting how some individuals may respond to stressful situations.”

Dr. Befus and his colleagues are currently developing a non-invasive CABS1-based saliva test that may have therapeutic applications in acute and chronic stress, post-traumatic stress syndrome, and acute respiratory distress syndrome.

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