Name(s)

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Project Number

S1311

Project Title

Impact of Substance Use on Cytokine Levels in Healthy Female Individuals

Abstract

Objectives/Goals

Substance (tobacco, alcohol) use and various inflammatory diseases (periodontitis, oral lichen planus, leukoplakia) induce chronic inflammation, which is a mechanism for head and neck squamous cell carcinoma (HNSCC). Analysis of salivary cytokine levels reveals abnormal cytokine production, which, if detected early enough, could improve treatment and survival rates for HNSCC. The correlation between substances (tobacco, alcohol, and marijuana) and cytokine levels has not been well researched. Measuring the cytokine levels in saliva samples of healthy, substance using individuals may identify biomarkers of individuals at risk of cancer. This study aims to investigate the correlation between substance use (tobacco, alcohol, marijuana) and cytokine levels (IFN-a, IL-10, IL-12, IL-13, MIP-1a, TNF-a, IL-4, IL-6, IL-8, IL-1a, IL-1b) in healthy female individuals and to determine if there is a role for saliva as a risk factor analytic medium for head and neck cancers.

Methods/Materials

Samples of saliva, collected from healthy female individuals, were obtained for a previous, unrelated study and stored in a -80°C freezer. Luminex-based multi-analyte MILLIPLEX MAP Human Cytokine/Chemokine Magnetic Bead Kits (Millipore Corp., Billerica, MA) and MAGPIX imaging technology was used to analyze the saliva samples (group 1, controls, n=24; group 2, tobacco and light alcohol use, n=21; group 3, tobacco and heavy alcohol use, n=18; group 4, marijuana and light tobacco/alcohol use, n=8).

Results

There was a statistically significant difference in cytokine IL-1B levels between the control group (n=24, SD=23.72) and the tobacco/light alcohol user group (n=21, SD=50.97), $p<0.05$. There was also a statistically significant difference in cytokine interleukin (IL)-8 levels between the control group (n=22, SD=242.71) and the tobacco/heavy alcohol user group (n=18, SD=422.88), $p<0.01$.

Conclusions/Discussion

The results of this pilot study suggest that young women who use tobacco and alcohol heavily are already showing signs of chronic inflammation that make them at risk for head and neck cancer later on. These findings also indicate that a saliva-based test could be a cost-effective tool in assisting early diagnosis of head and neck cancer through promising associations of substance use and cytokines.

Summary Statement

By measuring salivary cytokine levels in healthy female individuals, I identified possible biomarkers for people at risk of head and neck cancers.

Help Received

The saliva samples and the equipment I used were provided by Dr. Moscicki, the PI of the lab at UCLA where I conducted my research. I designed the experiment, processed the samples, and analyzed the data on my own. Dr. Moscicki and Hazel Huang, the project adviser, also reviewed my work upon completion.