Impact of Substance Use on Salivary Cytokine Levels in Healthy Female Individuals

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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 substance use and cytokine levels has not been well researched. This pilot study examines the correlation between substance use (tobacco, alcohol, marijuana) and cytokine levels (IFN-α, IL-10, IL-12, IL-13, MIP-1α, TNF-α, IL-4, IL-6, IL-8, IL-1α, IL-1β) in 71 healthy women (25-32 years old). 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. There was a statistically significant difference in cytokine interleukin (IL)-1β levels between the control group (n=24, SD=26.90) and the tobacco/light alcohol user group (n=21, SD= 164.14), $p \leq 0.05$. There was also a statistically significant difference in cytokine IL-8 levels between the control group (n=24, SD=236.58) and the tobacco/heavy alcohol user group (n=18, SD=295.26), $p \leq 0.01$. These results suggest that young women who use tobacco and alcohol heavily are already showing signs of chronic inflammation that make them at risk for HNSCC later on. With more research, a saliva-based test could be a cost-effective tool in assisting early diagnosis of head and neck cancers through promising associations between substance use and pro-inflammatory cytokines.

Awards Won:

University of the Sciences in Philadelphia: Tuition Scholarship of $15,000 per year for four years.