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Title: Comparative Structural and Molecular Analysis of Tear and Salivary Derived Exosomes in Sjögren's Syndrome

Research Description: Primary Sjögren's Syndrome (SS) is an autoimmune disease that disproportionately affects women. SS is characterized by dryness of the eyes and mouth. SS can also cause digestive and breathing issues and in rare cases, lead to cancer. Most patients with SS struggle with symptoms for years before an accurate diagnosis can be made. Even then, most treatment measures are aimed at managing the symptoms of SS rather than curing or preventing progression of the disease. Exosomes are small vesicles that are found in most body fluids. The goal of this project is to examine the structure and molecular biology of these small vesicles that are present in saliva and tears in women with SS. We believe that these small vesicles hold great promise in both allowing us to identify early diagnostic markers of SS and may be useful in developing new treatments to manage and/or prevent SS.

Scientific Abstract: Primary Sjögren's Syndrome (SS) is an autoimmune exocrinopathy characterized by severe xerostomia and keratoconjunctivitis sicca. The major problem facing Sjögren's patients and clinicians today remains the absence of effective biomarkers to allow for early detection and treatment. Exosomes are small extracellular vesicles that play a role in intercellular communication and mediate key immune regulatory functions. Exosomes are increasingly being investigated as biomarkers in disease. Based upon available data, we propose to test the hypothesis that saliva and tear derived exosomes will contain biomarkers unique to patients with primary SS. We will test this hypothesis by characterizing the ultrastructural biology and molecular signature of saliva and tear derived exosomes from women with primary SS compared to age-matched healthy controls using cryo-electron microscopy and next generation RNA-sequencing. The identification and characterization of the exosomal structure and molecular profile is the first step in the identification of novel, early biomarkers for SS.