

# Raman Hyperspectroscopy of Saliva and Machine Learning for Sjögren's Syndrome Diagnostics

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## **Abstract**

Sjögren's syndrome is an autoimmune disorder affecting exocrine glands, causing dry eyes and mouth and other morbidities. Polypharmacy or a history of radiation to the head and neck can also lead to dry mouth. Sjögren's syndrome is often underdiagnosed due to its non-specific symptoms, limited awareness among healthcare professionals, and the complexity of diagnostic criteria, limiting the ability to provide therapy early. Current diagnostic methods suffer from limitations including the variation in individuals, the absence of a single diagnostic marker, and the low sensitivity and specificity, high cost, complexity, and invasiveness of current procedures. Here we utilized Raman hyperspectroscopy combined with machine learning to develop a novel screening test for Sjögren's syndrome. The method effectively distinguished Sjögren's syndrome patients from healthy controls and radiation patients. This technique shows potential for development of a single non-invasive, efficient, rapid, and inexpensive medical screening test for Sjögren's syndrome using a Raman hyper-spectral signature.