

A Capacitive Biosensor for the Early Detection of Pancreatic Cancer Using Carbohydrate Antigen 19-9

9th International Electronic Conference on Sensors
and Applications

November 2022

Taskeen Ebrahim



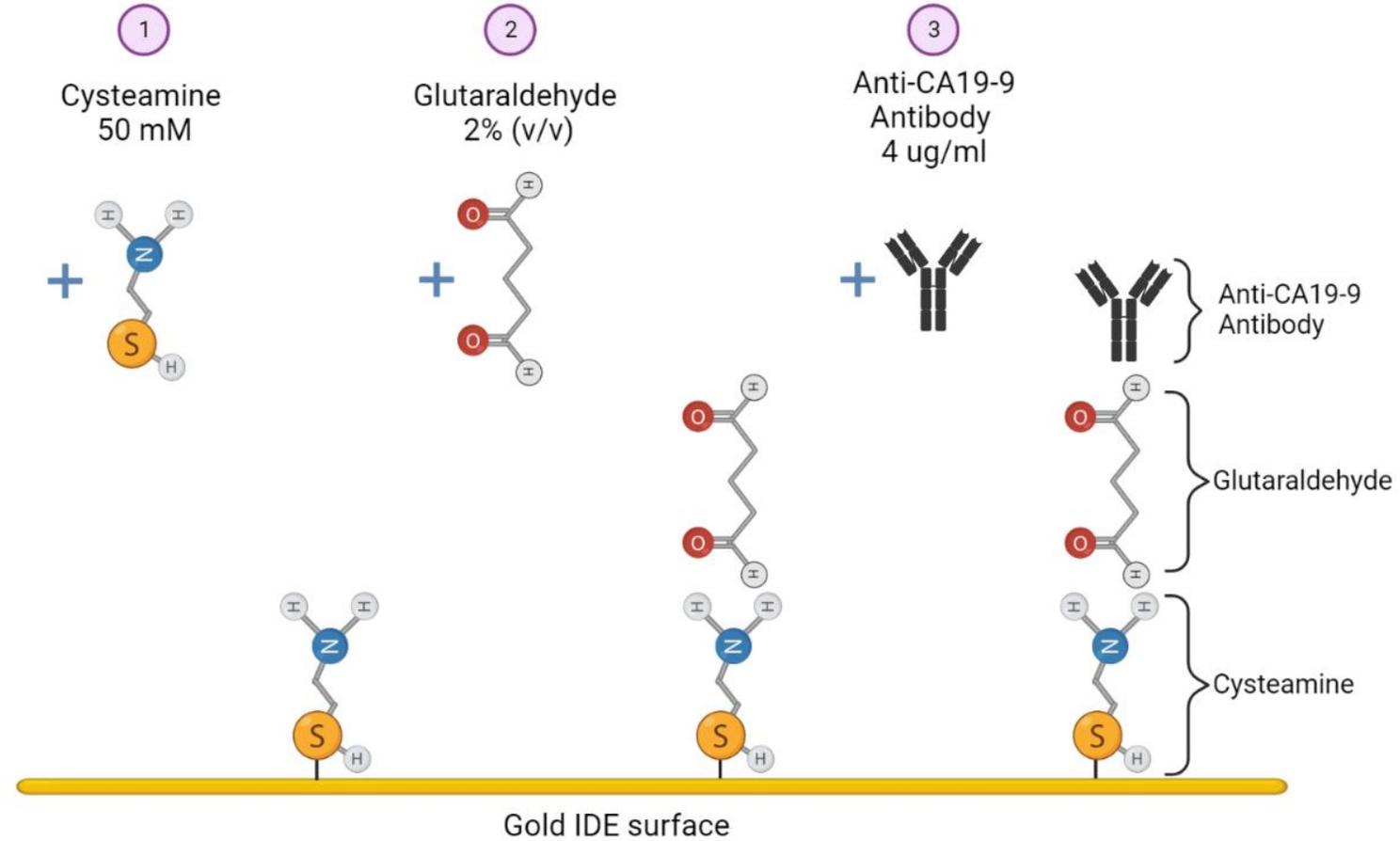
Contents

- Introduction
- Materials and Methods: Antibody Immobilization
- Materials and Methods: Immobilization Validation
- Materials and Methods: Antigen Tests
- Results: Microscopy
- Results: Antigen Tests
- Discussion

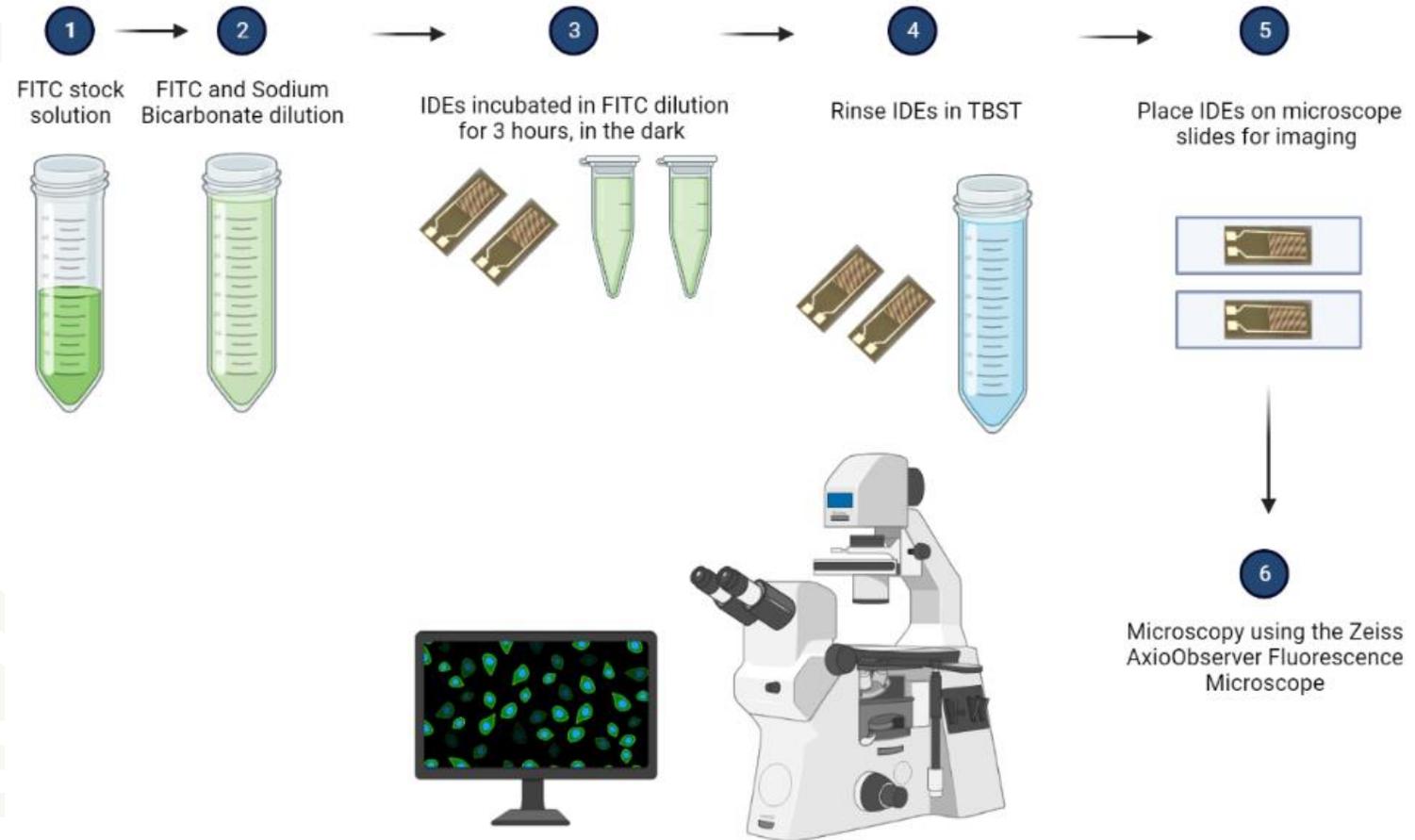
Introduction

- Pancreatic cancer mortality rate
- CA19-9 as a biomarker for the early detection of pancreatic cancer
- Electrochemical biosensors
- Impedance and capacitance spectroscopy
- Variation of real capacitance with increased concentration of CA19-9

Antibody Immobilization

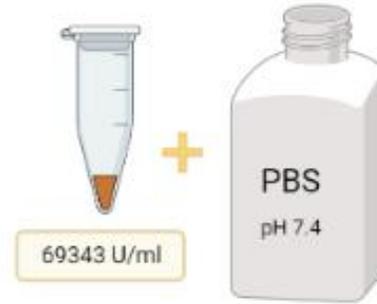


Immobilization Validation

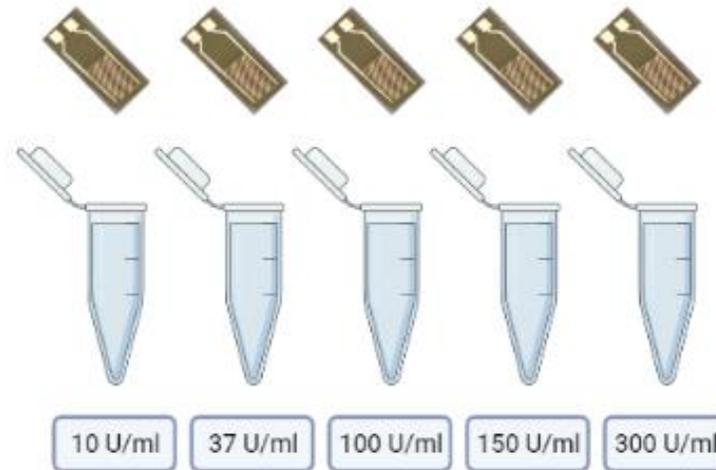


Antigen Tests

- 1 Dilute CA19-9 from stock solution in PBS



- 2 Incubate IDEs in CA19-9 for 45 minutes

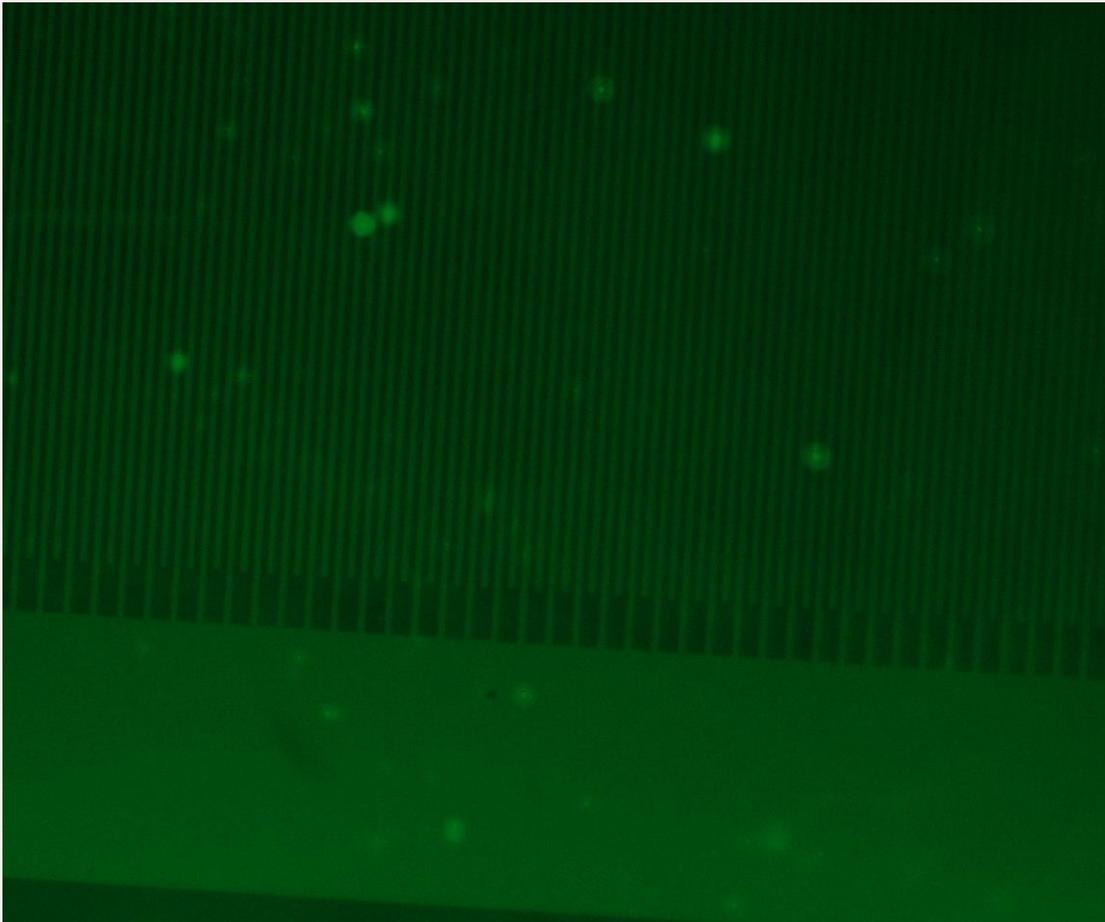


- 3 EIS Measurements with PalmSens4 Electrochemical Interface

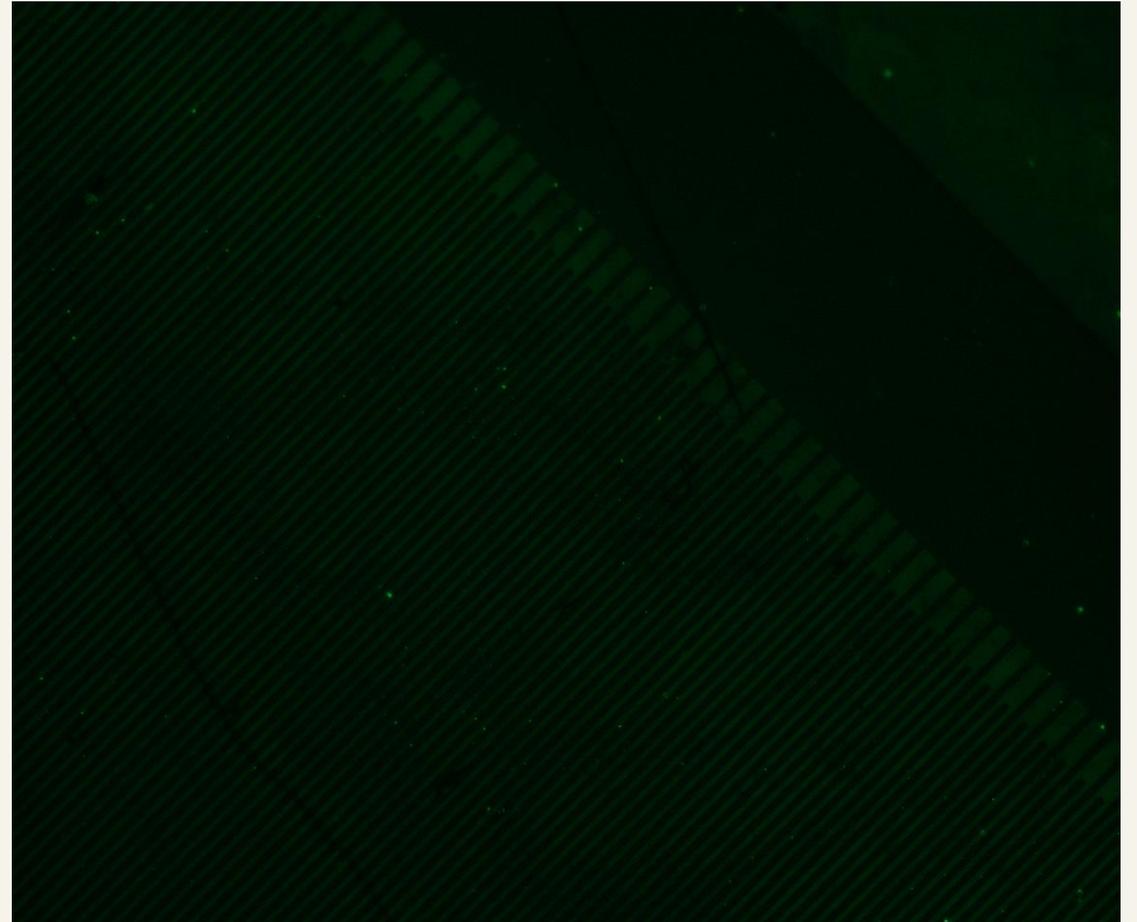


Results: Microscopy

Sample with immobilized antibody

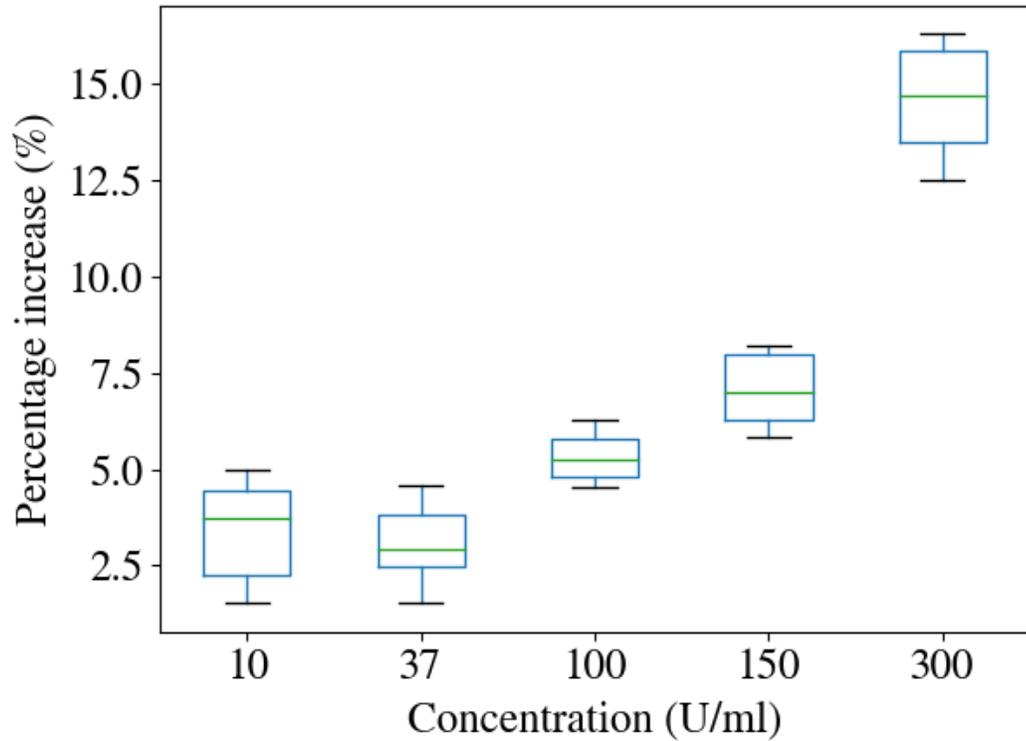


Control Sample

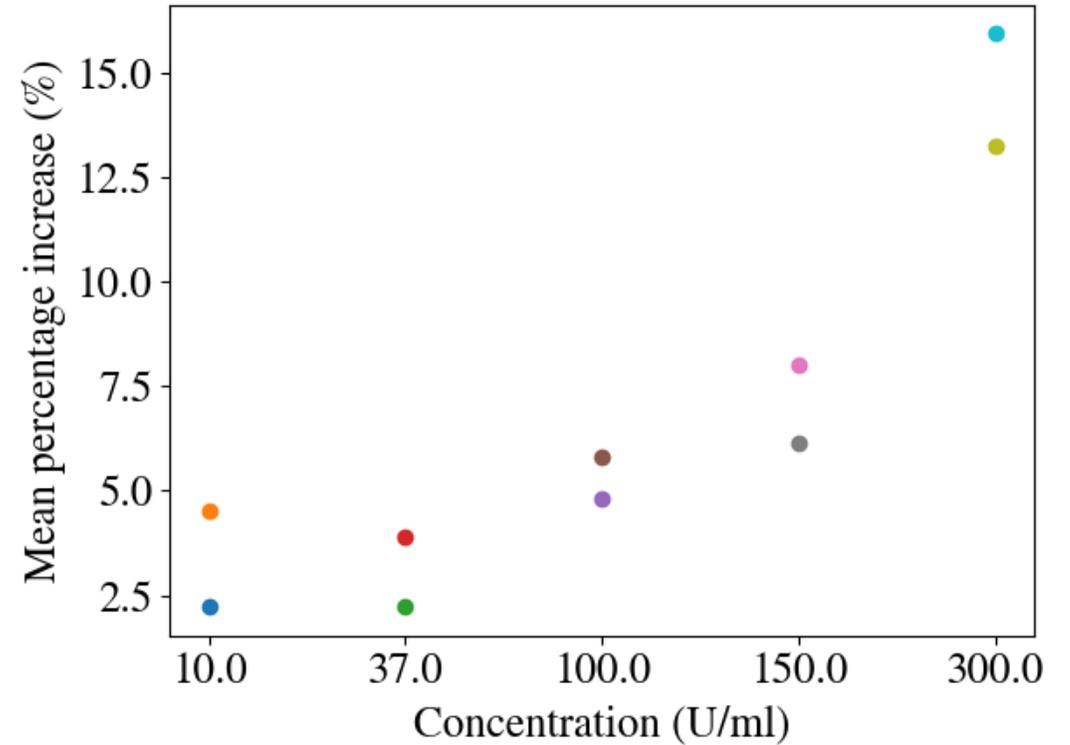


Results: Antigen Tests

Samples over all frequencies



Average real capacitance for each electrode



Discussion

- Threshold concentrations of 37 U/ml and 150 U/ml are clear
- Average real capacitance per electrode has clear groupings
- Future work

Thank you

