

# Cellulose Nanocrystal Hydrogel Based Glucose Optical Biosensor

Steven Le, Samuel Mugo\*

*MacEwan University*

## POSTER

Glucose is a compound of importance in various application areas. As a primary energy source and precursor in the biosynthesis of neurotransmitters, glucose plays a critical role in physiological processes that control an individual's wellbeing. Glucose metabolism disruption has been linked to diabetes and other diseases of the central nervous system such as Alzheimers, Parkinson's disease, and sclerosis. Other than medical diagnosis and diabetes management, glucose is also a useful compound to monitor in the environment, beverage, and bioprocesses industries. While there has been significant development in the fabrication of glucose biosensors for glucose detection, design improvements are needed to increase detection sensitivity.

The biocompatible cellulose nanocrystal hydrogel has been demonstrated as a material with high enzyme loading capacity, allowing optimal immobilization of glucose oxidase. This enables the use of glucose oxidase as the redox enzyme for oxidation of glucose to hydrogen peroxide. The resulting hydrogen peroxide is colorimetrically determined by horseradish peroxidase catalyzed peroxidation of 4-aminoantipyrine and phenol to a red colored quinoneimine, with spectroscopic absorbance measurement at 510nm. The optical biosensor is rapid and requires only a micro drop of sample.