Introduction

Gout, a common form of arthritis, causes needle-like urate crystals to form in the patient's synovial fluid as a result of elevated uric acid levels, caused by the consumption of foods with high levels of purines, the kidney's inability to sufficiently eliminate uric acid, or the increased production of uric acid by the patient's body.

Motivation and Impact

Blood tests, the common test that detects high levels of uric acid (400 µM).

Current Limitation: Time Consuming, Expensive, Specialized management

Proposed approach: Fast response, Affordable, Non-invasive, User friendly

Results

Cyclic Voltammetry

![Cyclic Voltammetry Graph]

Differential Pulse Voltammetry

Scan rate: 100 mV/S

\[ E_{\text{Ox}} = 280 \text{ mV} \]

\[ E_{\text{Red}} = -190 \text{ mV} \]

\[ I_{\text{Ox}} = 152 \mu A \]

\[ I_{\text{Red}} = -358 \mu A \]

Differential Pulse Voltammetry

Scan rate: 100 mV/S

\[ I_{500 \mu M} = 431 \mu A \]

\[ I_{250 \mu M} = 220 \mu A \]

\[ I_{125 \mu M} = 67 \mu A \]

Future Work

➢ Improve detection limit to develop point-of-care prevention device for uric acid build up.

➢ Develop compact, portable readout system for daily-use

Conclusion

➢ Fabricated paper-based electrode successfully detect UA in the therapeutic range

➢ CV and DPV shows accurate detection of uric acid concentration in phosphate buffer solution

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References


➢ https://ard.bmj.com/content/58/5/261