

# Electrochemical Characterization of Carboplatin at Unmodified Platinum Electrodes and Its Application to Drug Consumption Studies in Ovarian Cancer Cells



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## Introduction

- Carboplatin is on the World Health Organization list of essential medicines for the treatment of human cancers, including ovarian cancer.<sup>1</sup>
- 75% patients relapse within 18 months. Of these patients, 85% experienced drug resistance.<sup>1</sup>
- Mechanism of carboplatin resistance in ovarian cancer is not fully understood.<sup>1</sup> Inhibition of drug intake is one possible mechanism.
- Electrochemistry is suitable to study drug resistance in cancer.<sup>2</sup>

## Objective

- Electrochemical characterization of carboplatin.
- Investigation of the carboplatin consumption of A2780-s (drug susceptible) and A2780-cp (drug resistant) cells.

## Conclusion

- Carboplatin exhibits an irreversible oxidation peak at 0.76 V in PBS.
- The LOD and LOQ of carboplatin in PBS are 30 and 50 μM, respectively.
- Carboplatin consumption in cells can be electrochemically detected.
- No significant difference in drug consumption between A2780-s and A2780-cp is detected.

## Result and Discussion

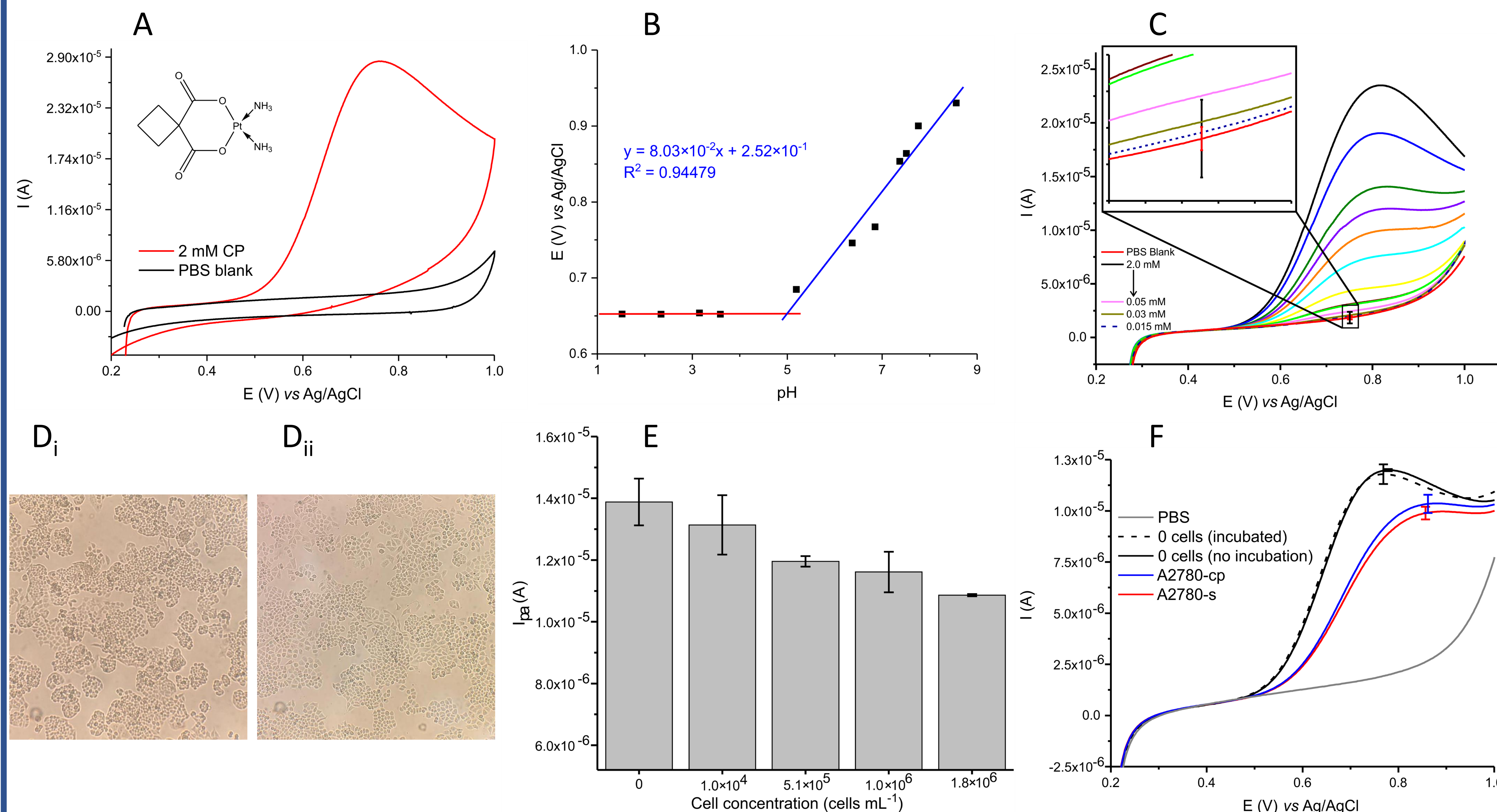


Figure (A) Cyclic voltammograms (CV) of phosphate buffer saline (PBS) solution (black) and 2 mM Carboplatin in PBS (red) (insert: structure of carboplatin). (B) pH study shows that carboplatin can be detected at pH 1.5 to 9.0. (C) Limit of detection (LOD) and limit of quantification (LOQ) of carboplatin in PBS are 30 and 50 μM, respectively. Optical images of (D<sub>i</sub>) A2780-s cells (D<sub>ii</sub>) A2780-cp cells (E) Electrochemical detection of drug consumption in A2780-s cells. (F) Drug consumption comparison of A2780-s (drug susceptible) and A2780-cp (drug resistant) cells.

## Acknowledgement



## Reference

1. Luu H.T.L., Nachtigal M.W., Kuss S. **Journal of Electroanalytical Chemistry** 2020, 872C, 114253
2. Islam M.R., Luu H.T.L., Kuss S. **Journal of the Electrochemical Society** 2020, 167, 045501.