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Hydrophilic interaction liquid chromatography-tandem mass spectrometry method for the determination of intact oxaliplatin in cells: validated and applied in colon cancer HCT-116 cell line

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Highlights

- 1. A novel sensitive HILIC-MS/MS method was developed for quantification of intact oxaliplatin in cells for the first time.
- 2. The method was fully validated and provided increased selectivity, sensitivity and high throughput.
- 3. The uptake of intact oxaliplatin by HCT-116 cell line was described successfully.
- 4. Our findings may prospectively support a celluar pharmacokinetic study and low concentration measurement of intact oxaliplatin in the clinic.

Abstract

Oxaliplatin is a platinum compound that is frequently prescribed for the chemotherapeutic treatment of colorectal cancer. In tumor cells, cellular uptake is the first step of oxaliplatin action. Cellular accumulation of oxaliplatin is considered to play an important role in anti-cancer efficacy. However, limited information about cellular accumulation of intact oxaliplatin is available. In this study, a sensitive hydrophilic interaction liquid chromatography-tandem mass spectrometry (HILIC-MS/MS) approach for the quantification of oxaliplatin in cells was developed and validated. The method allowed for a rapid and simple determination of intact oxaliplatin in cell lysate. The retention time of oxaliplatin was 3.04 min, which was achieved by applying a chromatographic gradient elution of 5 min. The lower limit of quantification (LLOQ) was 2 ng/mL and the analytical range of oxaliplatin was linear between 2 to 200 ng/mL. The intra-day precision and inter-day precision (RSD (relative standard deviation)) ranged from 0.52 to 7.89 %, and the accuracy (RE (relative error)) was within ± 4.5%. Matrix effects and recovery were acceptable. The method was successfully used for the determination of intact oxaliplatin uptake by HCT-116 colon cancer cells. Thus, our

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