PP12.2. FROM BIOANALYSIS TO INDIVIDUALIZED DOSING: INNOVATIVE APPROACHES IN THE ANALYSIS OF TARGETED ANTICANCER DRUGS

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Targeted anticancer drugs, including CDK4/6 inhibitors, PARP inhibitors and PI3K inhibitors, have considerably improved outcomes in cancer treatment. However, their clinical application is still challenged by significant interindividual pharmacokinetic variability. This may lead to differences in drug efficacy and toxicity among patients, resulting in suboptimal therapeutic outcomes. Therapeutic drug monitoring is therefore becoming and increasingly important tool for treatment individualization and optimization of clinical outcomes.

This lecture will give an overview of recently developed innovative analytical and bioanalytical approaches for the determination of selected targeted anticancer drugs in pharmaceutical formulations and biological samples. Special attention will be given on liquid chromatography and capillary electrophoresis methods coupled with tandem mass spectrometry. Innovative electrophoretic approaches coupled with mass spectrometry, including sweeping MEKC-MS/MS methods enabling highly sensitive analysis with very low sample consumption, will also be discussed.

Different advanced sample preparation strategies will also be presented, including solid-phase extraction, phospholipid removal, dispersive liquid–liquid microextraction and surfactant-enhanced microextraction approaches. The approaches were compared regarding analytical performance and clinical applicability using real patient plasma samples. The lecture will additionally cover clinically relevant aspects of targeted therapy, including adherence assessment, and metabolic interactions potential.

Combining advanced bioanalytical methodologies with pharmacokinetic and clinical data enables better interpretation of drug exposure in individual patients and supports more precise dosing of targeted anticancer therapies in clinical practice.

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