

DMPK BIOANALYSIS

Capabilities Overview

Small Molecules

- Mass spectrometry-based analysis
- Parent and metabolites from PK, PK/PD, in vitro ADME, metabolite identification
- Matrices: biological fluids and tissues

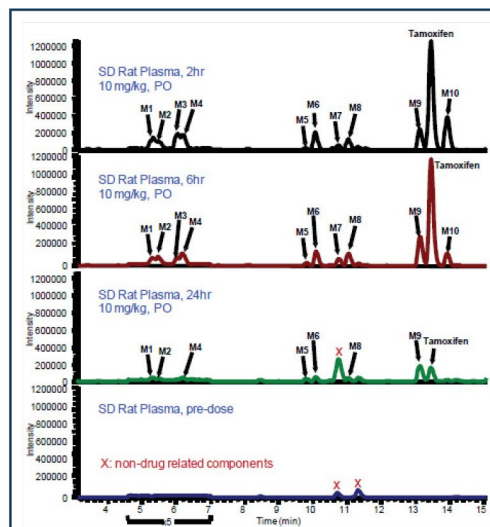
Large Molecules

- ELISA and MSD and mass spectrometry-based analysis
 - PK, PK/PD, biomarker test and immunogenicity test
 - Bioassay

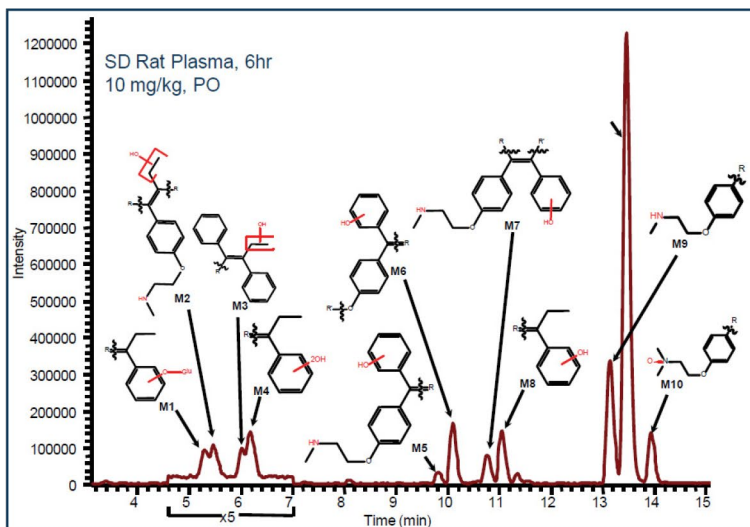
Metabolomics and Biomarker Analysis

Case Studies

TAMOXIFEN METABOLITE PROFILES IN RAT PLASMA



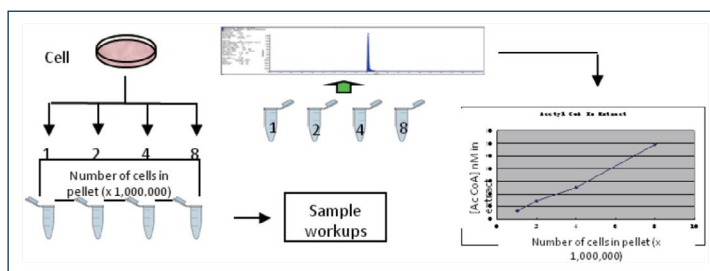
IDENTIFICATION OF TAMOXIFEN METABOLITES IN RAT PLASMA



Biomarker Analysis

- A set of cell pellets produced with known numbers of cells
- Extracts made and analyzed by LCMS/MS
- Resulting acetyl CoA in extract plotted against numbers of the cells loaded
- LC-MS/MS signal responses correlated with cell numbers
- Optimized cell numbers, washing factor evaluated and cell handling time optimized

ANALYSIS OF CANCER METABOLISM BIOMARKERS ACoA AND MCoA



Regulated Bioanalysis

Assay Method for Doxorubicin Quantification

- Objective
 - Due to in vivo PK difference, separation of free and encapsulated drug in plasma is needed
- Challenge
 - Liposome is fragile
 - Heat exposure, non-isotonic condition and thawing can produce premature bursting of the liposome
 - Sample preparation
- SPE Procedures
 - SPE plate selection
 - SPE procedure optimization
- LC-MS/MS Conditions
 - Column: Waters Xbridge C18 (2.1X50 mm, 3.5 um)
 - Mobile phase: Water: Acetonitrile: Formic Acid (10:90:0.2, v/v/v)
 - API 6500, TIS, positive

VALIDATION RESULTS				
QUALIFICATION ELEMENT			RESULTS	CRITERIA
Accuracy	Calibration Curve (n=6)	20.0~2000pg/ml	-2.8%~3.2%	Accuracy within $\pm 15.0\%$, except LLOQ within $\pm 20.0\%$
Accuracy	Intra-assay (n=6)	LLOQ QC	5.2%	Within $\pm 15.0\%$, except at the LLOQ where it should be within $\pm 20.0\%$
		Low QC	1.8%	
		Medium QC	2.5%	
		High QC	-2.5%	
	Inter-assay (n=18)	LLOQ QC	2.7%	Within $\pm 15.0\%$, except at the LLOQ where it should be within $\pm 20.0\%$
		Low QC	2.0%	
		Medium QC	2.7%	
		High QC	1.1%	
Precision	Intra-assay (n=6)	LLOQ QC	8.4%	$\leq 15.0\%$ except at the LLOQ where it should not exceed 20.0%
		Low QC	3.4%	
		Medium QC	2.8%	
		High QC	3.0%	
	Inter-assay (n=18)	LLOQ QC	8.1%	$\leq 15.0\%$ except at the LLOQ where it should not exceed 20.0%
		Low QC	3.2%	
		Medium QC	2.8%	
		High QC	3.9%	
Selectivity	Plasma (n=6)		No interference	$< 20.0\%$ of the mean response of the accepted LLOQ
Dilution Integrity	Dilution Factor: 20	Accuracy	5.8%	Within $\pm 15.0\%$
		Precision	2.4%	$\leq 15.0\%$
Robustness	Plasma Stability	RT (8 hr)	-6.5%~1.8%	Accuracy within $\pm 15.0\%$ for 2/3 samples
		LT (-70oC, 30 days)	-6.4%~6.1%	
		FT (4 cycles)	-7.5%~1.1%	
	Blood Stability	48 min	-0.8%~-0.3%	Ratio difference between Tn and T0 within $\pm 15.0\%$
Extraction Recovery	Recovery	Low QC	86.3%	%CV $\leq 20.0\%$
		Medium QC	83.3%	
		High QC	88.7%	
	Precision (CV%)		3.1%~5.6%	
Matrix Effect	IS-normalized MF	Low QC	3.6%	IS-normalized MF $< 15.0\%$
		High QC	2.2%	