QPS LLC Case Study

"The QPS partnership with SCIEX drives gene therapy and single patient therapies enabled by mass spectrometry."

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Project Goal

To address the need for precise bioanalytical methodologies for patient inclusion / exclusion criteria and to support pharmacokinetics / pharmacodynamics for gene therapy trials.

Biggest Challenges Right Now

- Development and validation of methods for monitoring endogenous small molecule biomarkers in plasma and urine
- For quantitative bioanalysis of oligonucleotides, sample preparation is usually achieved via ion-exchange solid phase extraction, chromatographic separation is by ion-pairing, producing multiply charged ions to be resolved in the mass spectrometer. This bioanalytical complexity requires:
  - High resolution mass spectrometry to recognize the isotopic forms
  - A software solution to quantitate by summing multiple charge states and multiple isotopic forms
  - A robust ion-source to run thousands of samples from Investigational New Drug (IND)-enabling studies without need of major cleaning
  - Stable calibration for high sample throughput
  - Uniform resolution over a large mass range to accurately determine the mass of multiply charged metabolites

The Solution

- CLIA- and GLP-validated UPLC-MS/MS small molecule biomarker assays which are more robust and reliable than the current LBA assays used by physicians for patient inclusion / exclusion criteria
- Validated UPLC-HRMS plasma, urine, and tissue assays for siRNA molecules to selectively quantitate both the anti-sense and the sense strand and understand metabolic clearance
- Metabolite identification to compare in vitro and in vivo metabolism of oligonucleotides in toxicology species and humans

"SCIEX technologies allow us to develop robust and accurate customized assays for decision making in-patient treatment and drug development"

Outcomes of Research

- A UPLC-HRMS workflow for siRNA quantitation to support preclinical and clinical studies for the largest gene therapy trial to-date
- A CLIA workflow for inclusion / exclusion criteria using LC-MS/MS biomarker monitoring that is more accurate than the current industry standard

Type of Organization

CRO (Contract Research Organization) focusing on providing preclinical and clinical support for drug discovery and development.

Goal

To achieve excellence in bioanalytical methodologies and PK/PD support of gene therapy and other drug discovery and development programs.

SCIEX Products

- TripleToF® 6600 System
- TripleToF® 5600+ System
- QTRAP 6500+ System
- Triple Quad™ 6500+ System
- MultiQuant™ Sotware
- SWATH® Acquisition
- Analyst® Software

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