OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference on
Analytical & Bioanalytical Techniques

16-17 December 2011 San francisco, USA

TITLE

HPLC-MS/MS Analysis of Carnitine and Acylcarnitines in Clinical Samples

Charles L. Hoppel

Departments of Pharmacology & Medicine
Case Western Reserve School of Medicine, USA

Introduction: Detailed analysis of carnitine and acylcarnitines is used for: 1) Follow-up to positive tandem MS / newborn screening (TMS/NBS) results to eliminate false positives and resolve isomeric acylcarnitines, 2) Monitoring with accurate values (as opposed to a semi/pseudo quantitative screen), and 3) In support of clinical research, with accurate and precise values, isotopomer analysis, and isomer separation.

Objective: Develop HPLC-MS/MS methods for the quantification of acylcarnitines regardless of sample type, acyl chain length, or isomeric configuration.

Methods: 1) Isolation of acylcarnitines, 2) Sample simplification, 3) Derivatization without inadvertent hydrolysis of acylcarnitines, 4) Chromatography that resolves isomeric acylcarnitines, 5) MRM detection, 6) Quantification using standard compounds and class appropriate internal standards with multiple-point calibration curves, and 7) Validation, demonstrating accuracy, precision, and robust performance.

Results: Accuracy - acetylcarnitine add-back experiments to plasma, urine, and skeletal muscle with values ± 5% of expected values. Precision -acetylcarnitine batch-to-batch percent relative standard deviations less than 5% (N=18). Robustness - quality control values over a 5 month period had a percent relative standard deviation of ± 6%, with no individual value in excess of ±15% of the expected value. Reference intervals were determined from patient samples - 4000 plasma, 900 urine, and 500 skeletal muscle samples.

Conclusions: A rigorously quantitative, accurate, and precise method for acylcarnitine analysis in plasma, urine, and tissue samples is presented. Chromatographic separation of isomeric acylcarnitines allows for detailed analysis of patient samples not possible by TMS/NBS.

Biography

Charles Hoppel completed his M.D. at St. Louis University School of Medicine and did his residency in Internal Medicine at the University of Kansas in Kansas City, Kansas. He then did postdoctoral studies at Western Reserve University School of Medicine. He is a Professor of Pharmacology and Medicine, and director of the Center for Mitochondrial Diseases at Case Western Reserve University School of Medicine He has published more than 250 papers in reputed journals.