[CLINICAL]

Peer-Reviewed Literature for Clinical Laboratories

Liquid chromatography tandem mass spectrometry systems enable *in vitro* quantification of a variety of compounds in biological matrices. This document provides references to illustrative publications demonstrating feasibility of LC-MS/MS to quantify various compounds. This list is not meant to be all inclusive. It is intended to represent LC-MS/MS capabilities broadly, utilizing a variety of devices, not a specific instrument or system.

ENDOCRINOLOGY

General

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Minerva Endocrinol 2017; Oct 27.

Kushnir MM, Rockwood AL, Bergquist J. Liquid chromatography–tandem mass spectrometry applications in endocrinology.
Mass Spectrom Rev 2010;29:480–502.

Peptide hormones

Chambers EE, Legido-Quigley C, Smith N, et al. Development of a fast method for direct analysis of intact synthetic insulins in human plasma: the large peptide challenge.
Bioanalysis 2013;5:65–81.

Kushnir MM, Rockwood AL, Roberts WL, et al. Measurement of thyroglobulin by liquid chromatography-tandem mass spectrometry in serum and plasma in the presence of antithyroglobulin autoantibodies.
Clin Chem 2013;59:982–990.

Bystrom CE, Sheng S, Clarke NJ. Narrow mass extraction of time-of-flight data for quantitative analysis of proteins: Determination of insulin-like growth factor-1.
Anal Chem 2011;83:9005–9010.

Van Der Gugten JG, Holmes D. Quantitation of plasma renin activity in plasma using liquid chromatography-tandem mass spectrometry (LC-MS/MS).
Methods Mol Biol 2016;1378:243–253.

Steroids

Sturmer LR, Dodd D, Chao CS, et al. Clinical utility of an ultrasensitive late night salivary cortisol assay by tandem mass spectrometry.
Steroids 2018;129:35–40.

Zhou H, Wang Y, Gatcombe M, et al. Simultaneous measurement of total estradiol and testosterone in human serum by isotope dilution liquid chromatography tandem mass spectrometry.
Anal Bioanal Chem 2017;409:5943–5954.

Fiet J, Le Bouc Y, Guéchot J, et al. A liquid chromatography/tandem mass spectrometry profile of 16 serum steroids, including 21-deoxycortisol and 21-deoxycorticosterone, for management of congenital adrenal hyperplasia.
J Endocr Soc 2017;1:186–201.

Van Der Gugten JG, Holmes DT. Quantitation of aldosterone in serum or plasma using liquid chromatography-tandem mass spectrometry (LC-MS/MS).
Methods Mol Biol 2016;1378:37–46.

Rossi C , Calton L , Hammond G, et al. Serum steroid profiling for congenital adrenal hyperplasia using liquid chromatography–tandem mass spectrometry.
Clin Chim Acta 2010;411:222–228.

Gallagher LM, Owen LJ, Keevil BG. Simultaneous determination of androstenedione and testosterone in human serum by liquid chromatography-tandem mass spectrometry.
Ann Clin Biochem 2007; 44:48–56.

Vitamin D Metabolites

Bikle DD. Vitamin D assays.
Front Horm Res 2018;50:14–30.

Wise SA, Phinney KW, Tai SS, et al. Baseline assessment of 25-hydroxyvitamin D assay performance: A vitamin D standardization program (VDSP) interlaboratory comparison study.
J AOAC Int 2017;100:1244–1252.

Yang Y, Rogers K, Wardle R, et al. High-throughput measurement of 25-hydroxyvitamin D by LC-MS/MS with separation of the C3-epimer interference for pediatric populations.
Clin Chim Acta 2016;454:102–106.

Yates AM, Bowron A, Calton L , et al. Interlaboratory variation in 25-hydroxyvitamin D2 and 25-hydroxyvitamin D3 is significantly improved if common calibration material is used.
Clin Chem 2008;54:2082–2084.

Kaufmann M, Gallagher JC, Peacock M, et al. Clinical utility of simultaneous quantitation of 25-hydroxyvitamin D and 24,25-dihydroxyvitamin D by LC-MS/MS involving derivatization with DMEQ-TAD.
J Clin Endocrinol Metab 2014;99:2567–2574.

Biogenic Amines

Pettys BJ, Graham KS, Parnas ML, et al. Performance characteristics of an LC–MS/MS method for the determination of plasma metanephrines.
Clin Chim Acta 2012;413:1459–1465.

Bergmann ML, Sadjadi S, Schmedes A. Analysis of catecholamines in urine by unique LC/MS suitable ion-pairing chromatography.
J Chromatogr B Analyt Technol Biomed Life Sci 2017;1057:118–123.

Heideloff C, Payto D, Wang S. Quantitation of free metanephrines in plasma by liquid chromatography-tandem mass spectrometry.
Methods Mol Biol 2016;1378:139–147.

METABOLIC PROFILING

Asef CK, Khaksarfard KM, De Jesus VR. Non-derivatized assay for the simultaneous detection of amino acids, acylcarnitines, succinylacetone, creatine, and guanidinoacetic acid in dried blood spots by tandem mass spectrometry.

Int. J. Neonatal Screen 2016;2(4): 13.

Tortorelli S, Turgeon CT, Gavrilov DK, et al. Simultaneous testing for 6 lysosomal storage disorders and X-adrenoleukodystrophy in dried blood spots by tandem mass spectrometry.
Clin Chem 2016;62:1248–1254.

Elliott S, Buroker N, Cournoyer JJ, et al. Dataset and standard operating procedure for newborn screening of six lysosomal storage diseases: By tandem mass spectrometry.
Data Brief 2016;8:915–924.

Turgeon C, Magera MJ, Allard P, et al. Combined newborn screening for succinylacetone, amino acids, and acylcarnitines in dried blood spots.
Clin Chem 2008;54:657–664.

Ombrone D, Giocaliere E, Forni G, et al. Expanded newborn screening by mass spectrometry: New tests, future perspectives.
Mass Spectrom Rev 2016;35:71–84.

Moat SJ, Rees D, King L, et al. Newborn blood spot screening for sickle cell disease by using tandem mass spectrometry: Implementation of a protocol to identify only the disease states of sickle cell disease.
Clin Chem 2014;60:373–380.

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Fisher L, Davies C, Al-Dirbashi AY, et al. A novel method for quantitation of acylglycines in human dried blood spots by UPLC-tandem mass spectrometry.
Clin Biochem 2018;54:131–138.

THERAPEUTIC DRUG MONITORING

Taylor PJ, Jones A, Balderson GA, et al. Sensitive, specific quantitative analysis of tacrolimus (FK506) in blood by liquid chromatography-electrospray tandem mass spectrometry.
Clin Chem 1996:42:279–285.

Keevil BG, Tierney DP, Cooper DP, et al. Rapid liquid chromatography-tandem mass spectrometry method for routine analysis of cyclosporin A over an extended concentration range.
Clin Chem 2002:48:69–76.

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Ann Clin Biochem 2002;39:487–492.

Keevil BG, Tierney DP, Cooper DP, et al. Simultaneous and rapid analysis of cyclosporin A and creatinine in finger prick blood samples using liquid chromatography tandem mass spectrometry and its application in C2 monitoring.
Ther Drug Monit 2002;24:757–767.

Levine DM, Maine GT, Armbruster DA, et al. The need for standardization of tacrolimus assays.
Clin Chem 2011;57:1739–1747.

Seger C, Tentschert K, Stoggl W, et al. A rapid HPLC-MS/MS method for the simultaneous quantification of cyclosporine A, tacrolimus, sirolimus and everolimus in human blood samples.
Nat Protoc 2009;4:526–534.

Cardoso E, Mercier T, Wagner AD, et al. Quantification of the next-generation oral anti-tumor drugs dabrafenib, trametinib, vemurafenib, cobimetinib, pazopanib, regorafenib and two metabolites in human plasma by liquid chromatography-tandem mass spectrometry.
J Chromatogr B Analyt Technol Biomed Life Sci 2018;1083:124–136.

Lin K, Mahadevan U. Pharmacokinetics of biologics and the role of therapeutic monitoring.
Gastroenterol Clin North Am 2014;43:565–579.

El Amrani M, van den Broek MP, Gobel C, et al. Quantification of active infliximab in human serum with liquid chromatography-tandem mass spectrometry using a tumor necrosis factor alpha -based pre-analytical sample purification and a stable isotopic labeled infliximab bio-similar as internal standard: A target-based, sensitive and cost-effective method.
J Chromatogr A 2016;1454:42–48.

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Clin Chem 2013;59:1630–1637.

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J Pharm Biomed Anal 2017;145:718–724.

Abdulla A, Bahmany S, Wijma RA, et al. Simultaneous determination of nine β-lactam antibiotics in human plasma by an ultrafast hydrophilic-interaction chromatography-tandem mass spectrometry.
J Chromatogr B Analyt Technol Biomed Life Sci 2017;1060:138–143.

CLINICAL TOXICOLOGY

Alves MNR, Piccinotti A, Tameni S, et al. Evaluation of buprenorphine LUCIO immunoassay versus GC–MS using urines from a workplace drug testing program.
JAT 2013;3:175–178.

Dickerson JA, Laha TJ, Pagano MB, et al. Improved detection of opioid use in chronic pain patients through monitoring of opioid glucuronides in urine.
JAT 2012;8:541–547.

Crutchfield CA, Clarke W. Present and future applications of high resolution mass spectrometry in the clinic.
Discoveries 2014;2:1–12.

Ruan X, Kaye AD. The debate on urine drug testing in pain and addiction management: Coverage or non-coverage?
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Jiwan JLH, Wallemacq P, Hérent MF. HPLC-high resolution mass spectrometry in clinical laboratory?
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Arch Pathol Lab Med 2010;134:735–739.

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J Opioid Manag 2015;11:69–75.

van den Ouwelanda JM, Kema IP. The role of liquid chromatography–tandem mass spectrometry in the clinical laboratory.
J Chrom B 2012;883:18–32.

Humbert L, Grisel F, Richeval C, et al. Screening of xenobiotics by ultra-performance liquid chromatography–mass spectrometry using in-source fragmentation at increasing cone voltages: Library constitution and an evaluation of spectral stability.
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Viette V, Fathi M, Rudaz S, et al. Current role of liquid chromatography coupled to mass spectrometry in clinical toxicology screening methods.
Clin Chem Lab Med 2011;49:1091–1103.

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The literature references presented here are for illustrative purposes only. Waters is not promoting analysis of any of the analytes described herein. Performance in an individual laboratory may differ from what is presented in the literature due to a number of factors, including laboratory methods, materials used, inter-operator technique, and system conditions. It is the laboratory's responsibility to validate performance of any assay it intends to deploy in its facility.

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