

Sensitive and rapid analytical method for the quantification of glucosamine in human plasma by ultra high performance liquid chromatography with tandem mass spectrometry

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Abstract

A highly sensitive and rapid ultra high performance liquid chromatography with tandem mass spectrometry method has been developed and validated for the determination of glucosamine in human plasma using miglitol as the internal standard. Special attention was paid to achieve the high throughput and sensitivity of the established method, and the absence of a matrix effect on the analytes. The sample preparation procedure involved a simple deproteinization step. The chromatographic separation was achieved on a Waters ACQUITY HSS Cyano column using a mixture of acetonitrile/2 mM ammonium acetate solution containing 0.03% formic acid (80:20, v/v) as the mobile phase with a very short run time of 1.5 min. This method was validated over the concentration range of 10–3000 ng/mL for glucosamine. The intra- and inter-batch precision was <13.9% for the low, medium, and high quality control samples. The established method is highly sensitive with a lower limit of quantification of 10 ng/mL, low enough to determine the circadian rhythm on endogenous glucosamine level in human plasma, which has not been reported in detail until now. The method was successfully applied to characterize the pharmacokinetic profile of glucosamine in healthy volunteers following a single oral administration of 750 or 1500 mg glucosamine hydrochloride.