TECHNOLOGY OFFER

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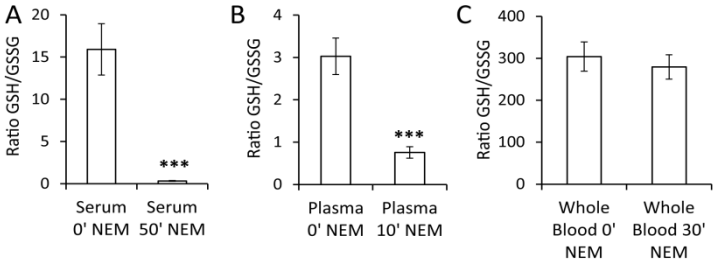
Accurate redox status measurements employing a two-step alkylation with N-ethylmaleimide isotopologues

BACKGROUND

Determination of the ratio of glutathione to glutathione disulfide is of profound clinical interest in assessing the oxidative status of tissues and body fluids. However, this ratio is not yet a routine clinical parameter because of the analytically challenging interconversion of glutathione to glutathione disulfide which starts directly after sampling. We present a methodology to stabilize glutathione and glutathione disulfide status aiding its incorporation as routine clinical parameter.

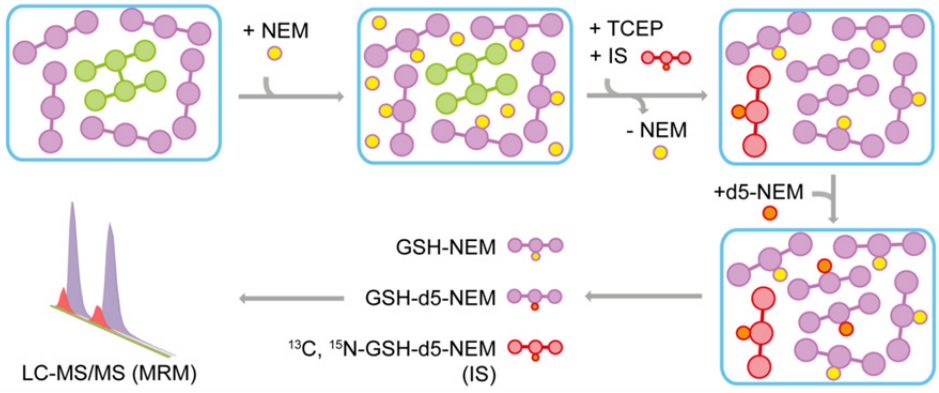
TECHNOLOGY

We demonstrate a simple derivatization route that yields different isotopologues of N-ethylmaleimide alkylated glutathione from glutathione and glutathione disulfide after chemical reduction for mass spectrometric analysis. A third isotopologue is employed as isotopic standard for simultaneous absolute quantification. Using customized blood vacuum containers the common pre-analytical errors associated with redox state measurement are avoided. As all isotopologues have similar chromatographic properties, matrix effects arising from different sample origin can only impact method sensitivity but not glutathione to glutathione disulfide ratio or absolute quantification.



ADVANTAGES

- Accuracy & Simplicity: Avoids common pre-analytical errors
- Robustness: Co-eluting isotopologues and internal standard
- High sensitivity: minimal sample amounts required
- Simplified data analysis: Direct readout of GSH/GSSG ratio and absolute quantification from the same chromatographic peak
- Cost effectiveness: one common standard



KEYWORDS:
GSH, GSSG, oxidative stress, biomarker, cardiomyopathy

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COOPERATION OPTIONS:
Kit development and bringing to market; Biomarker validation for specific diseases

DEVELOPMENT STATUS:
Complete analytical method including sample preparation from tissues and body fluids. Not yet clinically validated

STATUS OF PATENTS:
EP & US patent applications filed

M004-2021

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