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## Ratiometric Quantification of $\beta$ 2-microglobulin Antigen in Human Serum Based on Elemental Labeling Strategy

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### ABSTRACT

Ratiometric quantification for competitive immunoassay based on internal standard element detection utilizing inductively coupled plasma mass spectrometry (ICP-MS) as multiplex readout has been demonstrated. The Beta-2-microglobulin ( $\beta$ 2-MG) associated with clinical diseases was detected by Y-labeled capture antibody used as internal standard probes and Sm-labeled antigen used as report probes via antigen-antibody reaction. The ratiometric quantification was achieved by taking the signal ratio of Sm/Y. The ratiometric method could compensate for the particle loss and suppress the signal fluctuation, which improved the precision of the quantitative result. Under the optimized conditions, the calibration curves for  $\beta$ 2-MG antigen was linear in the range of 0.25-8.0  $\mu$ g/mL with a detection limit of 0.17  $\mu$ g/mL ( $3\sigma$ ,  $n = 11$ ). The recoveries of 96.5% - 132% were obtained for serum samples spiked with different concentration standards, and the relative standard deviation (RSD) was less than 10%. The  $\beta$ 2-MG results in serum samples obtained by the proposed method correlated well with those obtained by

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