Measurement of Vitamin D Binding Protein and Its Isoforms by LC-MS/MS

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Vitamin D-binding protein (VDBP) is a member of the albumin family of proteins and transports vitamin D metabolites to target tissues. Current immunoassays for VDBP appear to give discrepant results, hindering any conclusions regarding the relationship between VDBP concentration and ethnicity and/or vitamin D status. As an alternative approach, we have developed a liquid chromatography – tandem mass spectrometry (LC-MS/MS) method for measurement of VDBP concentration. Common SNPs give rise to three protein isoforms (GC-1s, GC-1f, and GC-2), with up to two sites of glycosylation unique to each VDBP isoform. We investigated quantification of VDBP based upon peptides common to all three major isoforms as well as based upon isoform-specific peptides. Isotopically labeled peptides were used as internal standards for these measurements. Concentrations of VDBP were determined in a plasma pool derived from donors of differing ethnicities and in single donor plasma samples.