

RBP-4 (Retinol Binding Protein 4)

Analyte: Retinol Binding Protein 4

Specimen Type: Urine

Optimum Volume: 0.5 mL

2-8°C

-20°C

-70°C

6 days

1 month

2.5 years

Reporting units: ng/L; ng/mg Creatinine (normalized)

Method: ELISA

Biological or Clinical Significance:

Retinol-binding protein 4 (RBP4), also known as plasma retinol-binding protein, is a lipocalin superfamily molecule that transports vitamin A (retinol) in the serum. Dietary retinol is metabolized to retinaldehyde, multiple isomers of retinoic acid, and retinyl esters. Retinaldehyde is the critical chromophore in the rhodopsin photoreceptor, while both it and retinoic acid regulate a multitude of cellular differentiation and proliferation effects through the intracellular receptors RAR and RXR. RBP4 adopts a β -barrel structure with a central cavity that accommodates either retinol or retinaldehyde. RBP4 is synthesized primarily by hepatocytes and adipocytes as a 21 kDa non-glycosylated, non-phosphorylated, and non-sulfated molecule. Its secretion into the blood requires the presence of retinol. Proteolytic processing of RBP4 removes one or both C-terminal leucine residues, resulting in 182 and 181 amino acid (aa) forms. Human RBP4 shares 100% aa sequence identity with chimpanzee, 91% - 93% aa sequence identity with bovine, porcine, and rabbit, and 83% - 86% aa sequence identity with chicken, mouse, and rat RBP4, respectively. The RBP4-retinol complex interacts with transthyretin (TTR), also known as thyroxine-binding protein and prealbumin. Formation of this complex increases the serum half-life of RBP4 by preventing RBP4 filtration through the kidney. The C-terminally processed forms of RBP4, which do not bind TTR, are normally excreted into the urine but accumulate in the serum during renal failure. Glomerular re-uptake of RBP4 is mediated by the endocytic receptor megalin. RBP4 is internalized by extrahepatic tissues through a receptor mediated process. Vitamin A derivatives in the form of retinyl esters can also be transported in chylomicrons, consistent with the observation that RBP4 deficiency results in only minor clinical effects.

Principle of Test Method:

The RBP-4 assay is a solid-phase ELISA that employs the quantitative sandwich enzyme immunoassay principle.