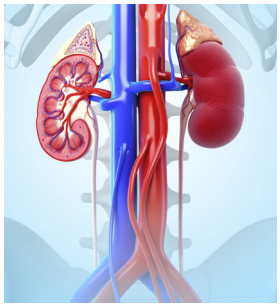
HyTest TechNotes

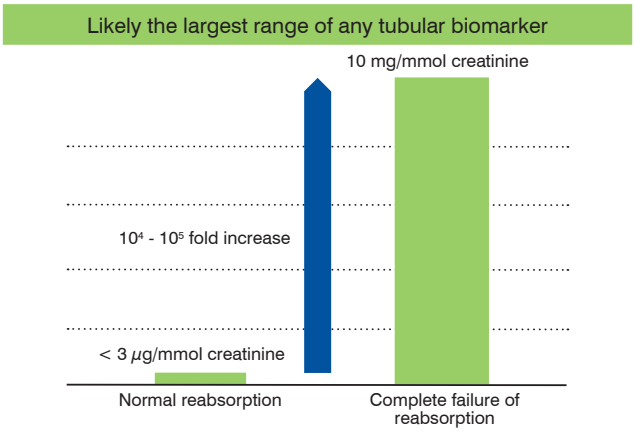
Urine RBP4: The Best Biomarker of Renal Proximal Tubule Function



Impaired tubule function is found in many acquired and hereditary diseases and this is usually not detected by conventional measures of kidney disease, such as glomerular filtration estimated by serum creatinine. Grossly impaired tubule function can be present, and cause clinical problems, even when glomerular filtration is 'normal'. Until recently clinical measurement of renal tubule function has been difficult.

Assay of Urine Retinol-Binding Protein 4 (uRBP4), now offers the best Biomarker of the function of the proximal renal tubule.

Since plasma RBP4 filtered by the renal glomerulus is almost completely reabsorbed by the proximal tubules, levels in healthy urine are very low (<3 μg/mmol creatinine). Complete failure of this reabsorption increases this excretion 10^4-10^5-fold, causing uRBP4 levels of about 10 mg/mmol creatinine. This is likely the largest range of any tubular biomarker.



When the proximal renal tubule fails to reabsorb salts and water as well as filtered proteins such as RBP4 there is a renal 'Fanconi Syndrome'. However, most uRBP4 elevations due to tubule damage are seen without the salt, water and acid abnormalities. Failure of reabsorption of RBP4 and other filtered plasma proteins is also termed 'Tubular' or 'Low Molecular Weight' proteinuria. This distinguishes it from the 'Glomerular Proteinuria' of much chronic kidney disease.

Urine RBP4 measurement helps clinicians and researchers enhance the care and study of number of patient groups;

- Acute Kidney Injury (AKI): uRBP4 is a very promising Biomarker that is now being explored
- All forms of renal Fanconi Sydrome: Hereditary and Acquired
- Monitoring for environmental renal toxins such as cadmium
- Detection of drug nephrotoxicity
- Disease and drug-related renal impairment in HIV disease
- Paraproteinemis such as myeloma, tubulointerstial renal disease

uRBP4 is attractive to laboratories;

- It is probably the most sensitive biomarker of proximal tubular function
- It is relatively stable in urine
- Use of random (spot) urine collections has been clinically validated
- Transport-time to a central laboratory not critical
- The 5-log range diseases offers great potential diagnostic power
- There is a robust literature of clinical applications

TechNotes | uRBP4: Biomarker of Renal Tubule Function

Core Biochemical Assay Laboratory (CBAL) in Cambridge, England, has developed a new, clinically validated, dual monoclonal based fluorescence immunoassay using HyTest's raw materials. This new assay offers number of advantages such as;

- Log 5-fold measurement linearity of uRBP4 found in disease
- Good sensitivity of about 1 μg/L
- Accurate standardisation with HyTest RBP4
- Potentially excellent inter-laboratory standardisation
- Traceability to molecular forms of uRBP4 defined by mass spectrometry

CBAL can now in collaboration with HyTest offer an easy and swift solution to transfer uRBP4 assay on your chosen plate system or automated platform. Making a state-of-art urine RBP4 assay could not be any easier.

We offer:

Supply of dual monoclonal antibodies, standard, QC and QA materials already validated on DELFIA® and Meso Scale Discovery® platforms

and

Consultancy to help you implement this assay, or a variant, on your chosen plate system or automated platform

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Keith Anthony Burling (MPhil) is Director of the NIHR Cambridge BRC CBAL. He has over 30 years experience as a NHS Biomedical Scientist. CBAL specialises in developing and evaluating novel immunoassays on high-sensitivity analytical platforms

Dr. Anthony Norden provides clinical support to the Keith's CBAL. After initial scientific training and a Ph.D. in neurochemistry, Anthony qualified as a medical doctor at University College London. He then pursued collaborative research with Nephrologists into the causes and laboratory investigation of renal tubular disease, particularly disease affecting the proximal tubule. Anthony was part of the group which first described Dent disease, an important form of the renal Fanconi Syndrome. While Clinical Director of Clinical Biochemistry at Addenbrooke`s he collaborated with Keith Burling and colleagues in the CBAL to meet the challenge of developing uRBP4 assays with defined molecular targets.

References:

1. *Keith A. Burling, Pedro R. Cutillas, David Church, Marta Lapsley, Anthony G.W. Norden . Analysis of molecular forms of urine Retinol-Binding Protein in Fanconi Syndrome and design of an accurate immunoassay. Clinica Chimica Acta 413 (2012) 483–489*
2. *Anthony G.W. Norden, Marta Lapsley and Robert J. Unwin. Urine Retinol-Binding Protein in Nephrology. Advances in Clinical Chemistry, 2013 In preparation.*

Monoclonal antibodies ordering information:

MAb	Cat.#	Specificity	Subclass	Application
RB42	4RB2	Retinol-binding protein 4 (RBP4)	IgG1	EIA, WB
RB48	4RB2	Retinol-binding protein 4 (RBP4)	IgG1	EIA, WB

Antigen ordering information:

Product	Cat.#	Purity	Source
Retinol-binding protein 4 (RBP4) from human plasma, free	8RF9	>95%	Human plasma

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