TECHNICAL NOTES

Precast Gels for Urinary Protein Diagnostics

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Electrophoresis of Urinary Proteins with SDS Urine Gels

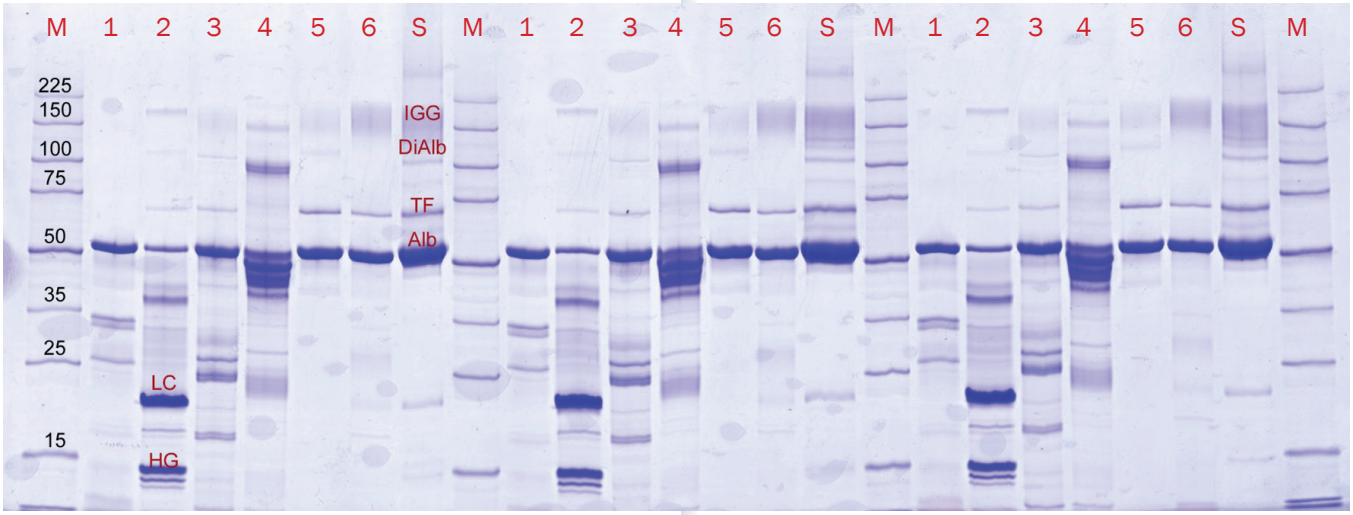
Simple, sensitive and non-invasive nephrological diagnosis

A primary indicator of kidney and kidney-related diseases is the excretion of protein in urine. Urinary analysis is a simple, non-invasive method which can be repeated as often as required without inconvenience or risk to the patient. It enables early recognition and differentiation of disease types and frequently avoids the use of more invasive diagnostic methods, such as biopsy or x-ray.

Differential analysis of proteinuria

Differentiation of the proteinuria enables a more precise diagnosis of the underlying cause. Damage to the nephron can be localized by separating urine proteins according to their molecular weight. Glomular proteinuria, nephrogene and post-renal proteinuria can be recognized on this basis.

The molecular weight of the urinary proteins is determined by means of electrophoresis in the presence of sodium dodecyl sulfate (SDS). A spectrum of molecular weight from 5 kDa to 1,000 kDa is obtained.



Urinary proteins separated on an SDS Urine Gel (M = Marker, S = Serum, 1,3 = Tubular proteins, 2 = Bence-Jones proteins 4 = Non-selective glomerular and tubular proteins, 5,6 = Glomerular proteins PAG 10 % , 25 slots; cat. no. 43391.01; Samples courtesy of: Dr. Christian Weber, Krankenhaus Reinkenheide, Bremerhaven, Germany)

Causes of proteinuria (the excretion of excess protein in the urine) can be grouped into three general categories: pre-renal, renal and post-renal.

- Patient-friendly method of diagnosis
- Early recognition and differentiation of kidney and kidney-related diseases
- Suitable for diagnostic screening or monitoring treatment
- Greater diagnostic certainty

Minimal sample preparation

Urine proteins are visualized with Coomassie(R) staining to enable both qualitative and quantitative validation. As little as 5 µl - 90 µl of urine sample volume is required with no sample concentration step. To ensure optimal electrophoretic separation, the total protein concentration should be between 30 mg/dl and 500 mg/dl. Fewer sample-preparation steps save time, and also increase reproducibility. Sample handling procedures, such as concentration methods, can lead to the loss of various bands or groups of bands.

- Increased reproducibility and result comparison
- No loss of bands or groups of bands
- Qualitative and quantitative validation

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Precast Gels for Urinary Protein Diagnostics

Electrophoresis of urinary proteins with SDS urine gels

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High resolution and sensitivity in record time

SDS electrophoresis in horizontal, ultra-thin, polyacrylamide homogenous gels is a sensitive and fast diagnostic method which is straightforward, samples do not need to be enriched, and only requires small sample volumes.

Ultra-thin gels require shorter run times and provide much sharper bands than conventional ‚thick' gels. As thin gels require less cooling, higher voltages can be applied to decrease separation time and enhance protein focusing.

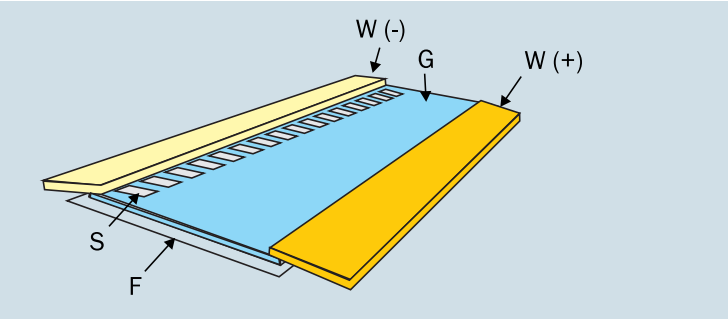
The sensitivity of thin gel-electrophoresis eliminates the need to concentrate samples, resulting in significant time-savings, improved reproducibility and the ability to compare results.

Electrophoresis in agarose gels is a common alternative to SDS electrophoresis in polyacrylamide gels (PAG). They are popular as they can be press-blotted. Agaroses gels, however, provide poor resolution compared to PAG. Resolution can be crucial for accurate diagnosis. The sharpness of the images rendered with SERVA SDS urine gels 10 % 25 S makes interpretation easier and more reliable.

- Ultra-thin gels for shorter separation time and greater detection sensitivity
- Enhanced reproducibility and results comparison
- Results in just four hours (electrophoresis and visualization)
- High resolution and sharper separation enables more accurate interpretation

Precast horizontal SDS urine gels - easy handling, short running time and fast visualisation

Horizontal electrophoresis offers numerous advan-tages over vertical techniques. It is easier to apply samples to the flat surface of the gel on the cooling plate. Also, visual and densitometric evaluation is more straightforward compared to individual round gels. The cooling plate and electrodes are simple and fast to clean.



Schematic drawing of a horizontal SDS urine gel
(G = gel matrix, F = film backing, S = slots; W(-)/W (+) = wicks)

Precast gels reduce manual procedures to a minimum, making them ideal for routine testing. The plastic-backed gels are robust and easy to handle. They are simple to dry which makes them particularly suitable for sample archiving. Gel can be annotated on the plastic backing film. The gels can also be cut to accommodate the number of samples to ensure lower cost per lane. Typing urinary proteins requires sensitive and quantitative staining. However, as urinary protein testing is a routine task, the staining procedure should be as simple as possible.

- Gels polymerized on plastic backing for ease of handling and flat drying for documentation
- Wicks soaked in concentrated buffers eliminate the need for large-volume electro-phoresis tanks
- Simultaneous staining and fixing with Coomassie(R) staining procedure saves time
- Gel backing suitable for labeling

Ordering information

Product	Quantity	Cat. no.
SDS Urine Gel Kit 4 gels + buffer kit, 25 Slots	1 Kit	43391.01
SERVA Blue R Staining Kit	1 Kit	42531.01
HPE™ BlueHorizon System contents HPE™ BlueHorizon™ Horizontal Electrophoresis Chamber (Kat.-Nr. HPE-BH), BluePower 3000 Power Supply (Kat.-Nr. BP-3000-HPE) and HPE™ Chiller (Kat.-Nr. HPE-CU1)	1 unit	HPE-BHSYS

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