Advantages of PHASE CONTRAST MICROSCOPY by 77 Elektronika

URISED®
TECHNOLOGY

Urinalysis in general

Urinalysis is one of the most common and most important tests for screening urinary tract and kidney diseases. The presence or absence of urinary sediment particles is crucial for the diagnosis of such diseases, even though the manual method, which is the gold standard for urine sediment analysis, is poorly standardized, labor intensive, time consuming and operator dependent. Due to these drawbacks, urine sediment analysis has only been carried out in limited cases during the last few decades.[1,2] The patented UriSed Technology was developed to reduce the shortcomings of manual microscopy through automation.

UriSed Technology

UriSed Technology is the optimized automation of traditional manual microscopy using a special cuvette as the only consumable.
The instruments based on the UriSed Technology offer a reliable, standardized automatic method for the identification of urine sediment particles even from low sample volumes of 2 mL.

Detected particles

- Red Blood Cells
- White Blood Cells
  - WBC Clumps
- Hyaline casts
- Pathological casts
- Squamous Epithelial Cells
- Non-squamous Epithelial Cells
- Bacteria
  - Cocci
  - Rod
- Crystals
  - CaOxm
  - CaOxd
  - Triple phosphate
  - Uric acid
- Yeast
- Mucus
- Spermatozoon
- Amorphous material

[1]Barta Zs, Kránicz T, Bayer G, UriSed Technology - A Standardised Automatic Method of Urine Sediment Analysis, European Infectious Disease, 2011.
[2]Fogazzi GB, The Urinary Sediment, Third Edition, Elsevier, 2009.

Phase contrast microscopy

Phase contrast microscopy is an optical microscopy technique that converts phase shifts in light passing through a transparent specimen to brightness changes in the image. Phase shifts themselves are invisible, but become visible when shown as brightness variations.

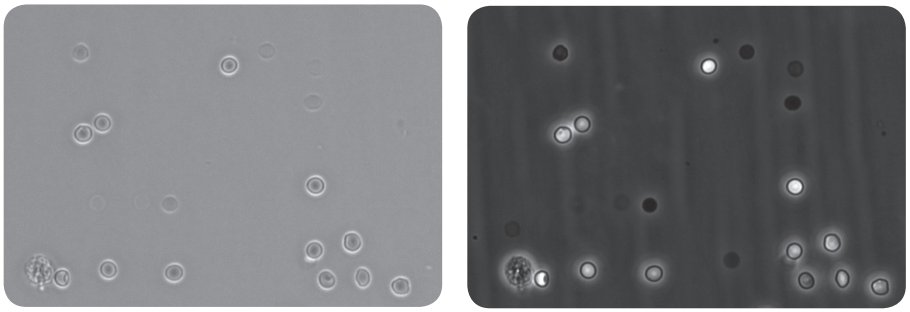
In particular, for urinary sediment examination, phase contrast supplies an optimal identification of particles with a low refractive index (e.g., hyaline casts and RBC devoid of their hemoglobin content, the so-called "ghost RBC") and of cellular morphological details. This last feature is of the highest importance for the differentiation of the renal epithelial cells from transitional epithelial cells. Moreover, it offers the best approach for the evaluation of RBC morphology. Therefore the use of phase contrast microscopy is encouraged also by international guidelines on urinalysis.[3]
The UriSed Technology based UriSed 3 PRO instrument combines both bright-field and phase contrast illumination in one optical system, taking information from both methods of the same viewfield into account.

Particle detection using Phase contrast microscopy

The most spectacular advantage for a user of phase contrast microscopy is that those sediment particles that are mostly transparent become visible! This leads to specific improvement in recognition at several particle types.

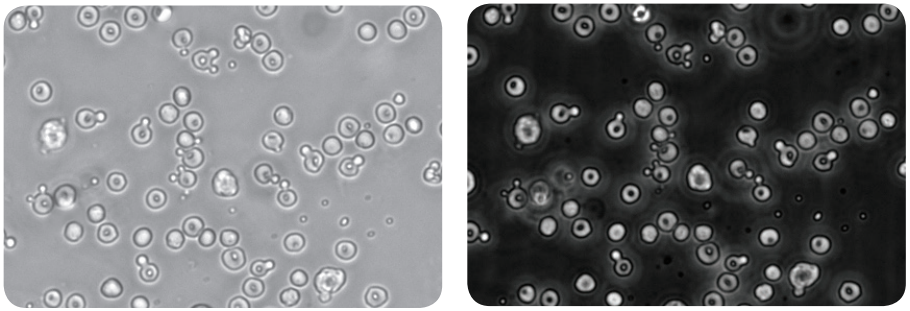
[3]European Urinalysis Guideline, p.23, European Confederation of Laboratory Medicine, 2000

Ghost Red Blood Cells



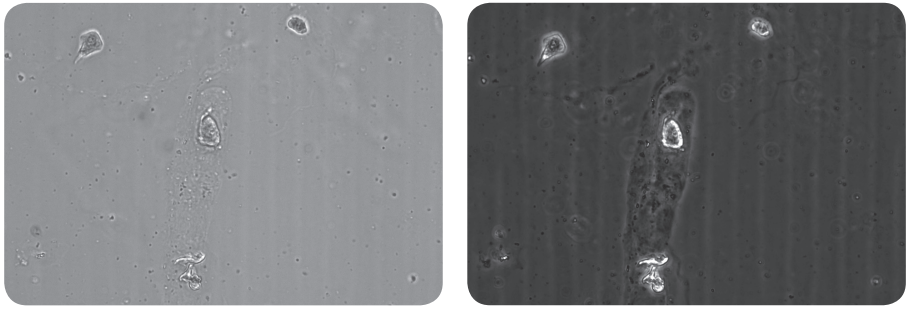
Easier identification of Ghost Red Blood Cells

Acanthocytes



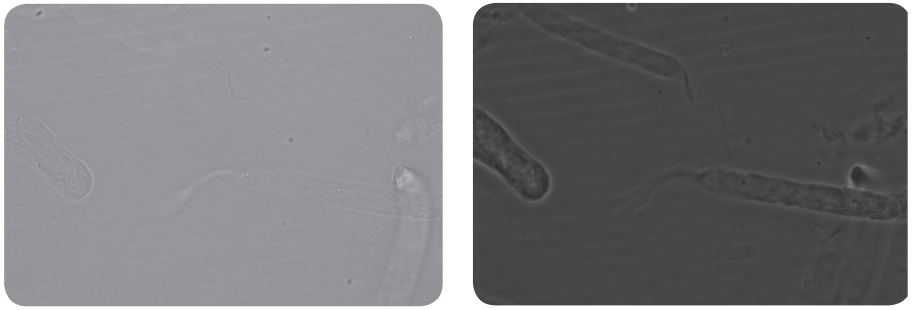
Easier identification of Acanthocytes

Pathological casts



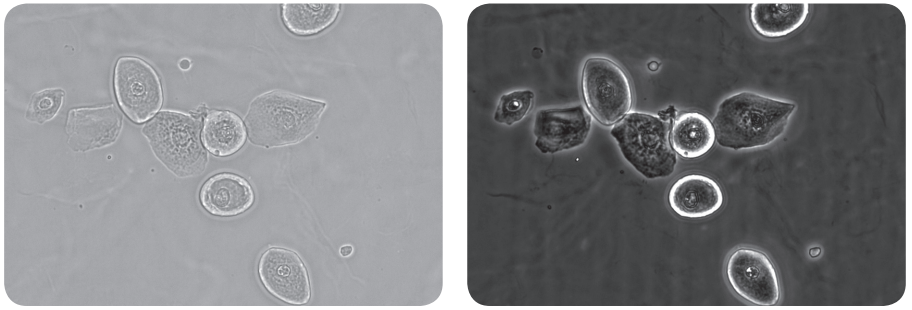
More reliable identification of Pathological Casts

Hyaline casts



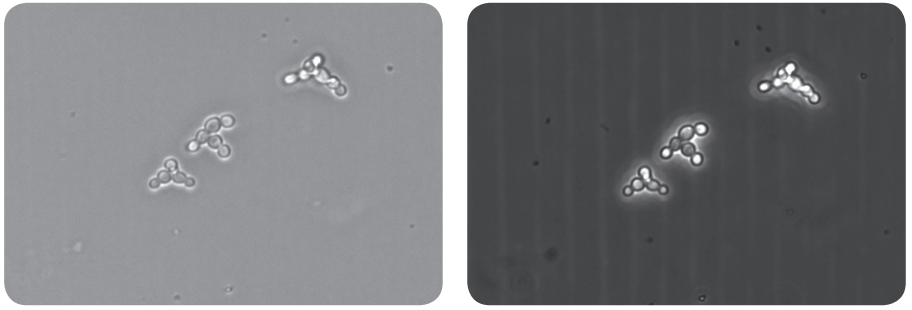
More reliable identification of Hyaline Casts

Squamous & Non-squamous Epithelial Cells



Easier subtype differentiation of Non-squamous Epithelial Cells

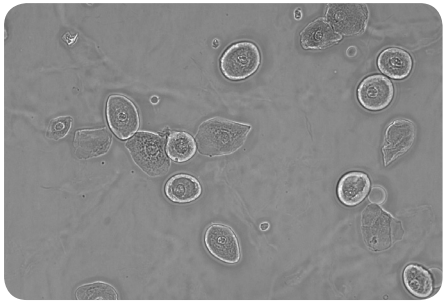
Yeasts

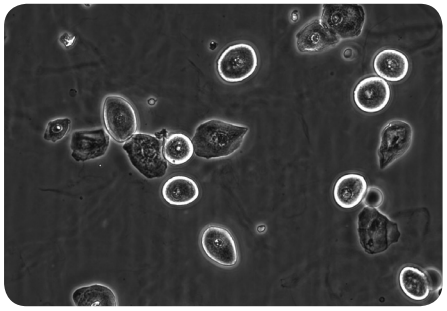


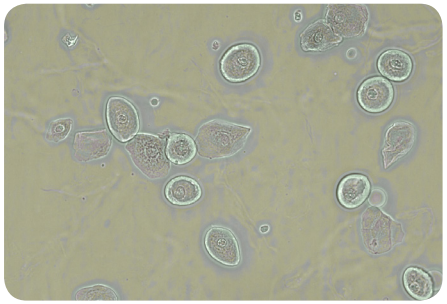
Better differentiation of Yeasts from Red Blood Cells

New PHASE with CONTRAST!

The UriSed 3 PRO instrument utilizes phase-contrast and bright-field microscopy to combine original and innovative technologies whose aim is the progressive improvement of automated urinary sediment examination and the progressive approach to the gold standard method manual microscopy. This instrument performs sample preparation and takes several images of the investigated 2.2 uL sample through its built-in microscope. The zoomable HPF-like images are evaluated by using the Auto Image Evaluation Module (AIEM), which is high-quality image processing software. UriSed 3 PRO takes and saves both a bright-field and a phase-contrast microscopy image from the same viewfield, and generates a composite image of the two to show the features of each image in one view. The evaluation provides a quantitative result for Red Blood Cells and White Blood Cells and semi-quantitative results for all other particle types.







Result Flags

With the aid of the new auto-flag feature, two different RBC subcategories can be identified.
Samples with haematuria are marked when the ratio of the hemolyzed – ghost – RBCs are higher than approximately 30%. This is practical in case of hypotonic urine, because the RBCs swell and release their hemoglobin content to become ghost cells. The auto-flag function also labels the sample if the ratio of acanthocytes – a type of dysmorphic RBC – is higher than 5%, which indicates the possible glomerular origin of the haematuria.

URISED® TECHNOLOGY

77 Elektronika Kft.

The Company

77 Elektronika is a developer, manufacturer of in vitro diagnostic medical devices mainly automated and semi-automated microscopic urine sediment analyzers, urine chemistry analyzers, blood glucose meters, rapid test readers and their consumables under own brand name and as OEM products for market-leading multinational companies in the field of medical diagnostics.

77 Elektronika was established in 1986 and is headquartered in Budapest, Hungary (EU). The company is committed to providing superior products and services to the complete satisfaction of its customers.

Instruments
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