Urine microscopy

In the palm of your hand

Microscopic examination of urine is an essential tool for screening and monitoring diseases and conditions such as urinary tract infections or kidney disorders in animals. However, automated methods in primary care can be cost-intensive, while manual analysis may result in inaccuracies. The lack of standardization in urine microscopy poses a significant challenge for veterinarians.

The vet fluidlab 1 utilizes state-of-the-art quantitative phase imaging technology to enable automated urine microscopy of uncentrifuged samples. This approach facilitates faster diagnoses through point-of-care (POC) methodology while eliminating unnecessary intermediate steps in sample preparation.

Ready-to-use

- Ready-to-use slide
- Small sample volume (20 µL)
- Step-by-step guide on the device

Reliable

- Standardized analysis
- Objective interpretation
- Reproducible results

Compact

- Fits in every practice
- Maintenance-free
- Recalibration-free

Immediate

- Low hands-on time (3 steps)
- No centrifugation
- Quick clinical decisions

vet fluidlab 1

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Digital holographic microscopy (DHM)

Red Blood Cells

DHM is an innovative technique newly introduced to veterinary in vitro diagnostic field. It involves illuminating the sample with light, where some is diffracted while some passes through without seeing the sample. The diffracted light interacts with the non-diffracted light, creating a hologram captured by an image sensor. This digital reconstruction provides valuable information about the different elements such as blood cells, crystals or casts distributed within the sample.

White Blood Cells

Epithelial Cells

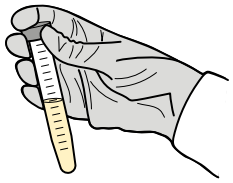
Crystals

Casts

Bacteria
(flagging of suspected presence)

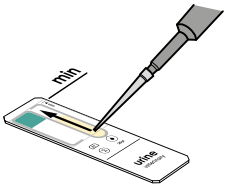
Workflow

1



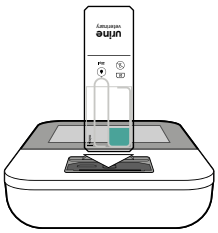
Collect your sample in a sterile manner. Fill in all patient information on your device.

2



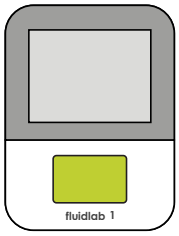
Take a glass slide out of the box. Mix the sample properly and aspire right away to avoid sedimentation. Fill the glass slide completely up to „min“-mark with 20 µL urine.

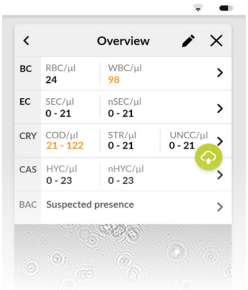
3



Insert the glass slide into the device. The measurement starts automatically. You‘ll receive the result in a few minutes.

4





Scroll down through the result screen to see the results and the microscopic image. Measurements can be saved and additionally transferred to a computer.

Technical specifications

vet fluidlab 1

Method	Digital Holographic Microscopy (DHM)
Sample centrifugation	No
Sample pipetting	Yes
Sample volume required for analysis	20 µL
Analyzed parameters	Red Blood Cells/White Blood Cells Squamous Epithelial Cells/Non-squamous Epithelial Cells Hyaline Casts/Non-hyaline Casts Calcium Oxalates Dihydrates/Struvites/Unclassified crystals Bacteria (suspected presence)
Consumables	Glass slide
Dimensions	128 x 94 x 33 mm
Weight	0.24 kg

Three components of urinalysis

vet fluidlab 1 completes the entirety of urinalysis together with the urine strips and refractometer but offers measurable precision for urinalysis.

Urine microscopy	Urine chemistry	Specific gravity
		
vet fluidlab 1	Urine strips	Refractometer

The rationale for utilizing uncentrifuged urine for urinalysis

In the field of human medicine, the benefits of using uncentrifuged urine for analysis have become increasingly evident. Recent 2023 updates in the European urinalysis guidelines lean towards recommending the utilization of uncentrifuged urine for diagnostic purposes.

„A quantitative result for urine particles is more reliably obtained by direct counting of uncentrifuged specimens in a chamber than after centrifugation.“ [1]

Advantages of using uncentrifuged urine

1. **Accurate quantification**
   Uncentrifuged urine avoids potential loss of erythrocytes and leukocytes, ensuring accurate quantification without significant relative losses, which can range from 20 to 80%. By bypassing centrifugation, these errors are mitigated, thereby preserving the analytical sensitivity and enhancing test result accuracy. [2]
2. **Enhance precision**
   By eliminating the need for centrifugation, the discrepancy reduction ensures a closer alignment between theoretical and practical concentrations, especially for smaller particles. [3]
3. **Reduce hands-on time**
   This not only increases efficiency but also reduces human errors, minimizes labor-intensive steps, and optimizes workflow in clinical settings.

Urine Microscopy Parameters

Measured Parameter		Clinical Significance	Negative in N/µL *in N/HPF*	Low in N/µL *in N/HPF*	Medium in N/µL *in N/HPF*	High in N/µL *in N/HPF*	Very High in N/µL *in N/HPF*
Blood Cells	Red Blood Cells (RBC)	Urinary tract disease or bleeding (inflammation, infection, stones, tumors, etc.)	0-25 *0-5*	25-100 *5-25*	100-500 *25-100*	>500 *>100*	
	Leukocytes (WBC)	Inflammation or infection in the urinary tract (pyelonephritis, cystitis, etc.)	0-15 *0-3*	15-30 *3-6*	30-100 *6-20*	100-250 *20-50*	>250 *>50*
Epithelial Cells	Squamous Epithelial Cells (SEC)	Often due to poor sample collection	0-5 *0-1*	5-25 *1-5*	25-50 *5-10*	50-100 *10-20*	>100 *>20*
	Non-squamous Epithelial Cells (nSEC)	Increased number may indicate urinary tract inflammation, infection, kidney stones, or renal tubular disease	0-5 *0-1*	5-25 *1-5*	25-50 *5-10*	50-100 *10-20*	>100 *>20*
Crystals	Calcium Oxalate Dihydate (COD)	Causes and likelihood of stones, clinical significance depends on their type and quantity	0-5 *0-1*	5-30 *1-6*	30-105 *6-21*	105-250 *21-50*	>250 *>50*
	Struvite (STR)		0-5 *0-1*	5-30 *1-6*	30-105 *6-21*	105-250 *21-50*	>250 *>50*
	Unclassified Crystals (UNC)		0-5 *0-1*	5-30 *1-6*	30-105 *6-21*	105-250 *21-50*	>250 *>50*
			Negative in N/µl *in N/LPF*	Presence (suspicion of abnormality) unit/µl *unit/LPF*			
Casts	Hyaline Cast (HYC)	Might not be significant in lower numbers,can be present when aking medications that affect the kidney	0 *0*	>1 *>1*			
	Non-hyaline Cast (nHYC)	Suggests renal conditions such as glomerulonephritis or pyelonephritis and chronic renal failure	0 *0*	>1 *>1*			
Bacteria	BAC	Suspected bacteria infection	Negative *Negative*	Suspected Presence *Suspected Presence*			

[1] Kouri, T., Hofmann, W., Rosanna, F., Oyaert, M., Schubert, S., Berg Gertsen, J., ... Pestel-Caron, M. (2023). The EFLM European Urinalysis Guideline Update 2023. Haikaraportti 4 B 22, FIN-02620 Espoo, FINLAND. 178.
[2] Delanghe, J., & Speeckaert, M. (2014). Preanalytical requirements of urinalysis. Biochemia Medica, 89-104.
[3] Ichiyanagi, Y. (2014). Field Volume of Urine Sediment Test - Comparison of Theoretical Volume with Practical Volume -. Sysmex Journal International Vol.24 No.1.