LABQUALITY

External Quality Assessment Scheme

Urine Particle Identification Round 1, 2023

Specimens
The samples in this scheme are four digital images of supravital stained urine sediment. No physical samples are sent to the clients

Background information
The sample is concentrated human patient urine that was stained using the Sternheimer method (Sternheimer R. A supravital cytodiagnostic stain for urinary sediments. J Am Med Ass 1975; 231: 826-832.) The images were taken without fixation with a digital microscope and edited with computer software. The participants are requested to identify the particles pointed by the arrows. Selected patient data and results from automated counting are provided as background information.

Examinations
Urine cells

Result reporting
Please enter the results and methods via LabScala (www.labscala.com).

Case
The single-catheterised specimen was obtained from a 90-year old female at the emergency room.

U-Particles (automated count, particles E6/L; abnormal results with BOLD face): red blood cell **128**, white blood cell 15, squamous epithelial cell 6, transitional epithelial cell 0, renal tubular epithelial cell **18**, hyaline cast **12**, pathological cast **11**, bacteria 25, yeast Neg.

2023-01-30

INSTRUCTIONS

Product no. 3200
LQ744523011-14/FI

Subcontracting: Sample preparation, Sample pretesting

The results should be reported no later than **February 20, 2023**.

Inquiries
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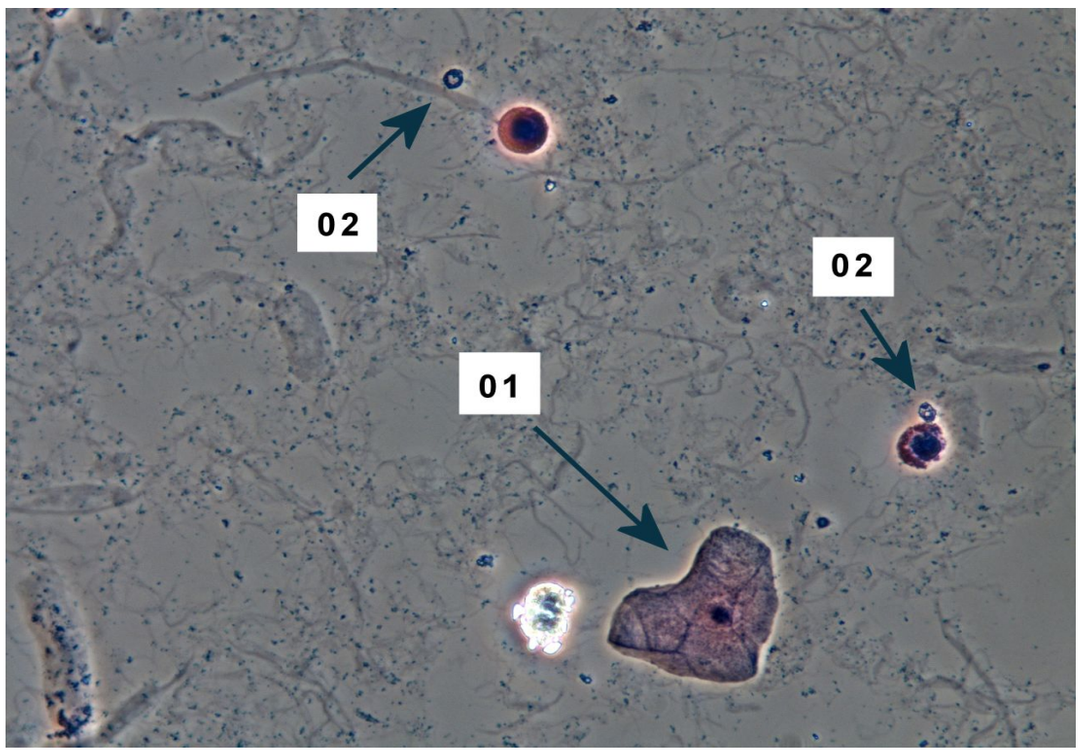
FINAS
Finnish Accreditation Service
PT02 (EN ISO/IEC 17043)

Quality Management
ISO 9001:2015

Image S001|Finding

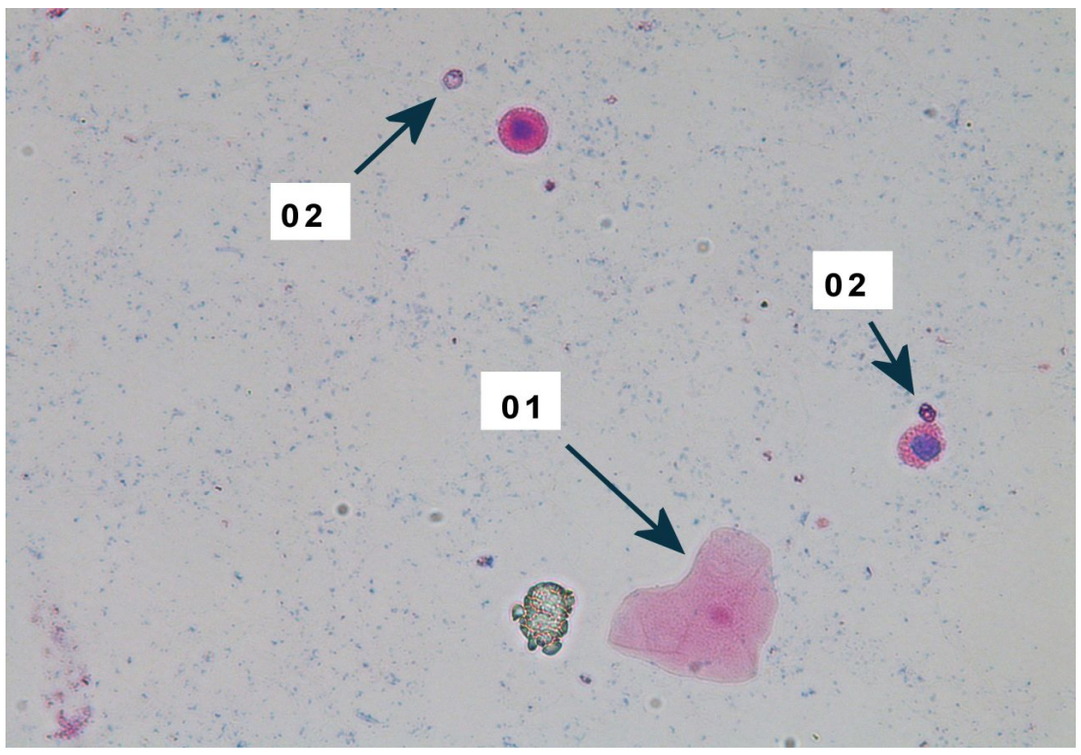
Result	n
Non-squamous epithelial cells (NEC)	1
Renal tubular epithelial cell	1
Squamous epithelial cell (SEC)	128
Total	**130**



Finding S001: The first arrow 01 of this round pointed at a squamous epithelial cell (E= expected response) that was identified by 98% of participants. Polygonal cell contained a small dark nucleus and plenty of finely granular cytoplasm.

Image S002|Finding

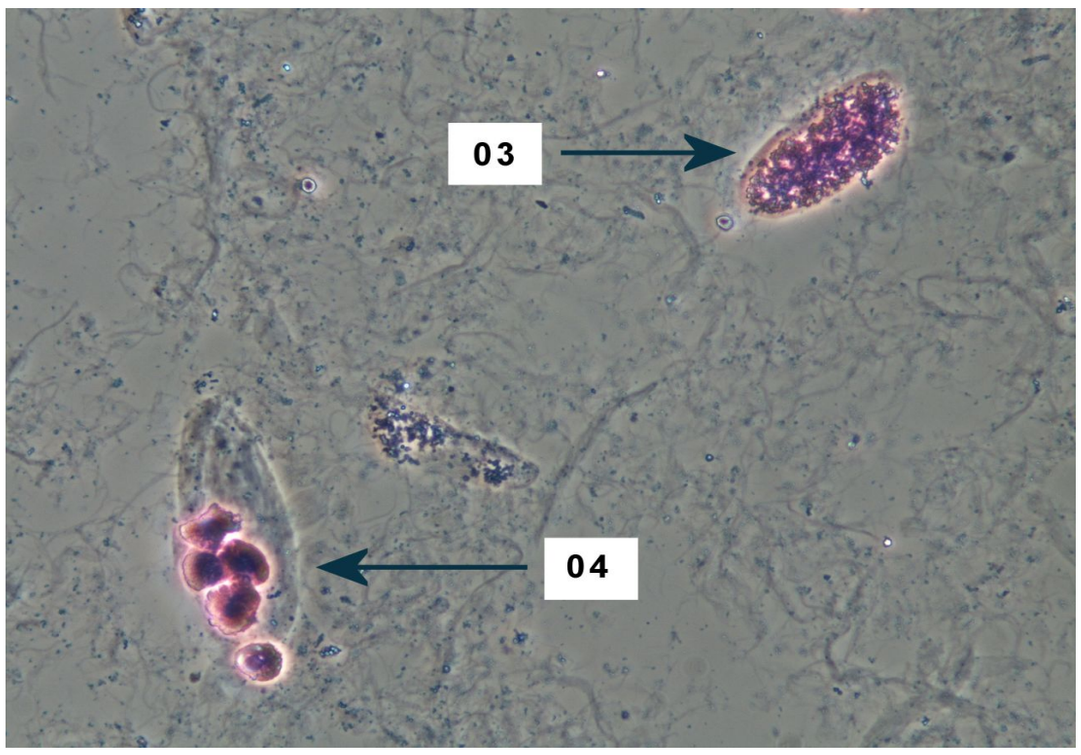
Result	n
Artefact	2
Crystal	1
Crystal, urate	1
Dysmorphic erythrocyte	54
Erythrocyte	67
Erythrocyte cast	1
Leukocyte	2
Other finding, describe in the comment field	1
Yeast (candida)	1
Total	**130**



Finding S002: The arrows 02 pointed at small round particles with visible holes in their centre. They were clearly smaller than the epithelial cells. These were dysmorphic red blood cells, RBC (E; 42% of responses) passing into urine through the kidneys. At the basic level of differentiation, RBC was expected (E; 52% of reports) if the laboratory is not reporting dysmorphic cells. Dysmorphic RBCs are most often small (diameter about 4-8 µm) as compared to normal RBC (diameter about 6-10 µm). Most importantly, their shape is variably different from normal RBC. The shown dysmorphic RBC are easily identified from the hole in the centre of the cell. No other particles, such as crystals, yeast, or fat droplets, have such a hole in their centre.

Image S003|Finding

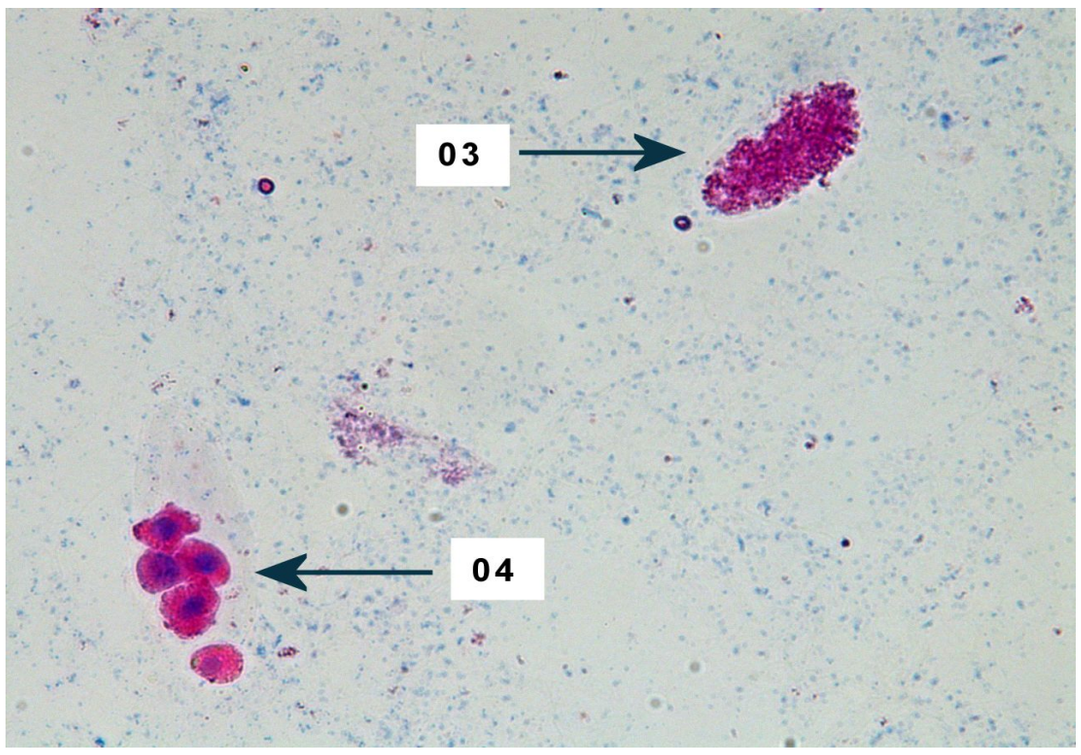
Result	n
Bacterial cast	3
Cellular cast (not specified)	3
Erythrocyte cast	2
Granular cast	110
Granulocyte cast	◉ 6
Hyaline cast	1
Other finding, describe in the comment field	1
Pathological cast	4
Total	**130**



Finding S003: The arrow 03 pointed at a granular cast, identified by most participants (E; 85% of responses). At the basic level of differentiation, it belongs to “pathological casts” (E; 3% of responses). This was not a granulocyte cast (5% of responses) nor a RBC cast (2 reports), because no intact cells were discerned. A mix-up of the terms “granular cast” (filled with granules) and “granulocyte cast” (filled with granular leukocytes) may have occurred in some responses. Yeast cells have a size of almost that of RBC, and they do not stain. A proposal of a fungal clump (1 report) was creative. The shown granules were smaller than yeast cells, and there was a border of a cast surrounding the particle.

Image S004|Finding

Result	n
Artefact	1
Cellular cast (not specified)	◉ 14
Granular cast	1
Granulocyte cast	3
Hyaline cast	27
Leukocyte	1
Macrophage	1
Pathological cast	1
Renal tubular cell cast	51
Renal tubular epithelial cell	18
Transitional epithelial cell	12
Total	**130**



Finding S004: The arrow 04 pointed at a renal tubular cell cast (E; 39% of responses), with the cells inside the cast covering together slightly more than 1/3 of the total surface area of the cast (the classification limit). The epithelial cells had a mononuclear, evenly blue nucleus, and a clearly granular, almost round cytoplasm, indicating renal tubular cells. If the laboratory interpreted that the arrow pointed at individual cells, renal tubular epithelial cell was also an expected report (E; 14% of reports). Epithelial cells were morphologically closer to renal tubular than transitional epithelial cells (9% of reports) based on the shape of the cells, and granularity of their cytoplasms. Transitional epithelial cells are usually spindle-shaped or, on the surface of the epithelium, round with smooth cytoplasms. At the basic level, the arrow pointed at a pathological cast (E; 1% of reports) or a cellular cast without classifying the cells (A= acceptable report; 11% of participants).

The thin focussing layer and pixel format in digital microscopy decrease sharpness of obtained images that is not seen in microscopy by eyes. The cast of the finding 04 could with good reason be interpreted such that the cells at the arrow were located above the cast, not within it, as seen by the microscopist who took the photo. Then, the separate cast alone was clearly a hyaline cast (A; 21% of reports).

Clinical significance: A single-catheter urine specimen had been obtained from a 90-year-old female patient. A clear haematuria at 128 RBC xE6/L was observed, and additionally renal tubular cells 18 xE6/L, hyaline casts 12 xE6/L, and pathological casts 11 xE6/L in the automated counting. With a test strip, albuminuria was detected. Visual microscopy confirmed the presence of renal particles, as well as dysmorphic haematuria, i.e., a kidney damage. Bacteriuria was not present. The specimen was representative with an osmolality of 426 mOsm/kgH_2O

(estimate from a conductivity measurement). The estimated GFR was 51 mL/min/1.73 m^2, calculated from plasma creatinine, usual at her age. Along with aging, kidney disease may complicate diabetes, vascular diseases, or several other diseases. Plasma CRP concentration was 46 mg/L (diagnostic cut-off < 10 mg/L). A cause to seek help from the emergency room might have been an inflammation, a fluid balance disorder, worsening of a kidney disease, or another organ damage.

Urine, identification of cells and other particles, February, 1-2023

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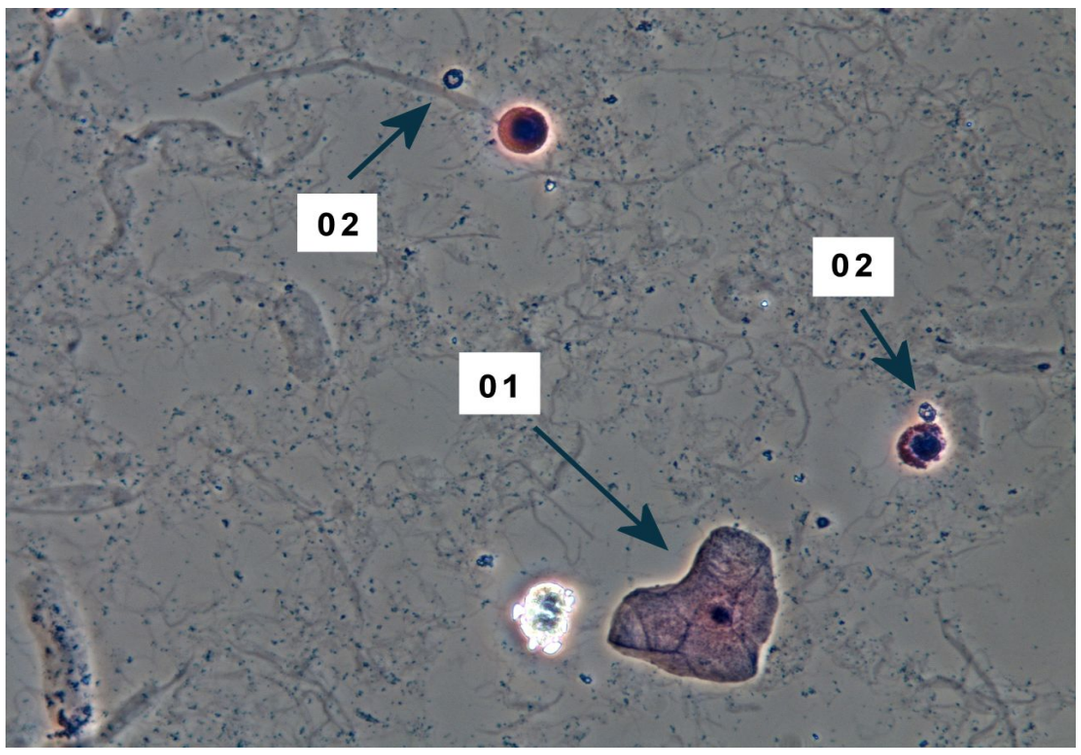

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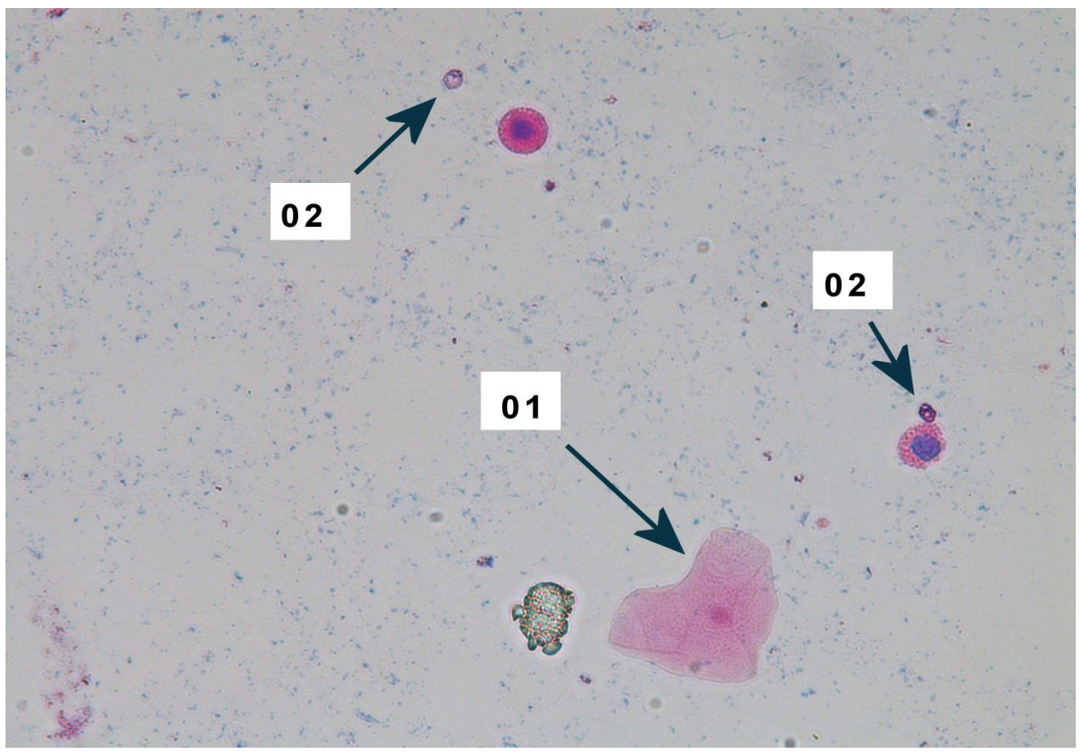

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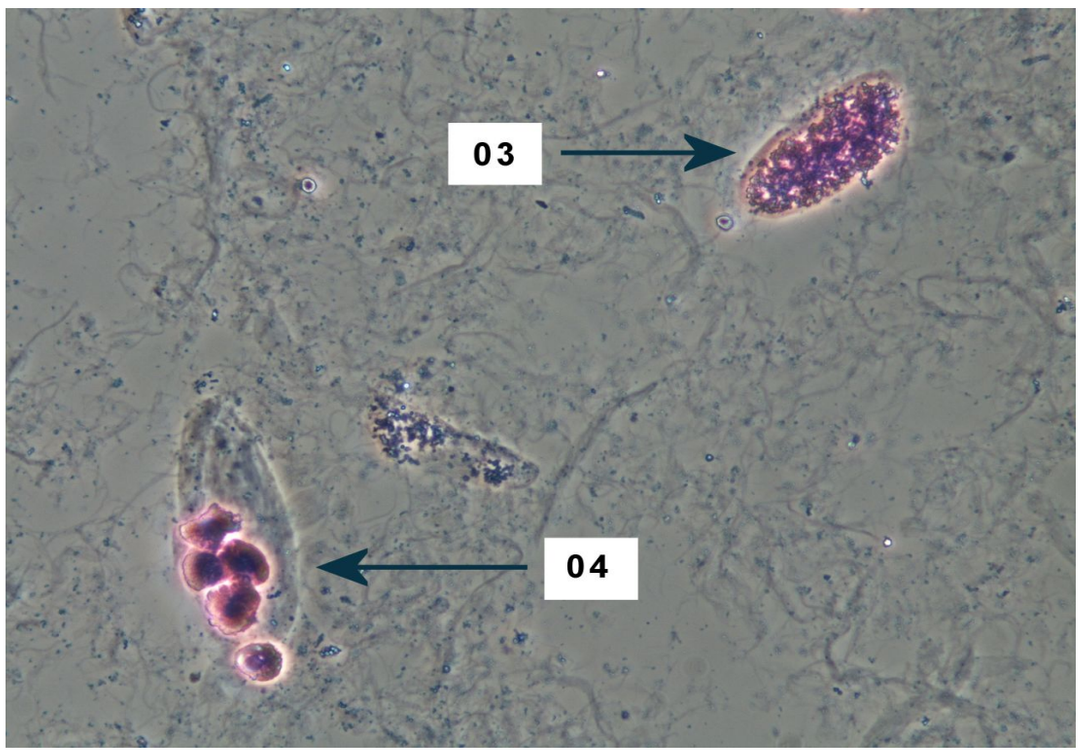

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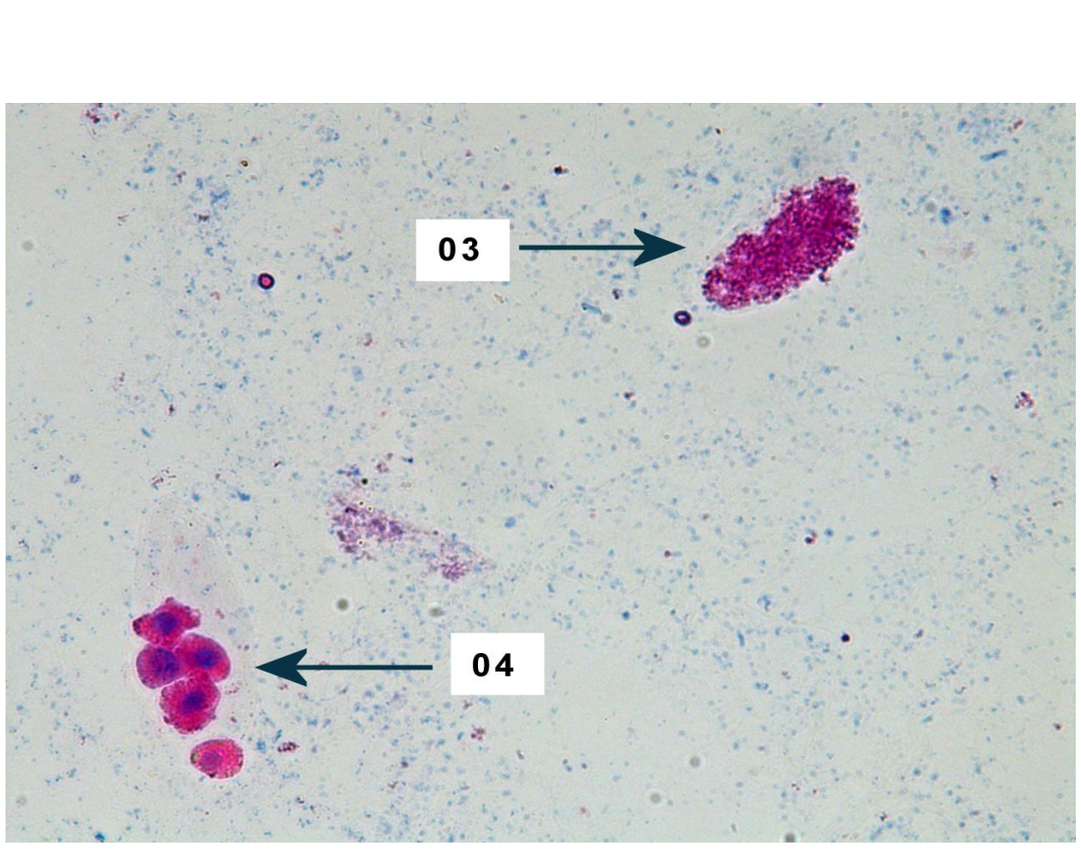

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External Quality Assessment Scheme

Urine Particles
Round 1, 2023

Specimens
Specimens LQ744523011-744523014 were digital images of supravital stained urine sediment S001-S004 in LabScala.

Report info
The report contains numerical summary with individual results presented in a table. Both Expected (E) and accepted (A) results are marked with green colour and laboratory's own result with a black radio button (⊙). If you have not reported any results, you will get a note: "You have not responded in time, only global report is available."

It is important to read the Final report first, because it contains important information of the samples and results in each round.

Comments – Expert
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2023-03-06

FINAL REPORT

Product no. 3200

Subcontracting: Sample preparation

Samples sent	2023-01-30
Round closed	2023-02-20
Final report	2023-03-06

Request for correction
Typing errors in laboratory's result forms are on laboratory's responsibility. Labquality accepts responsibility only for result processing. Requests must be notified by writing within three weeks from the date of this letter.

Authorized by
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Expert
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MD, PhD, Docent,
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End of report