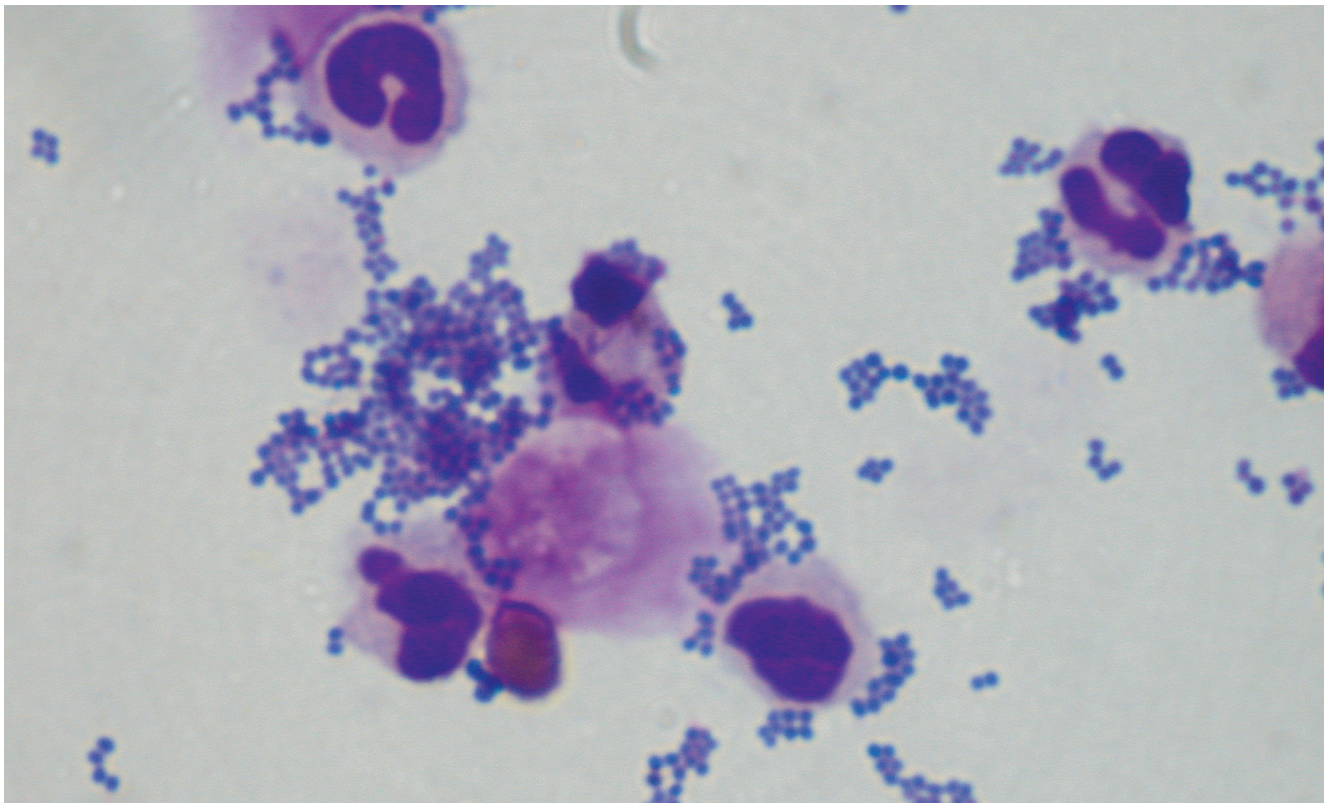


# “Urine-Titled” to Know: Urine Sediment Evaluation



The primary purpose of microscopic examination of urine sediment is to detect abnormal formed elements (eg, cells, casts, crystals) in the sample. Urine sediment may contain a variety of miscellaneous components, some that have clinical significance (eg, parasites, bacteria), and some that are strictly contaminants (eg, starch granules, pollen, grass particles). The presence or absence of specific formed elements can provide detailed diagnostic information.

Urine sediment examination should utilize 5 mL of fresh urine.<sup>1</sup> Normal reference ranges are based on a particular urine amount and any alteration of the amount should be considered. However, it is more important that technicians

are consistent when obtaining and evaluating the urine than the amount of urine obtained. Every practice should clearly communicate its protocol and standards to ensure accuracy.

The urine sample should be centrifuged at a low speed (eg, 1500–2000 RPM) for 5 minutes. The supernatant is then decanted and the sediment re-suspended in the remaining urine. A drop of this suspension is placed on a glass slide (**Figure 1**) with a cover slip and examined microscopically.

### Unstained Urine Sediment

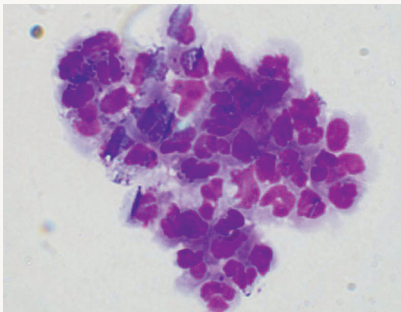
To evaluate the unstained urine sediment slide, first scan the slide with a low-power objective lens (10×) and subdued lighting (iris diaphragm partially closed and condenser in the lowered position).<sup>1,2</sup> To ensure the viewing level is actually urine sediment and not the cover slip or slide, find and focus on any cellular component.<sup>2</sup> Once this is established, perform a scan on low power. Large formed elements (eg, casts, crystals) or clumps of cells are evident at 10× magnification.

Overall cellularity can be assessed, and bacteria, parasites, and other infectious agents can be seen. Next, proceed to the high-power (40×) objective lens while slightly increasing the light and raising the condenser.

### Stained Urine Sediment Supravital Stain

A wet preparation may be desired as a follow-up to enhance the refractive index for examination (see **Wet- and Dry-Preparation Stains**). One advantage of the supravital stain is that

## Wet- and Dry-Preparation Stains



Cells can be difficult to identify or differentiate using unstained urine sediment analysis because swollen white blood cells may be confused with renal epithelial cells, or contaminant material may be confused with formed elements. Clusters of transitional cells require further examination on oil immersion to determine if they are normal, reactive, or neoplastic via evaluation of the stained urine sediment:

- **Wet-preparation supravital stain (Sedi-Stain [bd.com]; new methylene blue):** Mix a drop of stain with the suspended sediment and incubate at room temperature for 2–3 minutes before placing a drop of stained sediment onto a microscope slide.
- **Dry-preparation Romanowsky stain (Diff-Quik [Figure 2]; Wright-Giemsa stain [Figure 3]):** Place one drop of suspended sediment on a clean microscope slide. Using a second clean microscope slide, make a compression smear (Figure 4). Air dry the top slide thoroughly and stain gently.

#### TIP

Because of the low-protein nature of urine specimens, cellular components of urine sediment may not adhere to the slide.<sup>1</sup> Agitation in the staining process can also result in loss of the sediment from the slide. Increasing the fixative time will improve the cell's adherence; more than 1–2 minutes of fixative time for urine cytology is recommended.<sup>3</sup> Stain as gently as possible, considering the rinse of a gentle flow of water. Staining time may be 1.5–2 times the amount used for hematology slides, depending on the cellularity of the sediment. The slide should then be air dried thoroughly and evaluated on low-, high-, and oil-immersion.

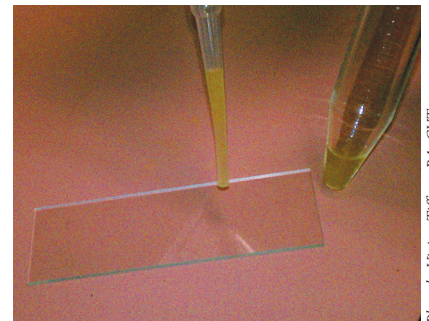


Photo by Vivian Tiffany, BA, CVT

**Figure 1.** Placing a drop of suspension on a glass slide



**Figure 2.** Diff-Quik slide preparation materials



**Figure 3.** Wright-Giemsa stain slide preparation materials

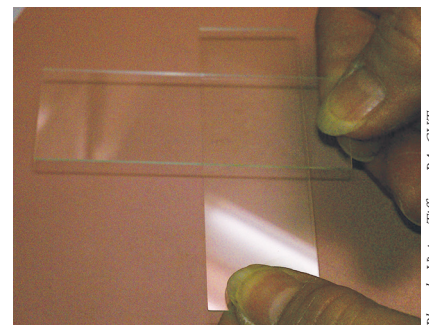


Photo by Vivian Tiffany, BA, CVT

**Figure 4.** Creation of a compression smear sample



## To be of greatest value, efforts must be made to standardize the performance and reporting of results.

it does not contain a fixative, which dissolves crystals. Counts must be performed on the unstained sediment slide first, as quantifying the sediment's elements once diluted with the stain yields inaccurate results.


Problems may result from a supravital stain that can actually make the identification more complicated; for example, if bacteria and stain precipitant accumulate over time and are not filtered, they can be unintentionally added to the urine sediment. In addition, the stain will occasionally stain cytoplasm the same color as the nucleus, making it difficult to clearly differentiate them. To see nuclear and cytoplasmic detail, particularly when identifying nuclear criteria of malignancy, oil immersion is needed, which the supravital wet preparation does not allow.

### **Romanowsky Sediment**

When cellular elements are difficult to identify, the preferred (and simple) method is to make a dry-preparation or air-dried cytology slide (see **Wet- and Dry-Preparation Stains**, previous page). The slide is stained with a Romanowsky-type stain, such as Diff-Quik. There is comfort in viewing an air-dried cytology slide on oil immersion because of its correlation

to peripheral blood—red and white blood cells are easily identified. From this vantage point, other elements can be compared with cells that are now easily identified (eg, blood cells vs transitional epithelial cells). With wet-preparation evaluation, white blood cells become more difficult to identify when swollen, and bacteria can be challenging to detect when found in groups or when contaminants are involved. The dry-preparation cytology stain procedure can help differentiate these aspects and confirm what was seen on direct sediment evaluation. If a cluster of suspicious transitional epithelial cells is encountered, further evaluation under oil immersion is needed for nuclear criteria of malignancy.<sup>2</sup>

### **Conclusion**

Microscopic examination of urine sediment is a rapid, easy-to-perform diagnostic procedure that provides valuable information. To be of greatest value, efforts must be made to standardize the performance and reporting of results. Unstained and air-dried cytology can enhance the amount of information for reliable results. 

**See Aids & Resources, back page, for references & suggested reading.**

### **COMFORTIS®-Cats (spinosad)**

#### **Chevable Tablets**

Before using COMFORTIS chewable tablets, please consult the product insert, a summary of which follows:

**Caution:** Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

#### **Indications:**

COMFORTIS kills fleas and is indicated for the prevention and treatment of flea infestations (*Ctenocephalides felis*), for one month, on cats and kittens 14 weeks of age and older and two pounds of body weight or greater.

#### **Dosage and Administration:**

COMFORTIS is given orally once a month, at the minimum dosage of 22.5 mg/lb (50 mg/kg). Administer COMFORTIS with food for maximum effectiveness. If vomiting occurs within an hour of administration, redose with another full dose. If a dose is missed, administer COMFORTIS with food and resume a monthly dosing schedule.

#### **Contraindications:**

There are no known contraindications for the use of COMFORTIS.

#### **Warnings:**

Not for human use. Keep this and all drugs out of the reach of children.

#### **Precautions:**

Use with caution with concomitant extra-label use of ivermectin. The safe use of COMFORTIS in breeding, pregnant, or lactating cats has not been evaluated.

#### **Adverse Reactions:**

In a well-controlled US field study, which included a total of 211 cats (139 treated with COMFORTIS and 72 treated with an active topical control once a month for 3 treatments), no serious adverse reactions were attributed to the administration of COMFORTIS. The most frequently reported adverse reaction in cats was vomiting.

#### **Percentage of Cats (%) with Adverse Reactions**

	Month 1		Month 2		Month 3	
	COMFORTIS (n=139)	Active Topical Control (n=72)	COMFORTIS (n=135)	Active Topical Control (n=69)	COMFORTIS (n=132)	Active Topical Control (n=67)
Vomiting	14.4	1.4	14.8	1.4	13.6	4.5
Lethargy	3.6	0	0.7	0	1.5	1.5
Anorexia	2.2	0	0.7	0	2.3	1.5
Weight Loss	1.4	0	0	0	3	0
Diarrhea	1.4	1.4	0.7	2.9	2.3	1.5

Over the 3-month (3-dose) study, vomiting occurred on the day of or the day after at least one dose in 26.1% (39/139) of the cats treated with COMFORTIS and in 2.8% (2/72) of the cats treated with the active topical control. Three of the 139 cats treated with COMFORTIS vomited on the day of or the day after all three doses. Two cats that received extra-label topical ivermectin on Day -1 of the field study developed lethargy on Day 1 after COMFORTIS administration on Day 0.

For technical assistance or to report an adverse drug experience, call Elanco at 1-888-545-5973. Additional information can be found at [www.comfortis.com](http://www.comfortis.com). For a complete listing of adverse reactions for spinosad reported to the Center for Veterinary Medicine, see Adverse Drug Experience Reports under <http://www.fda.gov/AnimalVeterinary/SafetyHealth/ProductSafetyInformation>

#### **Effectiveness:**

In a well-controlled laboratory study, COMFORTIS began to kill fleas 30 minutes after administration and demonstrated 98% effectiveness within 4 hours. COMFORTIS kills fleas before they can lay eggs. In a separate well-controlled laboratory study, COMFORTIS demonstrated 100% effectiveness on the first day following treatment and >90% effectiveness on Day 30.

If a severe environmental infestation exists, fleas may persist for a period of time after dose administration due to the emergence of adult fleas from pupae already in the environment. In a field study conducted in households with existing flea infestations, flea count reductions of 97.5% were observed one month after the first treatment and 99.3% after three monthly treatments with COMFORTIS. Cats with pre-existing signs of flea allergy dermatitis showed improvement in erythema, papules, scaling, alopecia, dermatitis/pyodermitis, and pruritus as a direct result of eliminating the fleas.

#### **Storage Information:**

Store at 20 to 25°C (68 to 77°F), excursions permitted between 15 to 30°C (59 to 86°F).

#### **How Supplied:**

COMFORTIS is available in four tablet sizes for use in cats: 90, 140, 270 or 560 mg. Each tablet size is available in color-coded packages of 6 tablets.

NADA #141-277, Approved by the FDA

Manufactured for Elanco Animal Health, A Division of Eli Lilly and Company, Indianapolis, IN 46285