

# House Soiling: A Sign of the 'Other' Diabetes?

If your well-trained cat suddenly begins soiling outside her box, or shows signs of dehydration or poor coat condition, she may have this largely unknown form of diabetes. While different from the much more common 'sugar' diabetes, 'water' diabetes shares some of its symptoms.

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## STORY AT-A-GLANCE

- Feline diabetes insipidus (DI), or water diabetes, is different from the more common diabetes mellitus (sugar diabetes), though they share some symptoms
- DI is a metabolic disorder in which a cat's kidneys aren't able to reabsorb normal amounts of water, resulting in the production of large quantities of very dilute urine
- The two primary types of DI affecting cats are neurogenic (central) diabetes insipidus and nephrogenic diabetes insipidus; a third even more rare type of DI is psychogenic diabetes insipidus
- Symptoms of DI include excessive urination, extreme thirst with increased water intake, dehydration, electrolyte imbalance, house soiling, weight loss, poor coat condition and disorientation
- Treatment for a cat with DI will depend on its cause; some forms of DI can be cured, while others are lifelong
- Caring for a cat with DI includes ensuring there is access to fresh water at all times, as well as constant access to clean litterboxes

***Editor's Note: This article is a reprint. It was originally published January 05, 2021.***

Many cat parents don't realize that diabetes mellitus, or "sugar diabetes," which is unfortunately very common in today's kitties, is not the only type of diabetes. There's also diabetes insipidus (DI), aka "water diabetes," a much rarer form of the disease.

Whereas diabetes mellitus is a disorder of sugar metabolism involving the hormone insulin, diabetes insipidus is a metabolic disorder in which the kidneys aren't able to reabsorb normal amounts of water, so the cat eliminates large quantities of very dilute urine. The word "insipid" describes this colorless, tasteless characteristic of the dilute urine.

There are two forms of DI that affect cats: neurogenic or central diabetes insipidus and nephrogenic diabetes insipidus.

## Neurogenic Diabetes Insipidus

In neurogenic DI, the hypothalamus in the brain and/or the connected pituitary gland doesn't release enough of the antidiuretic hormone known as vasopressin.

The job of vasopressin once it enters the bloodstream is to travel to the kidneys and bind to receptors on specialized cells. This action tells the kidneys to increase reabsorption of water rather than excreting it in urine, which produces the appropriately concentrated urine.

The hypothalamus mixes vasopressin and the pituitary stores it. If either gland fails to do its job, there's a vasopressin shortage. Cats with neurogenic DI don't produce enough vasopressin to signal the kidneys to perform their normal fluid regulation function.

This form of diabetes insipidus is thought to be caused by a congenital defect, trauma, bacterial or viral infection, a pituitary cyst or tumor, or some other factor that causes the vasopressin-secreting tissues to degenerate and die.

## Nephrogenic Diabetes Insipidus

Nephrogenic DI is a much rarer form than neurogenic DI in which there's an adequate amount of vasopressin being produced, but the kidneys don't respond to the hormone as they should. It could be that something interferes with the ability of vasopressin to bind to the receptors on the kidney cells. The outcome is the same as it is with an insufficient supply of vasopressin — the kidneys don't receive the signal to reabsorb more water.

It's thought the decreased binding ability of vasopressin could be caused by an endocrine or metabolic disorder such as Cushing's disease, hypercalcemia, high levels of aldosterone, or low levels of potassium. Sometimes potential toxins caused by E. coli bacteria, **kidney disease**, or an infection can also be contributing factors to nephrogenic DI.

## Psychogenic Diabetes Insipidus

There's actually also a third type of diabetes insipidus caused by either a neurologic thirst-control disorder or a behavior problem that involves excessive water drinking. This form of the condition is caused by excessive water intake (polydipsia) and excessive urination (polyuria). Veterinarians call this combination of polyuria and polydipsia PU/PD.

Psychogenic diabetes insipidus does not involve a primary problem with kidney or pituitary gland function.

## Symptoms and Diagnosis

Cats with congenital or nephrogenic DI are often diagnosed in their first year of life. Those with neurogenic DI are often not diagnosed until middle age. The two symptoms all cats with DI exhibit are passing abnormally large amounts of dilute urine and extreme thirst and increased water intake. Other symptoms can include:

- Poor coat condition
- House soiling in a housetrained pet
- Disorientation
- Weight loss
- **Dehydration**
- Loss of coordination
- Electrolyte imbalance

In severe cases, symptoms can include stupor, seizures, tremors, and collapse. Diagnosing diabetes insipidus can be quite challenging and involves a number of different tests. Blood tests, urinalysis, and a urine culture will all be necessary in part to rule out other causes for the symptoms, including diabetes mellitus, Cushing's, hypothyroidism, and problems with the kidneys, bladder, or liver.

Other tests can include measuring pituitary hormone levels, an MRI or CT scan to check for a mass on the pituitary gland, an abdominal ultrasound, as well as a water deprivation test to see if the cat can produce a more concentrated urine when water intake is restricted.

In some cases, veterinarians perform a desmopressin stimulation test. Desmopressin is the drug used to treat DI. If an animal has a positive response to the drug, it's a good indicator the problem is diabetes insipidus.

## Treatment Options

The treatment goal for cats with DI is to identify and resolve any underlying cause, and correct the excessive water drinking and urination. In some cases, if increased water intake and urination is tolerable, and the pet's organ function and metabolic function are otherwise healthy, it's not always necessary to treat the condition.

Important: A cat with diabetes insipidus must have free access to clean, fresh water at all times. Water must never be withheld from an animal dealing with this condition, as lack of water can lead quickly to death.

If the diagnosis is neurogenic DI, a synthetic form of vasopressin can be given orally or more commonly as an eye drop. Supplementing vasopressin in cats with nephrogenic DI or psychogenic DI is useless, because the problem isn't low levels of this hormone in the first place. A low sodium diet has proven beneficial for some DI patients.

Unless your pet's DI is acquired (vs. congenital) and unless the condition can be resolved by treating an underlying problem, your cat will have DI for the rest of his or her life.

## Caring for a Cat With DI

Important considerations for your DI kitty are, again, keeping plenty of fresh drinking water available 24 hours a day to prevent life-threatening dehydration, and ensuring she has a convenient place to urinate whenever she needs to. Cats with DI need two or three litterboxes that are scooped frequently each day and replenished with plenty of fresh litter.

I think the biggest frustration for most cat parents prior to a diagnosis is the amazing amount of urine these kitties can produce. Remember that most cats with DI can't go for more than an hour or so without urinating, so there will almost certainly be accidents. It's not your kitty's fault. She can't help it. It's important that you're prepared for cleanups with an enzyme-based cleaner, urine remover, or odor remover.

Most importantly, if your cat suddenly begins drinking and peeing excessively, visit your veterinarian to determine the medical reason for this behavior. In many instances, all the basic tests will come back normal, and it's only a positive response to treatment that ultimately confirms the diagnosis of diabetes insipidus.

## Sources and References