

# Uncomplicated Diabetes Mellitus in Cats

## Basics

### OVERVIEW

- Disorder of carbohydrate, fat, and protein metabolism caused by absolute or relative insulin deficiency or resistance to insulin
- Type II (non-insulin-dependent diabetes mellitus) is characterized by inadequate or delayed insulin secretion relative to the needs of the cat; many of these pets live without the need for insulin injections (exogenous insulin) and are less prone to ketoacidosis (acidic condition of the blood caused by the presence of ketone bodies); most common form in cats
- Insulin resistance decreases the ability of tissues (especially muscle, fat tissue, and the liver) to use carbohydrates, fats, and proteins
- “Uncomplicated” diabetes mellitus is a designation that indicates the cat has diabetes mellitus, but does not have secondary problems (such as ketoacidosis, vomiting, or diarrhea) that makes the cat “more sick” and requires more aggressive treatment

### GENETICS

- Genetic susceptibility

### SIGNALMENT/DESCRIPTION OF PET

#### Species

- Cats

#### Breed Predilections

- None

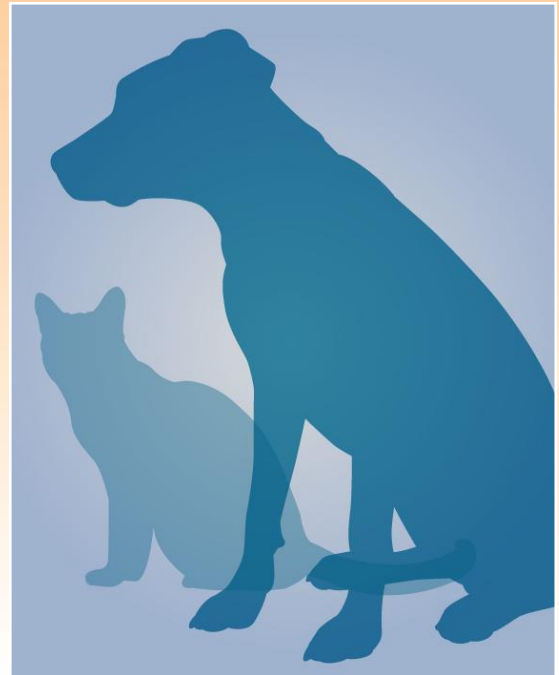
#### Mean Age and Range

- 75% are 8–13 years of age; range, 1–19 years of age

#### Predominant Sex

- Male

### SIGNS/OBSERVED CHANGES IN THE PET



- Early signs—obesity is typical
- Muscle wasting along the back and an oily coat with dandruff are common
- Enlarged liver (known as “hepatomegaly”); yellowish discoloration to skin and moist tissues (mucous membranes) of the body (known as “icterus” or “jaundice”) are more common in cats than dogs
- Less common findings—a plantigrade stance (in which the lower part of the rear legs is dropped toward the ground so it looks like the cat is standing or walking on its lower leg and paw or is in a somewhat crouched position; caused by a nervous system disorder related to the diabetes, known as “diabetic neuropathy”)
- Later signs—excessive urination (known as “polyuria”) and excessive thirst (known as “polydipsia”), excessive appetite (known as “polyphagia”), and weight loss, loss of appetite (known as “anorexia”), sluggishness (lethargy), depression, and vomiting

## CAUSES

- Genetic susceptibility
- Amyloid (insoluble proteins deposited outside of the cells in various tissues and organs, compromising their normal function)
- Inflammation of the pancreas (known as “pancreatitis”); the pancreas is the organ that normally produces and releases insulin
- Predisposing diseases (such as hyperadrenocorticism or Cushing's disease [where the adrenal glands produce excessive amounts of steroids] and acromegaly [where the body produces excessive amounts of somatotropin, a growth hormone, leading to enlargement of the head, limbs, and organs])
- Drugs (such as steroids and progestogens)

## RISK FACTORS

- Obesity for type II diabetes mellitus

## Treatment

### HEALTH CARE

- Cats that have compensated for their diabetes (that is, the cat appears to be “healthy” and is alert, eating and drinking, with no signs of vomiting) can be managed as outpatients

### ACTIVITY

- Strenuous activity may lower insulin requirement; a consistent amount of activity each day is helpful

### DIET

- Studies suggest that ultra low-carbohydrate canned diets may lead to diabetic remission in 70–95% of newly diagnosed diabetic cats; monitor closely for change in insulin requirement following any adjustment in diet
- Avoid soft, moist foods because they cause severe increases in blood glucose (known as “hyperglycemia”) following the meal (known as “post-prandial elevations in blood glucose” or “post-prandial hyperglycemia”)

### SURGERY

- Intact females should be spayed (ovariohysterectomy) when stable; progesterone (a female hormone) secretion makes management of diabetes mellitus difficult

## Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- Insulin—treatment of choice for most cats
- Pork lente insulin (Vetsulin, U-40)—intermediate duration of effect; given subcutaneously (under the skin); Vetsulin has had limited availability recently
- Protamine zinc insulin (PZI, U-40)—long-acting insulin; given subcutaneously
- Glargine insulin (Lantus, U-100)—human recombinant insulin; gives best results when combined with a low-carbohydrate, high-protein diet—remission rates of 70–100% reported with this combination
- Oral drugs to decrease blood glucose (known as “hypoglycemic agents”)—glipizide is useful with dietary therapy

in cats with type II diabetes mellitus; the cat should have uncomplicated diabetes mellitus (“uncomplicated” diabetes mellitus is a designation that indicates the cat does not have secondary problems [such as ketoacidosis, vomiting, or diarrhea] that makes the cat “more sick” and requires more aggressive treatment) and no history of ketoacidosis (acidic condition of the blood caused by the presence of ketone bodies)

- Acarbose

## **Follow-Up Care**

### **PATIENT MONITORING**

- Glucose curve—not helpful in cats
- Urinary glucose monitoring—urine is tested for glucose and ketones before the meal and insulin injection; to use this as a regulatory method, the pet must be allowed to have trace to 1/4% glucose in the urine (known as “glucosuria”) to avoid the development of too low a level of glucose in the blood (hypoglycemia)
- Fructosamine (a particular protein found in blood used to monitor control of blood glucose levels [glycemic control])—maintain at less than 400 micromol/L; recheck every 4 weeks during initial regulation of insulin treatment and then every 3 months
- Clinical signs—owner can assess degree of excessive urination (polyuria) and excessive thirst (polydipsia), appetite, and body weight; if these are normal, the disease is well regulated or controlled

### **PREVENTIONS AND AVOIDANCE**

- Prevent or correct obesity
- Avoid unnecessary treatment with steroids or megestrol acetate

### **POSSIBLE COMPLICATIONS**

- Seizure, blindness or coma with insulin overdose
- Kidney damage related to diabetes mellitus (known as “diabetic nephropathy”)
- Nerve damage related to diabetes mellitus (diabetic neuropathy)

### **EXPECTED COURSE AND PROGNOSIS**

- Some cats recover, but may relapse at a later time
- Prognosis with treatment is good; most pets have normal lifespans

## **Key Points**

- Daily feeding and medication schedules are necessary to maintain blood glucose in normal range
- If the cat develops signs of weakness, sluggishness, blindness, or seizures (possible signs of low blood sugar [hypoglycemia]), call your pet's veterinarian immediately
- Keep a chart of pertinent information about the pet, such as urine dipstick results, daily insulin dose, and weekly body weight