Laboratory Considerations
No specific laboratory interactions were noted for this drug.

Doses
- **DOGS:**
  a) For treatment of narcolepsy/cataplexy: 5–10 mg (total dose) PO once daily. (Joseph 2000)
  b) For treatment of narcolepsy/cataplexy (to supplement imipramine at 0.5–1 mg/kg PO q8–12h): Methylphenidate: 0.25–0.5 mg/kg PO or 5–10 mg (total dose) PO q12–24h (Shell 2003b)
  c) For treatment of hyperkinesis: 5–20 mg (total dose) q8–12h; give for 3 days and assess for improvement of target behaviors (anxiety, overactivity, learning ability) (Siebert 2003c)
  d) For hyperkinesis-hyperactivity: Small dogs: 5+ mg total dose PO q12h; Large Dogs: 20–40 mg total dose PO q12h (Virga 2002)

Monitoring
- Clinical efficacy
- Occasional physical exam to monitor vital signs, body weight
- In humans, it is recommended to do periodic CBC with differential and platelet counts during prolonged therapy.

Client Information
- Clients should understand that this drug has significant potential for abuse by humans and to keep it safely secure.
- Clients should report untoward stimulatory effects to the veterinarian.
- If using an extended-release product, do not crush tablet or capsule.

Chemistry/Synonyms
A CNS stimulant related to amphetamines, methylphenidate HCl occurs as fine, white odorless, crystalline powder. It is feely soluble in water and soluble in alcohol.

Methylphenidate may also be known as: *Attenta®*, *Daytrana®*, *Equasym®*, *Focalin®*, *Metadate ER®*, *Methylin®*, *Rilatine®*, *Riphenidate®*, *Ritalina®*, *Ritalin®*, *Ritaline®*, *Ritaphen®*, *Rubifen®*, or *Tranquilyn®*.

Storage/Stability
Unless otherwise noted on the label, methylphenidate tablets and extended-release tablets and capsules should be stored in tight, light-resistant containers at room temperature.

Dosage Forms/Regulatory Status
VETERINARY-LABELED PRODUCTS: None

The ARCI (Racing Commissioners International) has designated this drug as a class 1 substance. See the appendix for more information.

HUMAN-LABELED PRODUCTS:

Methylphenidate Tablets: 5 mg, 10 mg & 20 mg; Chewable Tablets: 2.5 mg, 5 mg & 10 mg; Extended-Release Tablets: 10 mg, 18 mg, 20 mg, 27 mg, 36 mg & 54 mg; Extended-Release Capsules: 20 mg, 30 mg & 40 mg; *Methylin®* (Mallinckrodt; Alliant); *Ritalin®*, *Ritalin® LA*, & *Ritalin-SR®* (Novartis); *Metadate ER®* (Mallinckrodt; Celltech); *Concerta®* (McNeil); (Rx; C-II)

Methylphenidate Oral Solution: 5 mg/5 mL & 10 mg/5 mL in 500 mL; *Methylin®* (Alliant); (Rx; C-II)

Methylphenidate Transdermal Patch: 10 mg, 15 mg, 20 mg & 30 mg; *Daytrana®* (Shire); (Rx; C-II)

METHYLPREDNISOLONE
METHYLPREDNISOLONE ACETATE
METHYLPREDNISOLONE SODIUM SUCCINATE

(meth-ill-pred-***niss***-oh-lone) Medrol®, Depo-Medrol®

GLUCOCORTICOID

Prescriber Highlights
- Oral & parenteral glucocorticoid that is 4–5X more potent than hydrocortisone; no appreciable mineralocorticoid activity
- Contraindicated (relatively): Systemic fungal infections, manufacturer lists: "in viral infections, . . . animals with arrested tuberculosis, peptic ulcer, acute psychoses, corneal ulcer, & Cushingoid syndrome. The presence of diabetes, osteoporosis, chronic psychotic reactions, predisposition to thrombophlebitis, hypertension, CHF, renal insufficiency, & active tuberculosis necessitates carefully controlled use."
- Therapy goal is to use as much as is required & as little as possible for as short an amount of time as possible
- Primary adverse effects are "Cushingoid" in nature with sustained use
- Many potential drug & lab interactions

Uses/Indications
Glucocorticoids have been used in an attempt to treat practically every malady that afflicts man or animal, but there are three broad uses and dosage ranges for use of these agents. **1)** Replacement of glucocorticoid activity in patients with adrenal insufficiency, **2)** as an antiinflammatory agent, and **3)** as an immunosuppressive. Among some of the uses for glucocorticoids include treatment of: endocrine conditions (*e.g.*, adrenal insufficiency), rheumatic diseases (*e.g.*, rheumatoid arthritis), collagen diseases (*e.g.*, systemic lupus), allergic states, respiratory diseases (*e.g.*, asthma), dermatologic diseases (*e.g.*, pemphigus, allergic dermatoses), hematologic disorders (*e.g.*, thrombocytopenias, autoimmune hemolytic anemias), neoplasias, nervous system disorders (increased CSF pressure), GI diseases (*e.g.*, ulcerative colitis exacerbations), and renal diseases (*e.g.*, nephrotic syndrome). Some glucocorticoids are used topically in the eye and skin for various conditions or are injected intra-articularly or intra-lesionally. The above listing is certainly not complete. For specific dosages and indications refer to the Doses section.

Pharmacology/Actions
Methylprednisolone may be administered either orally or parenterally. Its relative antiinflammatory potency is approximately 5 times that of cortisol. It has negligible mineralocorticoid activity.

Glucocorticoids have effects on virtually every cell type and system in mammals. An overview of the effects of these agents follows:

CARDIOVASCULAR SYSTEM: Glucocorticoids can reduce capillary permeability and enhance vasoconstriction. A relatively clinically insignificant positive inotropic effect can occur after glucocorticoid administration. Increased blood pressure can result from both the

drugs' vasoconstrictive properties and increased blood volume that may be produced.

CELLS: Glucocorticoids inhibit fibroblast proliferation, macrophage response to migration inhibiting factor, sensitization of lymphocytes, and the cellular response to mediators of inflammation. Glucocorticoids stabilize lysosomal membranes.

CNS/AUTONOMIC NERVOUS SYSTEM: Glucocorticoids can lower seizure threshold, alter mood and behavior, diminish the response to pyrogens, stimulate appetite, and maintain alpha rhythm. Glucocorticoids are necessary for normal adrenergic receptor sensitivity.

ENDOCRINE SYSTEM: When animals are not stressed, glucocorticoids will suppress the release of ACTH from the anterior pituitary, thereby reducing or preventing the release of endogenous corticosteroids. Stress factors (*e.g.*, renal disease, liver disease, diabetes) may sometimes nullify the suppressing aspects of exogenously administered steroids. Release of thyroid-stimulating hormone (TSH), follicle-stimulating hormone (FSH), prolactin, and luteinizing hormone (LH) may all be reduced when glucocorticoids are administered at pharmacological doses. Conversion of thyroxine (T_4) to triiodothyronine (T_3) may be reduced by glucocorticoids; and plasma levels of parathyroid hormone increased. Glucocorticoids may inhibit osteoblast function. Vasopressin (ADH) activity is reduced at the renal tubules and diuresis may occur. Glucocorticoids inhibit insulin binding to insulin-receptors and the post-receptor effects of insulin.

HEMATOPOIETIC SYSTEM: Glucocorticoids can increase the numbers of circulating platelets, neutrophils, and red blood cells, but inhibit platelet aggregation. Decreased amounts of lymphocytes (peripheral), monocytes, and eosinophils are seen as glucocorticoids can sequester these cells into the lungs and spleen and prompt decreased release from the bone marrow. Removal of old red blood cells is diminished. Glucocorticoids can cause involution of lymphoid tissue.

GI TRACT AND HEPATIC SYSTEM: Glucocorticoids increase the secretion of gastric acid, pepsin, and trypsin. They alter the structure of mucin and decrease mucosal cell proliferation. Iron salts and calcium absorption decrease while fat absorption increases. Hepatic changes can include increased fat and glycogen deposits within hepatocytes, increased serum levels of alanine aminotransferase (ALT) and gamma-glutamyl transpeptidase (GGT). Significant increases can be seen in serum alkaline phosphatase levels. Glucocorticoids can cause minor increases in BSP (bromosulfophthalein) retention time.

IMMUNE SYSTEM (also see Cells and Hematopoietic System): Glucocorticoids can decrease circulating levels of T-lymphocytes; inhibit lymphokines; inhibit neutrophil, macrophage, and monocyte migration; reduce production of interferon; inhibit phagocytosis and chemotaxis; antigen processing; and diminish intracellular killing. Specific acquired immunity is affected less than nonspecific immune responses. Glucocorticoids can also antagonize the complement cascade and mask the clinical signs of infection. Mast cells are decreased in number and histamine synthesis is suppressed. Many of these effects only occur at high or very high doses and there are species differences in response.

METABOLIC EFFECTS: Glucocorticoids stimulate gluconeogenesis. Lipogenesis is enhanced in certain areas of the body (*e.g.*, abdomen) and adipose tissue can be redistributed away from the extremities to the trunk. Fatty acids are mobilized from tissues and their oxidation is increased. Plasma levels of triglycerides, cholesterol, and glycerol are increased. Protein is mobilized from most areas of the body (not the liver).

MUSCULOSKELETAL: Glucocorticoids may cause muscular weakness (also caused if there is a lack of glucocorticoids), atrophy, and osteoporosis. Bone growth can be inhibited via growth hormone and somatomedin inhibition, increased calcium excretion, and inhibition of vitamin D activation. Resorption of bone can be enhanced. Fibrocartilage growth is also inhibited.

OPHTHALMIC: Prolonged corticosteroid use (both systemic or topically to the eye) can cause increased intraocular pressure and glaucoma, cataracts, and exophthalmos.

RENAL, FLUID, & ELECTROLYTES: Glucocorticoids can increase potassium and calcium excretion; sodium and chloride reabsorption, and extracellular fluid volume. Hypokalemia and/or hypocalcemia occur rarely. Diuresis may occur following glucocorticoid administration.

SKIN: Thinning of dermal tissue and skin atrophy can be seen with glucocorticoid therapy. Hair follicles can become distended and alopecia may occur.

Contraindications/Precautions/Warnings

The manufacturer (Upjohn Veterinary) states that the drug (tablets) should not be used in dogs or cats "in viral infections, … animals with arrested tuberculosis, peptic ulcer, acute psychoses, corneal ulcer, and Cushingoid syndrome. The presence of diabetes, osteoporosis, chronic psychotic reactions, predisposition to thrombophlebitis, hypertension, CHF, renal insufficiency, and active tuberculosis necessitates carefully controlled use."

The injectable acetate product is contraindicated as outlined above when used systemically. When injected intrasynovially, intratendinously, or by other local means, it is contraindicated in the "presence of acute local infections."

Systemic use of glucocorticoids is generally considered contraindicated in systemic fungal infections (unless used for replacement therapy in Addison's), when administered IM in patients with idiopathic thrombocytopenia, and in patients hypersensitive to a particular compound. Use of sustained-release injectable glucocorticoids is considered contraindicated for chronic corticosteroid therapy of systemic diseases.

Animals that have received glucocorticoids systemically other than with "burst" therapy, should be tapered off the drugs. Patients who have received the drugs chronically should be tapered off slowly as endogenous ACTH and corticosteroid function may return slowly. Should the animal undergo a "stressor" (*e.g.*, surgery, trauma, illness, etc.) during the tapering process or until normal adrenal and pituitary function resume, additional glucocorticoids should be administered.

Adverse Effects

Adverse effects are generally associated with long-term administration of these drugs, especially if given at high dosages or not on an alternate day regimen. Effects generally are manifested as clinical signs of hyperadrenocorticism. When administered to young, growing animals, glucocorticoids can retard growth. Many of the potential effects, adverse and otherwise, are outlined above in the Pharmacology section.

In dogs, polydipsia (PD), polyphagia (PP), and polyuria (PU) may all be seen with short-term "burst" therapy as well as with alternate-day maintenance therapy on days when administering the drug. Adverse effects in dogs can include dull, dry haircoat, weight gain, panting, vomiting, diarrhea, elevated liver enzymes, pancreatitis, GI ulceration, lipidemias, activation or worsening of diabetes mellitus, muscle wasting, and behavioral changes (depression, lethargy, viciousness). Discontinuation of the drug may be necessary; changing to an alternate steroid may also alleviate the problem. With the exception of PU/PD/PP, adverse effects associated with

antiinflammatory therapy are relatively uncommon. Adverse effects associated with immunosuppressive doses are more common and, potentially, more severe.

Cats generally require higher dosages than dogs for clinical effect, but tend to develop fewer adverse effects. Occasionally, polydipsia, polyuria, polyphagia with weight gain, diarrhea, or depression can be seen. Long-term high dose therapy can lead to "Cushingoid" effects, however.

Administration of dexamethasone or triamcinolone may play a role in the development of laminitis in horses.

Reproductive/Nursing Safety

Glucocorticoids are probably necessary for normal fetal development. They may be required for adequate surfactant production, myelin, retinal, pancreas and mammary development. Excessive dosages early in pregnancy may lead to teratogenic effects. In horses and ruminants, exogenous steroid administration may induce parturition when administered in the latter stages of pregnancy. In humans, the FDA categorizes this drug as category ***C*** for use during pregnancy (*Animal studies have shown an adverse effect on the fetus, but there are no adequate studies in humans; or there are no animal reproduction studies and no adequate studies in humans.*)

Use with caution in nursing dams. Glucocorticoids unbound to plasma proteins will enter milk. High dosages or prolonged administration to mothers may, potentially, inhibit growth, interfere with endogenous corticosteroid production or cause other unwanted effects in nursing offspring. However, in humans, several studies suggest that amounts excreted in breast milk are negligible when methylprednisolone doses are less than or equal to 8 mg/day. Larger doses for short periods may not harm the infant.

Overdosage/Acute Toxicity

Glucocorticoids when given short-term are unlikely to cause harmful effects, even in massive dosages. One incidence of a dog developing acute CNS effects after accidental ingestion of glucocorticoids has been reported. Should clinical signs occur, use supportive treatment if required.

Chronic usage of glucocorticoids can lead to serious adverse effects. Refer to Adverse Effects above for more information.

Drug Interactions

The following drug interactions have either been reported or are theoretical in humans or animals receiving methylprednisolone and may be of significance in veterinary patients:

- **AMPHOTERICIN B**: Administered concomitantly with glucocorticoids may cause hypokalemia; in humans, there have been cases of CHF and cardiac enlargement reported after using methylprednisolone to treat Amphotericin B adverse effects
- **ANALGESICS, OPIATE** and/or **ANESTHETICS, LOCAL** (**epidural injections**): Combination with glucocorticoids in epidurals has caused serious CNS injuries and death; do not use more volume than very small intrathecal test doses of these agents with glucocorticoids
- **ANTICHOLINESTERASE AGENTS** (*e.g.*, **pyridostigmine**, **neostigmine**, etc.): In patients with myasthenia gravis, concomitant glucocorticoid and anticholinesterase agent administration may lead to profound muscle weakness. If possible, discontinue anticholinesterase medication at least 24 hours prior to corticosteroid administration
- **ASPIRIN**: Glucocorticoids may reduce salicylate blood levels
- **BARBITURATES**: May increase the metabolism of glucocorticoids and decrease blood levels
- **CYCLOPHOSPHAMIDE**: Glucocorticoids may inhibit the hepatic metabolism of cyclophosphamide; dosage adjustments may be required
- **CYCLOSPORINE**: Concomitant administration of glucocorticoids and cyclosporine may increase the blood levels of each, by mutually inhibiting the hepatic metabolism of each other; the clinical significance of this interaction is not clear
- **DIURETICS, POTASSIUM-DEPLETING** (*e.g.*, **spironolactone**, **triamterene**): Administered concomitantly with glucocorticoids may cause hypokalemia
- **EPHEDRINE**: May reduce methylprednisolone blood levels
- **ESTROGENS**: The effects of methylprednisolone, and possibly other glucocorticoids, may be potentiated by concomitant administration with estrogens
- **INSULIN**: Insulin requirements may increase in patients receiving glucocorticoids
- **KETOCONAZOLE** and other **AZOLE ANTIFUNGALS**: May decrease the metabolism of glucocorticoids and increase methylprednisolone blood levels; ketoconazole may induce adrenal insufficiency when glucocorticoids are withdrawn by inhibiting adrenal corticosteroid synthesis
- **MACROLIDE ANTIBIOTICS** (**erythromycin**, **clarithromycin**): May decrease the metabolism of glucocorticoids and increase methylprednisolone blood levels
- **MITOTANE**: May alter the metabolism of steroids; higher than usual doses of steroids may be necessary to treat mitotane-induced adrenal insufficiency
- **NSAIDs**: Administration of ulcerogenic drugs with glucocorticoids may increase the risk of gastrointestinal ulceration
- **PHENOBARBITAL**: May increase the metabolism of glucocorticoids and decrease methylprednisolone blood levels
- **RIFAMPIN**: May increase the metabolism of glucocorticoids and decrease methylprednisolone blood levels
- **VACCINES**: Patients receiving corticosteroids at immunosuppressive dosages should generally not receive live attenuated-virus vaccines as virus replication may be augmented; a diminished immune response may occur after vaccine, toxoid, or bacterin administration in patients receiving glucocorticoid
- **WARFARIN**: Methylprednisolone may affect INR's; monitor

Laboratory Considerations

- Methylprednisolone acetate may reduce **post-ACTH cortisol** concentrations by 20–50%.
- Glucocorticoids may increase **serum cholesterol**
- Glucocorticoids may increase **serum and urine glucose** levels
- Glucocorticoids may decrease **serum potassium**
- Glucocorticoids can suppress the release of thyroid stimulating hormone (TSH) and reduce **T_3 & T_4** values. Thyroid gland atrophy has been reported after chronic glucocorticoid administration. Uptake of **I^{131}** by the thyroid may be decreased by glucocorticoids.
- Reactions to **skin tests** may be suppressed by glucocorticoids
- False-negative results of the **nitroblue tetrazolium** test for systemic bacterial infections may be induced by glucocorticoids
- Glucocorticoids may cause **neutrophilia** within 4–8 hours after dosing and return to baseline within 24–48 hours after drug discontinuation
- Glucocorticoids can cause **lymphopenia** which can persist for weeks after drug discontinuation in dogs

Doses

■ **DOGS:**

As an antiinflammatory agent:

a) Initially 1–2 mg/kg/day divided two to three times daily for 5 to 10 days. After clinical signs are suppressed, consolidate dose (1–2 mg/kg/day) and give at 7–10 AM once a day for 1 week. Then reduce dose to 0.5–1 mg/kg/day for 5–7 days. Convert to alternate day dosing by giving 1–2 mg/kg on alternate mornings. Reduce dosage by ½ each week until a minimally effective dose is reached. (Kemppainen 1986)

b) Methylprednisolone: 1 mg/kg PO q8h; methylprednisolone acetate: 1 mg/kg IM every 14 days (Jenkins 1985)

c) Methylprednisolone acetate: 1.1 mg/kg SC or IM; effects (for dermatologic indications) generally last for 1–3 weeks (Scott 1982)

d) For labeled uses:

Oral:

Dogs weighing 5–15 lbs: 2 mg

Dogs weighing 15–40 lbs: 2–4 mg

Dogs weighing 40–80 lbs: 4–8 mg

These total daily doses should be divided and given 6–10 hours apart.

Intramuscularly: 2–120 mg IM (average 20 mg); depending on breed (size), severity of condition, and response. May repeat at weekly intervals or in accordance with the severity of the condition and the response. (Package insert; *Depo-Medrol*®—Upjohn) The manufacturer has specific directions for use of the drug intrasynovially. It is recommended to refer directly to the package insert for more information.

As an immunosuppressant:

a) Pulse therapy to induce remission or control of autoimmune skin diseases: Methylprednisolone sodium succinate 11 mg/kg in 250 mL D_5W infused IV over 1 hour for 3 consecutive days. Cimetidine 4 mg/kg PO q8h may also be given to reduce GI implications. After day 3, begin oral prednisone maintenance at 1.1 mg/kg q24–48h. Azathioprine can also be added during maintenance phase. (White, Stewart, and Bernstein 1987)

For adjunctive medical therapy of spinal cord trauma [**Note:** At present (2007), use of corticosteroids for use in CNS/spinal chord trauma is very controversial]:

a) Methylprednisolone sodium succinate: Initially, 30 mg/kg IV; 2 hours later give 15 mg/kg IV. Then give 10 mg/kg IV or SC 4 times a day for 24–36 hours. Reduce dosage gradually over next 7 days. Cimetidine may be helpful in preventing hemorrhagic gastroenteritis associated with high dose glucocorticoids. (Schunk 1988a)

b) Two dosing schedules:

30 mg/kg IV followed 2 hours later with a constant IV infusion of 5.4 mg/kg/hr for 24–48 hours

30 mg/kg IV loading dose, followed by 15 mg/kg IV 2 hours later then every 6 hours for 24–48 hours (Thomas 2002)

For adjunctive therapy for various forms of shock [**Note:** At present (2007), use of corticosteroids for use in shock is very controversial]:

a) Methylprednisolone sodium succinate: 30–35 mg/kg IV (Kemppainen 1986)

For intralesional (sub-lesional) use:

a) A sufficient volume of 20 mg/mL methylprednisolone acetate is used to undermine the lesion (10–40 mg total dose) (Scott 1982)

■ **CATS:**

As an antiinflammatory agent:

a) Methylprednisolone acetate: 5.5 mg/kg SC or IM (average sized cat = 20 mg); effects (for dermatologic indications) generally last for 1 week to 6 months (Scott 1982)

b) For labeled uses:

Oral:

Cats weighing 5–15 lbs: 2 mg

Cats weighing >15 lbs: 2–4 mg

These total daily doses should be divided and given 6–10 hours apart

Intramuscularly: up to 20 mg (average 10 mg) IM; depending on breed (size), severity of condition, and response. May repeat at weekly intervals or in accordance with the severity of the condition and the response. (Package insert; *Depo-Medrol*®—Upjohn)

For adjunctive treatment of cerebral ischemic necrosis:

a) Methylprednisolone sodium succinate: 30 mg/kg IV (Kornegay 2003a)

For eosinophilic ulcer:

a) Methylprednisolone acetate 20 mg SC every 2 weeks for 2–3 doses. If chronic case, maintenance therapy may be required at 20 mg SC as needed. May also consider adding megestrol acetate. (DeNovo, Potter, and Woolfson 1988)

As alternate adjunctive therapy for feline plasma cell gingivitis-pharyngitis:

a) Methylprednisolone acetate 10–20 mg SC as needed. May also consider adding megestrol acetate. (DeNovo, Potter, and Woolfson 1988)

As an antiinflammatory for the adjunctive treatment of feline asthma:

a) Methylprednisolone acetate: 2 mg/kg (dosage interval or route not specified) (Papich 1986)

b) Methylprednisolone acetate: 1–2 mg/kg IM (dosage interval not specified) (Noone 1986)

For adjunctive therapy of flea allergy:

a) Methylprednisolone acetate: 5 mg/kg SC; generally will keep animal comfortable for 3–6 weeks. Do not use more often than every 2 months. (Kwochka 1986)

For adjunctive treatment of idiopathic feline miliary dermatoses:

a) Methylprednisolone acetate: 5 mg/kg SC; if favorable response is noted, may repeat same dosage two times at 2–3 week intervals. Thereafter, do not use more often than every 2 months. (Kwochka 1986)

For adjunctive treatment of pulmonary edema secondary to blood transfusion reactions:

a) 30 mg/kg repeated every 6 hours (route not specified) (Auer and Bell 1986)

For intralesional (sub-lesional) use:

a) A sufficient volume of 20 mg/mL methylprednisolone acetate is used to undermine the lesion (10–40 mg total dose) (Scott 1982)

■ **HORSES:**

As an antiinflammatory (glucocorticoid effects):

a) Methylprednisolone: 0.5 mg/kg PO; Methylprednisolone sodium succinate: 0.5 mg/kg IV or IM (Robinson 1987)

b) For labeled uses: Methylprednisolone acetate 200 mg IM repeated as necessary (Package insert; *Depo-Medrol*®—Upjohn). The manufacturer has specific directions for use of the drug intrasynovially. It is recommended to refer directly to the package insert for more information.

c) For intra-articular use: Methylprednisolone acetate 100 mg IA (McClure 2002)

For shock [**Note:** At present (2007), use of corticosteroids for use in shock is very controversial]: Methylprednisolone sodium succinate:

a) 10–20 mg/kg IV (Robinson 1987)

Monitoring

Monitoring of glucocorticoid therapy is dependent on its reason for use, dosage, agent used (amount of mineralocorticoid activity), dosage schedule (daily versus alternate day therapy), duration of therapy, and the animal's age and condition. The following list may not be appropriate or complete for all animals; use clinical assessment and judgment should adverse effects be noted:

- Weight, appetite, signs of edema
- Serum and/or urine electrolytes
- Total plasma proteins, albumin
- Blood glucose
- Growth and development in young animals
- ACTH stimulation test if necessary

Client Information

- Clients should carefully follow the dosage instructions and should not discontinue the drug abruptly without consulting with veterinarian beforehand.
- Clients should be briefed on the potential adverse effects that can be seen with these drugs and instructed to contact the veterinarian should these effects become severe or progress.

Chemistry/Synonyms

Methylprednisolone is a synthetically produced glucocorticoid. Both the free alcohol and the acetate ester occur as odorless, white or practically white, crystalline powder. They are practically insoluble in water and sparingly soluble in alcohol.

Methylprednisolone sodium succinate occurs as an odorless, white or nearly white, hygroscopic, amorphous solid. It is very soluble in both water and alcohol.

Methylprednisolone may also be known as: 6alpha-methylprednisolone, methylprednisolonum, NSC-19987, *A-Methapred®*, *Alergolon®*, *Caberdelta M®*, *Cipridanol®*, *Cortisolona®*, *Depo-Medrol®*, *Esametone®*, *Firmacort®*, *Medrate®*, *Medrol®*, *Medrone®*, *Mega-Star®*, *Metilpren®*, *Metisona®*, *Methapred®*, *Metypred®*, *Metysolon®*, *Predni M®*, *Prednilen®*, *Reactenol®*, *Sieropresol®*, *Solomet®*, *Solu-Medrol®*, *Summicort®* and *Urbason®*.

Storage/Stability/Compatibility

Commercially available products of methylprednisolone should be stored at room temperature (15–30°C); avoid freezing the acetate injection. After reconstituting the sodium succinate injection, store at room temperature and use within 48 hours; only use solutions that are clear.

Methylprednisolone sodium succinate injection is reportedly physically **compatible** with the following fluids and drugs: amino acids 4.25%/dextrose 25%, amphotericin B (limited amounts), chloramphenicol sodium succinate, cimetidine HCl, clindamycin phosphate, dopamine HCl, heparin sodium, metoclopramide, norepinephrine bitartrate, penicillin G potassium, sodium iodide/aminophylline, and verapamil.

The following drugs and fluids have either been reported to be physically **incompatible** when mixed with methylprednisolone sodium succinate, compatible dependent upon concentration, or data conflicts: D_5/half normal saline, D_5 normal saline (80 mg/L reported compatible), D_5W (up to 5 grams/L reported compatible), Lactated Ringer's (up to 80 mg/L reported compatible), normal saline (data conflicts; some reports of up to 60 grams/liter compatible), calcium gluconate, cephalothin sodium (up to 500 mg/L in D5W or NS compatible), glycopyrrolate, insulin, metaraminol bitartrate, nafcillin sodium, penicillin G sodium, and tetracycline HCl. Compatibility is dependent upon factors such as pH, concentration, temperature, and diluent used; consult specialized references or a hospital pharmacist for more specific information.

Dosage Forms/Regulatory Status

VETERINARY-LABELED PRODUCTS:

Methylprednisolone Tablets: 4 mg tablets, *Medrol®*; (Pfizer); (Rx). Approved for use in dogs and cats.

Methylprednisolone Acetate Injection: 20 mg/mL in 10 mL and 20 mL vials, and 40 mg/mL in 5 mL vials; *Depo-Medrol®* (Pfizer); generic; (Rx). Approved for IM and intrasynovial injection in dogs and horses; for IM injection in cats.

The ARCI (Racing Commissioners International) has designated this drug as a class 4 substance. See the appendix for more information.

A 10 ppb tolerance has been established for methylprednisolone in milk.

HUMAN-LABELED PRODUCTS:

Methylprednisolone Tablets: 2 mg, 4 mg, 8 mg, 16 mg, 24 mg & 32 mg; *Medrol®* (Upjohn); generic; (Rx)

Methylprednisolone Acetate Injection: 20 mg/mL, 40 mg/mL, 80 mg/mL suspension in 1 mL, 5 mL and 10 mL vials; *Depo-Medrol®* (Upjohn); generic; (Rx)

Methylprednisolone Sodium Succinate Powder for Injection: 40 mg/vial in 1 and 3 mL vials and 1 mL *Univials* and *Act-O-Vials*; 125 mg/vial in 2 mL and 5 mL vials and 2 mL *Univials* and *Act-O-Vials*; 500 mg/vial in 1 mL, 4 mL, 8mL (with or without diluent) and 20 mL vials mL; 1 g/vial in 1 mL, 8 mL, 50 mL, & 1 g vials (with or without diluent), 8 mL *Act-O-Vials*; 2 g/vial with diluent; *Solu-Medrol®* (Pfizer); *A-Methapred®* (Hospira); generic; (Rx)

4-Methylpyrazole — see Fomepizole

METHYLTESTOSTERONE

(meth-ill-tess-*toss*-ter-ohn) Android®, Methitest®

ANDROGENIC/ANABOLIC

Prescriber Highlights

- **Androgenic & anabolic agent that may be useful to suppress estrus, treat testosterone-responsive alopecia, & pseudopregnancy in dogs**
- **Use in cats is controversial as hepatotoxicity may be more prevalent**
- **Contraindicated in pregnancy or hepatic dysfunction**
- **Most serious adverse effect is hepatotoxicity**

Uses/Indications

In female dogs, methyltestosterone may be useful for suppression of estrus, treating estrogen-dependent mammary tumors, pseudopregnancy, or certain hormonal-dependent alopecias. In male dogs, it may be useful for treating deficient libido and certain hormonal alopecias. In cats, methyltestosterone may be useful for certain hormonal-dependent alopecias and to increase libido in toms.