TABLE 5.1
Overview of Antineoplastic Chemotherapy and Immunotherapy Agents Commonly Used in Veterinary Medicine

Chemotherapy Agent/Anticancer Agent	Principal Indications	Type of Drug	Route of Administration	Toxicities/Side Effects	Special Considerations for Monitoring or Treatment
Asparaginase	• Lymphoma • Leukemia	• Bacterial enzyme	• IM • SC	• Hypersensitivity reaction after administration	Bone marrow suppression is rare; prior administration can increase risk of hypersensitivity; use with caution in patients with prior hypersensitivity, history of pancreatitis.
Carboplatin	• Osteosarcoma • Melanoma • Carcinoma • Sarcoma	• Platinum drug	• IV • Intracavitary	• Myelosuppression • GI upset • Nephrotoxicity	Less nephrotoxic and fewer GI adverse effects compared with cisplatin. Myelosuppression is typically the DLT with a "later nadir." Neutrophil nadir typically occurs around day 10 to 14 (or 21) in dogs and day 7 to 28 in cats.

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TABLE 5.1, CONTINUED
Overview of Antineoplastic Chemotherapy and Immunotherapy Agents Commonly Used in Veterinary Medicine

Chemotherapy Agent/Anticancer Agent	Principal Indications	Type of Drug	Route of Administration	Toxicities/Side Effects	Special Considerations for Monitoring or Treatment
Chlorambucil	• Lymphoma • Chronic lymphocytic leukemia • MCT • Transitional cell carcinoma	• Alkylating agent (nitrogen mustard derivative)	• Oral	• Myelosuppression • GI toxicity	Monitoring is essential. Myelosuppression is typically more gradual and may occur 7–14 days after start, and recovery is similar. Severe myelosuppression may occur with chronic use and can take months to years to recover. Frequent blood work monitoring is recommended even with chronic use (every 6–12 weeks). Use disposable chemotherapy-resistant gloves when handling pills and the pet's bodily fluids and waste.
Cyclophosphamide	• Lymphoma • Carcinoma • Sarcoma	• Alkylating agent	• IV • Oral • SC • IP	• Myelosuppression • GI upset • SHC in dogs (rare in cats)	Administer with furosemide in dogs to decrease SHC; educate owners about this side effect and ways to decrease it (frequent walks after treatment, encourage additional access to water for 3 days after treatment). Use disposable chemotherapy-resistant gloves when handling pills and the pet's bodily fluids and waste.
Doxorubicin	• Lymphoma • Osteosarcoma • Hemangiosarcoma • Carcinoma • Sarcoma	• Anthracycline antibiotic	• IV	• Myelosuppression • GI upset • Perivascular damage with extravasation • Myocardial toxicity • Hypersensitivity during administration • Nephrotoxicity (cats)	Vesicant injuries can be severe; contraindicated in dogs with impaired cardiac function or that have reached a total cumulative dose of doxorubicin (180–240 mg/m^2). Use with caution in dogs with MDR1 genetic mutation and breeds predisposed to cardiomyopathy.

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TABLE 5.1, CONTINUED
Overview of Antineoplastic Chemotherapy and Immunotherapy Agents Commonly Used in Veterinary Medicine

Chemotherapy Agent/Anticancer Agent	Principal Indications	Type of Drug	Route of Administration	Toxicities/Side Effects	Special Considerations for Monitoring or Treatment
Gilvetmab	• Canine MCT (stages I, II, and III) • Melanoma (stages II and III) (USDA conditionally licensed)	• Monoclonal antibody immune checkpoint inhibitor	• IV	• Lethargy/fatigue • Decreased appetite • Vomiting • Increased liver enzymes	Currently available only to oncologists. Premedicate with diphenhydramine to reduce risk of infusion reaction.
Lomustine (also known as CCNU)	• Lymphoma • MCT • Brain tumors • Histiocytic sarcoma • Hemangiosarcoma	• Alkylating agent	• Oral	• Myelosuppression • Idiosyncratic hepatotoxicity	CBC nadirs in dogs generally occur at day 7 but can vary to 1 to 3 weeks after treatment. In cats, nadir is variable, usually 1–6 weeks. Thrombocytopenia may also occur and is typically cumulative. Use disposable chemotherapy-resistant gloves when handling pills and the pet's bodily fluids and waste.
Mitoxantrone	• Transitional cell carcinoma • Anal sac carcinomas • Carcinomas • Lymphoma	• Antitumor antibiotic	• IV	• Myelosuppression • GI upset • Perivascular damage with extravasation • Nephrotoxicity	Less cardiotoxic than doxorubicin, so commonly used as an alternative to doxorubicin in patients with cardiac dysfunction. In cats, it is less nephrotoxic than doxorubicin and may be a safer option for those with renal insufficiency.
Oncept canine melanoma vaccine	• Malignant melanoma (USDA licensed)	• Xenogeneic DNA vaccine	• Transdermal	• No known contraindications • Transient low-grade fever may be noted • Possible bruising and soreness at vaccination site	Most effective when local disease control has been achieved. Only available from a specialist. Requires special injection device.

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TABLE 5.1, CONTINUED
Overview of Antineoplastic Chemotherapy and Immunotherapy Agents Commonly Used in Veterinary Medicine

Chemotherapy Agent/Anticancer Agent	Principal Indications	Type of Drug	Route of Administration	Toxicities/Side Effects	Special Considerations for Monitoring or Treatment
Prednisone/ Prednisolone	• Lymphoma • MCT • Myeloma • Chronic lymphocytic leukemia Noncytotoxic indications are: • Central nervous system tumors • Insulinoma • Management of hypercalcemia	• Glucocorticoid	• Oral	• Polyuria • Polyphagia • Polydipsia • Muscle wasting • Behavioral changes	Steroid hepatopathy with chronic use. Do not use in conjunction with NSAIDs. A washout period between using NSAIDs and steroids may be indicated.
Rabacfosadine	• Lymphoma (FDA approved for canine lymphoma)	• Guanine nucleotide analogue prodrug	• IV	• Decrease or loss of appetite • Vomiting • Diarrhea • Cumulative dermatopathy • Neutropenia • Perivascular irritation upon extravasation • Rare idiopathic pulmonary fibrosis	Recommend being proactive with nausea and appetite stimulant medications. Rare life-threatening pulmonary fibrosis reported. Contraindicated in West Highland white terriers.
Tigilanol tiglate	• MCT (FDA approved for nonmetastatic dermal MCT and SC MCT at or distal to elbow or hock)	• Protein kinase C activator	• IT	Most commonly related to MOA: • Wound formation and swelling • Injection site reactions (pain, swelling, erythema, bruising, lameness in treated limb) • Wound formation may be extensive GI effects: • Hyporexia • Vomiting • Diarrhea	Must be used with concomitant medications (corticosteroid, H1 and H2 blockers) to minimize effects of degranulation; MCT volume ≤10 cm^3 and total dose must not exceed 5 mL/dog and 0.25 mL/kg.

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TABLE 5.1, CONTINUED
Overview of Antineoplastic Chemotherapy and Immunotherapy Agents Commonly Used in Veterinary Medicine

Chemotherapy Agent/Anticancer Agent	Principal Indications	Type of Drug	Route of Administration	Toxicities/Side Effects	Special Considerations for Monitoring or Treatment
Toceranib	• MCT (FDA approved for grade 2 and 3 MCT in dogs) • Used extralabel in a variety of canine sarcomas, carcinomas, melanoma, heart-based tumors • In cats MCT, oral SCC	• TKI: Primary targets include KIT, VEGFR2 and PDGFR	• Oral	• Anorexia/hyporexia • Weight loss • Vomiting • Diarrhea • Hypertension • Proteinuria • Cytopenias Less common: • Lameness	Monitoring blood work, body weight, blood pressure, and urinalysis for potential proteinuria is essential. Label dosage for dogs is considered by most clinicians to be higher than is necessary and associated with more side effects. Use disposable chemotherapy-resistant gloves when handling pills and the pet's bodily fluids and waste.
Verdinexor	• FDA conditionally approved for canine lymphoma	• Selective inhibitor of nuclear export	• Oral	Predominantly GI: • Anorexia • Vomiting • Diarrhea • Weight loss • Lethargy Less common: • Polydipsia • Polyuria • Elevated liver enzymes • Thrombocytopenia	Give with food. Use disposable chemotherapy-resistant gloves when handling pills and the pet's bodily fluids and waste.
Vinblastine	• MCT • Lymphoma • Transitional cell carcinoma	• Vinca alkaloid antitubulin agent	• IV	• Myelosuppression (more than vincristine) • Perivascular vesicant • Tends to cause less nausea and vomiting than vincristine	Use with caution in dogs with MDR1 genetic mutation.
Vincristine	• Lymphoma • MCT • Transmissible venereal tumor • Leukemia	• Vinca alkaloid antitubulin agent	• IV	• Myelosuppression (less myelosuppressive than vinblastine) • Perivascular vesicant • Peripheral neuropathy Ileus (cats)	Use with caution in dogs with MDR1 genetic mutation. For cats that develop neurotoxicity, can substitute vinblastine.

DLT, dose-limiting toxicity; GI, gastrointestinal; IM, intramuscular; IP, intraperitoneal; IT, intratumoral; MCT, mast cell tumor; MDR1, multidrug resistance 1; MOA, method of administration; NSAID, nonsteroidal anti-inflammatory drug; SC, subcutaneous; SCC, squamous cell carcinoma; SHC; sterile hemorrhagic cystitis; TKI, tyrosine kinase inhibitor.

The *2026 AAHA Oncology Guidelines for Dogs and Cats* are available at aaha.org/oncology-guidelines.

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