**Medications used in Small Ruminants and Camelids**

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 With the increase in smaller farms wanting to raise sheep and goats as well as camelids (alpacas and llamas) in the U.S., veterinarians who do not routinely treat small ruminants and camelids may be asked about medications that can be used in their treatment. This proceedings article will discuss medications – including vaccines, antibiotics, anthelmintics, etc. that can be used to treat sheep and goats as well as camelids. The majority of these dosages have been acquired from a number of veterinarians who has experience with these species and have published guidelines.

 One of the main issues with prescribing and treating small ruminants is that there that are relatively few drugs that are APPROVED by the FDA for use in these species. The use of a medication/drug not specifically labeled for use in sheep or goats is considered to be Extra-label Drug Use (ELDU). Extra-label Drug Use is defined as “the use of a drug in an animal in a manner that is not in accordance with the approved labeling.” This usage includes but is not limited to: use in a different species, use for indications (disease and other conditions), use at dosage levels, frequencies, duration or routes of administration other than those stated in the labeling, and deviation from labeled withdrawal times based on the above described uses. However, unapproved drugs cannot be used “off-label” to improve performance or control reproduction. Extra-label Drug Use is legal ONLY if prescribed by a veterinarian in the context of a valid client-patient relationship.

 What are important features of a valid client-patient relationship?

* The veterinarian takes responsibility for medical and treatment judgments for the animal(s) and the client agrees to follow the veterinarian's instructions
* The veterinarian has close knowledge of the animal(s) and their medical condition obtained by examination and premise visit
* The veterinarian is available for follow up visits or has emergency coverage in the event of adverse reactions or failure of the treatment regimen

**Anthelmintics FDA-approved**

Sheep

|  |  |  |  |
| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Meat withdrawal** |
| Cydectin® drench | Moxidectin | 1 ml/11 lbs. | 7 days |
| Ivomec® sheep drench | Ivermectin | 3 ml/2 lbs. | 11 days |
| Prohibit® drench | Levamisole | 1 oz/100 lbs.2 ml/50 lbs. | 3 days |
| Valbazen® drench | Albendazole | 3 ml/100 lbs. | 7 days |

Goats

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| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Meat withdrawal** |
| Valbazen® drench | Albendazole 11.36% | 1ml/25 lbs.\* | 7 days; not lactating does |
| Safeguard® suspension 10% | Fenbendazole | 0.6 ml/25 lbs.\*\* | 0 days |
| Rumatel® | Morantel | 1 ml/100 lbs. | 30 days |

\*on various goat web sites, they claim the effective dose is 1 ml/10 lbs.

\*\* effective dosage is 10-20 mg/kg or 0.45-0.9 ml/10 lbs. – increases meat withdrawal to 14-21 days and milk withdrawal to 5-7 days

**Anthelmintics Extra-Label**

Goats

|  |  |  |  |
| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Meat withdrawal** |
| Cydectin® drench | Moxidectin | 0.5 mg/kg or 2.25 ml/10 lbs  | 21-45 days, milk 60-120 days |
| Prohibit® drench | Levamisole | 1 oz/100 lbs.2 ml/50 lbs. | 14 days, milk 5 days |

**Anthelmintics Extra-Label**

Alpacas and LLamas

|  |  |  |  |
| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Comments** |
| Ivomec® 1% cattle injection | Ivermectin | 1.5 ml/100 lbs SC, every 30-45 days for meningeal worm prevention |  |
| Dectomax® injection | doramectin | 2 ml/100 lbs SC, every 45-60 days for meningeal worm prevention |  |
| Cydectin® drench | Moxidectin | 0.18 mg/lb PO once (10 ml/55 lbs) – double the sheep dose | Can cause coughing after administration; use in older animals; no studies on pregnant animals |
| Panacur®/Safeguard® | Fendbendazole | 9-23 mg/lb PO once to twice daily for 3-5 days; meningeal worm 23 mg/lb PO BID for 5-10 days | Wide margin of safety, but has parasite resistance |
| Valbazan® | Albendazole | 4.5 mg/lb PO once and repeat in 7 d if needed for severe cases | Narrow margin of safety – do not use in crias < 6 mos oldDO NOT USE in pregnant animals! |

**Coccidiostats** – Sheep and Goats

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| **Trade name** | **Ingredient**  | **Dosage** | **Meat withdrawal** |
| Deccox® | Decoquinate | 0.5 mg/kg kids and lambs | 0 days; not lactating animals |

**Extra-label drugs for treating coccidiosis** – Sheep and Goats

|  |  |  |  |
| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Effective dosage** |
| Corid® | Amprolium | 4 oz./50 gal. water 4.5 mg/kg | 22.7 -45 mg/kgWithdrawal – 12 days |
| Albon | Sulfadimethoxine | 1.25 to 2.5 g/100 lbs.4 ml of 12% soln./25 lbs. | 25 mg/lb day 1 and then 12 mg/lb days 2-5Withdrawal – meat 12 d, milk 5 d |
| Sulmet®  | Sulfamethazine | Various due to different products |  |

**Treating coccidiosis in Camelids**

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| --- | --- | --- |
| Corid® | Amprolium | 8 oz./50 gal. water  |
| Albon® | Sulfadimethoxine | Day 1: 25 mg/lb PO QDDay 2-5: 13 mg/lb PO QD |

**Treating *Eimeria macusaniensis* in Camelids**

|  |  |  |
| --- | --- | --- |
| Marquis® | Ponazuril | 9 mg/lb PO once daily for 3-5 days (must dilute first!!)Dilute 40 ml of drug with 20 ml distilled water = 100 mg/ml solution  |

**Antibiotics FDA-approved**

Sheep

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| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Meat withdrawal** |
| Aureomycin® | Chlortetracycline | 20-50 g/ton (lambs) | 0 days |
| Biosol® | Neomycin sulfate | 10 mg/lb., < 14 days | 2 days |
| Micotil® | Tilmicosin phosphate | 10 mg/kg SQ single treatment | 28 days |
| Naxcel® | Ceftiofur sodium | 0.5-1.0 mg/lb., IM for 3 days | 0 days |
| Pro-Pen G Agri-Cillin® | Penicillin G procaine | 1 ml/100 lbs. IM < 4 consecutive days | 8 days |
| Terramycin® | Oxytetracycline | 10-20 g/ton feed 10 mg/lb. | 5 days |

Goats

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| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Meat withdrawal** |
| Biosol® | Neomycin sulfate | 10 mg/lb., < 14 days | 2 days |
| Naxcel® | Ceftiofur sodium | 0.5-1.0 mg/lb., IM for 3 days | 0 days |

**Antibiotics Extra-Label – Sheep and Goats and Camelids (meat withdrawal unknown)**

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| --- | --- | --- | --- |
| **Trade name** | **Ingredient**  | **Dosage** | **Meat withdrawal** |
| Pro-Pen G Agri-Cillin® | Penicillin G procaine | 3.3-5 ml/100 lbs. IM 2x/day  | 28 days |
| Oxytetracycline 10% | Oxytetracycline 100 mg/ml | 10 mg/kg every 12-24 hrs |  28 days |
| Oxytetracycline 200 mg/ml | Oxytetracycline 200 mg/ml | 20 mg/kg every 48 hrs |  28 days |
| Excenel® | Ceftiofur hydrochloride | 1-2.2 mg/kg SQ every 24 hrs | 4 days, 0 milk |
| Nuflor® | Florfenicol | 3 ml/100 lb IM every other day OR 6 ml/100 lb SQ every 3rd day | IM – 0 daysSQ – 90 days |

Intramammary infusions used to prevent and treat mastitis in cattle have also been used in sheep and goats, but should be used with caution and withdrawal times extended.

**Vaccines labeled for Sheep and Lambs**

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| --- | --- | --- |
| **Vaccine** | **Dosage** | **Meat withdrawal** |
| Campylobacter | 5 ml SQ shortly before breeding, repeat in 60-90 days. Revaccinate annually (single dose) | 21 days |
| Case-Bac™ | 2 ml SQ, repeat 2 ml dose in 4 weeks, revaccinate annually (single dose) | 21 days |
| Caseous D-T™ | 2 ml SQ, repeat 2 ml dose in 4 weeks, revaccinate annually (single dose) | 21 days |
| C & D antitoxin | Suckling lambs, 5 ml SQ, feeder lambs, 10 ml SQ; for treatment double doses | 21 days |
| CD-T | 2 ml SQ, repeat in 21-28 daysrevaccinate annually | 21 days |
| Covexin™-8 | 5 ml SQ, followed by a 2 ml dose in six weeks, revaccinate annually with 2 ml | 21 days |
| Chlamydia | 2 ml SQ 60 days prior to breeding, repeat dose 30 days later, revaccinate annually (single dose) | 60 days |
| Ram epididymitis bacterin | 2 ml SQ, repeat dose in 30-60 daysAnnual booster | 21 days |
| Footvax® | 1 ml SQ prior to anticipated outbreak, repeat 6 weeks to 6 months, booster bi-annually | 60 days |
| Ovine Ecolizer™ | 5 ml orally within 12 hours of birth | 21 days |
| Pasteurella | 2 ml SQ, repeat in 2-4 weeks | 21 days |
| Rabies | 2 ml IM, annual revaccination | 21 days |
| Soremouth | Apply one drop to scarified area | 21 days |
| Tetanus antitoxin | 1,500 units for prevention3,000-15,000 units for treatment, SQ or IM | 21 days |
| Volar footrot bacterin | 3 ml SQ or IM, repeat in 3-4 weeks, booster annually or prior to anticipated outbreaks | 21 days |

**Vaccines labeled for Goats and Kids**

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| --- | --- | --- |
| **Vaccine** | **Dosage** | **Meat withdrawal** |
| C & D antitoxin | Suckling lambs, 5 ml SQ, feeder lambs, 10 ml SQ; for treatment double doses | 21 days |
| CL Bacterin vaccine | For use in healthy goats, 3 months of age or older – inject 1 ml subcutaneously in the neck and repeat in 14 days on the opposite side of the neck | 60 days, NOT approved for lactating does |
| CD-T | 2 ml SQ, repeat in 21-28 daysrevaccinate annually | 21 days |
| Tetanus antitoxin | 1,500 units for prevention3,000-15,000 units for treatment, SQ or IM | 21 days |

**Vaccines in Camelids**

Alpaca and llama owners may use Clostridium CD & T toxoid in their herd. Generally, the dose is 2 ml, but have seen 3 ml listed in older animals.

**Other Injectables – Sheep and Goats**

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| --- | --- | --- | --- | --- |
| **Drug Name** |  | **Labeled Use** | **Dosage** | **Withdrawal** |
| Flunixin meglumine | Rx | Anti-inflammatory; anti-pain; antipyretic | 1 ml/100 lbs IV every 12 h or 2 ml/100 lbs every 24 h | IV – milk – 36 hrs; meat – 4 daysSC – milk 10 days; meat 60 days |
| Aspirin | OTC | Anti-inflammatory; anti-pain | 100 mg/kg or 13 tabs (325 mg)/100 lbs PO once or twice daily | Milk and meat – 1 day |
| Dexamethasone | Rx | Anti-inflammatory; anti-pain | 5-10 ml/100 lbs IV as a single anti-inflamm. dose – higher doses for shock | Milk – 1 dayMeat – 7 days |
| BO-SE® | Rx | Prevent and treat selelium deficiency | Sheep – 2.5 ml/100 lbs.Lambs – 1 ml/40 lbs. | 0 days |
| Calcium gluconate | OTC | Treat milk fever caused by calcium deficiency | 50-100 ml of a 23% solution, IV | 0 days |
| Dextrose 50% | OTC | Treat glucose deficiency (ketosis) | 50 ml/100 lbs. IV | 0 days |
| Epinephrine | Rx | Treatment of anaphylactoid shock | 1 ml/100 lbs, SQ | 0 days |
| Lutalyse® | Rx | Causes regression of corpus luteum in cattle. Induce parturition in swine | 5-10 mg IM | Meat and milk - 1 day |
| Oxtytocin | Rx | Uterine contractor. To assist in birthings and milk letdown. | 1.5-2.5 ml IM or IV | 0 days |
| Thiamine 200 mg/ml (Vit. B1) | Rx | Treats polioencephalomalacia | 10 mg/kg (2.2 ml/100 lbs SQ 4-6 times/ day for a few days | 0 days |
| Vitamin B12 | Rx | Treats Vitamin B12 deficiency  | 3 mg (1 ml) SQ 1-2 times/day | 0 days |
| Vitamin B Complex | OTC | To treat B vitamin deficiencies and provide supplemental B vitamins | 5 ml/100 lbs IM | 0 days |

**Oral Medications – Sheep and Goats**

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| **Drug name** | **Use** |
| Bismuth subsalicylate | For control of non-infectious diarrhea |
| Mineral oil | Mild laxative |
| Propylene glycol | Treatment and prevention of ketosis |
| Therabloat® | Treatment of frothy bloat |

Many of the same injectable and oral medications have been used in camelids. This is not a comprehensive list of medications used in these species. It a guide from a compilation of sources from other experienced veterinarians.