

### VET 433A: Drugs of Abuse, OTC, and Prescription Medications

Drug	Toxin	ADME / MOA	Species Affected	Clinical Signs	Treatment
<b>Cannabis</b> <i>Cannabis sativa</i>	Delta 9-THC  Toxicity: Low – minimum oral lethal dose > 3 g/kg	Significant first-pass effect after ingestion  Metabolized by the liver  Lipophilic > distributes to the brain or other fatty tissues  Short plasma T <sub>1/2</sub> Long biologic half-life due to adipose storage  CB <sub>1</sub> and CB <sub>2</sub> receptor agonist	Canine <1 year	Occur within 30-90 min of ingestion lasting up to 72 hours  CNS effects Primarily CNS depression Ataxia Disorientation Mydriasis Urinary Incontinence GI Signs – Emesis  CNS stimulation in some dogs Signs may last up to 96h	Decontamination if large ingestion  No antidote – lipophilic so ILE in severe cases  Observation and monitoring  Recovery may be prolonged (up to 3 days but averages 24 hours)
<b>Cannabis Alternatives</b> “K2, Spice, Skunk”	Contains synthetic cannabinoids	More potent CB <sub>1</sub> and CB <sub>2</sub> receptor agonist than THC +/- NMDA acts on L-glutamate receptors	Canine	Ataxia Vomiting Excessive Salivation Urinary incontinence Twitching Hyperesthesia Mydriasis *no deaths reported	Standard decontamination protocols if appropriate  Hospitalization recommended  Muscle twitching/tremors – Methocarbamol  Seizures/Agitation: Diazepam/chlorpromazine  Good prognosis – Recovery generally 24 hours or less
<b>Amphetamines</b>	LD <sub>50</sub> = 10-30 mg/kg	Rapidly absorbed from GIT Primary effect is related to release of catecholamines		Stimulates cortical centers	Very early emesis Activated Charcoal – repeat if XR drug

	<p>Amphetamine sulfate oral LD<sub>50</sub> in dogs = 20-27 mg/kg</p> <p>Methamphetamine hydrochloride oral LD<sub>50</sub> in dogs = 11 mg/kg</p>	<p>(norepinephrine and dopamine from presynaptic terminals)</p> <p>There is also a serotonergic effect</p> <p>Highly lipid soluble</p> <p>Minimal metabolism Eliminated via urine</p>		<p>Sympathomimetic (dilated pupils)</p> <p>Cardiac (tachycardia) and CNS stimulation</p> <p><u>Sympathomimetic toxidrome</u> Hypersalivation, Hyperactivity, Mydriasis, Restlessness, Tremors, Hyperthermia, Seizures, Tachycardia, Hypertension, Ataxia, Repetitive stereotypical behaviors, Hypoglycemia</p>	<p>IVF 1.5-2x maintenance Acidify urine to enhance excretion</p> <p>Control body temp Control tremors: methocarbamol Control seizures: chlorpromazine, phenobarbital, propofol, inhalant anesthetics</p> <p>*Avoid diazepam – dysphoria and paradoxical stimulation reported</p> <p>Control tachycardia/hypertension – Beta-blockers</p> <p>Monitor ECG, body temp, acid/base status, renal function (UA)</p>
<b>Cocaine</b>	<p>Erythroxylon coca Erythroxylon monogynum *often combined with other substances</p>	<p>Direct blockade of fast Na<sup>+</sup> channels, stabilizes axonal membranes and myocardial tissues</p> <p>CNS stimulant – interferes with NT (NE, Serotonin, and dopamine) re-uptake by nerve terminals increases catecholamine release</p>		<p>Vasoconstrictor</p> <p>Direct myocardial effect</p> <p>Sympathomimetic toxidrome Hyperthermia, CNS stimulation, Cardiac effects – tachycardia, skeletal muscle effects – tremors elevated CK</p>	<p>Early decontamination, emetic, activated charcoal, cathartic</p> <p>Rapid control of motor/seizure activity while protecting the patient's airway and providing adequate ventilation and oxygenation</p> <p>Control hyperthermia Treat dysrhythmias: NaHCO<sub>3</sub> Propranolol</p>

					If increased CPK or myoglobinuria: fluids and NaHCO <sub>3</sub>
<b>Bath Salts</b>	Synthetic cathinone (Khat, amphetamine-like)			Humans Aggressive, psychotic behavior Self-mutilation, suicide attempts Paresthesia and mood changes for days to weeks Death	
<b>Heroin/Opioids</b>	<u>Natural opioids</u> Codeine (prodrug), morphine, heroin  <u>Semi-synthetic opioids</u> oxycodone, hydrocodone, hydromorphone, oxymorphone  <u>Synthetic opioids</u> methadone, tramadol, fentanyl	Metabolized by the liver and undergoes first-pass metabolism  Phase II glucuronidation  Large Vd  Variable protein binding  Wide variation in serum half-life  Eliminated via the kidneys  Works on opioid receptors mu, kappa, delta, sigma, and epsilon which are widely distributed in the brain, spinal cord, and GIT	Canine	<u>Respiratory depression</u>  Depressed mental status  Decreased respiratory rate  Decreased tidal volume  Decreased bowel sounds  Miotic pupils  Drowsiness, ataxia, vomiting, seizures, miosis, coma, hypotension  Death can occur within 12h  Be aware that when testing for these compounds, false positives can be found with	Naloxone: reverses CNS/respiratory depression  Seizures > Diazepam  Warming  Artificial respiration  Decontaminate if needed

		Results in dopamine release, blockade of pain signals and euphoria		amitriptyline, penicillin, and tetracyclines	
<b>Ethanol</b>	<p>Wine, beer, mixed drinks etc.</p> <p>Fermented grains, fruit, liquid feeds, bread dough, etc.</p> <p>LD<sub>50</sub> of 95% ethanol ranges from 5.5 to 6.6 ml/kg</p> <p>Doses as low as ½ the LD<sub>50</sub> can be life threatening</p>	<p>Rapidly absorbed and distributed throughout the body</p> <p>Acts as an anesthetic agent by reversibly blocking action potentials of neurons</p>	Canine	<p>Behavioral changes Excitability Vocalizing Incontinence</p> <p>Emesis Ataxia/incoordination Drowsiness or depression Unconsciousness or loss of reflexes Respiratory depression Respiratory and cardiac arrest Death</p>	<p>Early decontamination Emetics, gastric lavage with isothermic water, activated charcoal</p> <p>Supportive care Maintain ventilation, respiratory stimulation, oxygen and mechanical support as needed</p> <p>Monitor blood acid-base, electrolyte, and fluid balance *Lactic acid containing fluids are contraindicated</p> <p>Maintain body temperature</p>