Veterinary Toxicology
Differential Diagnosis List

NB: Toxicities in bold will either be covered in class or you will be expected to read in the Veterinary Continuing Education (208) Veterinary Clinical Toxicology.

I. Toxicants Affecting the Nervous System

Toxicants Affecting Neurotransmitter

A. **Toxicants Associated with Seizures** (See also Toxicants with Mixed Effects on the CNS)

-Strychnine and Brucine
-Bubby Bush (Calycanthus)
-Carolina Jessamine (Gelsium)
-Tetanus
-**Metaldehyde**
-**Fluoroacetate (1080)**
-5-Fluorouracil
-Castrix (Crimidine)
-Acute Fluoride Toxicosis (Toxicant Affecting the Teeth and Skeletal System)
-**Japanese Yew** (Taxus) in dogs (Toxicants Affecting the Heart)

B. **Toxicants Associated with Stimulation or Seizures**

-**Organochlorine** Insecticides
-Diphenyl aliphatics and miscellaneous organochlorine insecticides
-Cyclodiene organochlorine insecticides
-4-Aminopyridine
-**Chocolate**, Caffeine and other Methylxanthines
-Nitrofurans
-Dutchman's Breeches (Dicentra)
-4-methyl Imidazole
-Water Deprivation/Sodium Ion Toxicosis (salt poisoning)
-Amphetamines
-Cocaine
-Tremorgenic Mycotoxins including penitrem, roquefortine/Nervous Ergotism/
- Ryegrass staggers- Lolitrem B
-Bermuda Grass Staggers
-Zinc Phosphide/Alumininum Phosphide
-Water Hemlock (Cicuta)
-Fitweed (Corydalis)
-Milkweed (Asclepias)
-Carolina Jessamine (Gelsemium)
-Calycanthus Shrub (Bubby Bush) (Calycanthus)
-Desert Spike (Oligomeris)
-Daffodil, Jonquil (Narcissus) (Plants Affecting the Gastrointestinal Tract)

C. **Toxicants with Mixed Effects on the CNS**

-Lead
-Mercury
-Ammonia Toxicoses (Urea) (Also Toxicoses Causing Acidosis)
-**Pyrethrins and Pyrethroids**
-Rotenone
-Tricyclic Antidepressants
-**Fumonisins-**mycotoxin associated with corn/leukoencephalomalacia in horse
-Yellow Star Thistle (Centauria)
-Russian Napweed (Centauria)
-Locoweeds (Astragalus and Oxytropis)
-Hexachlorophene
-Bromethalin Containing Rodenticides
-Vacor (Rodenticide-now banned)
-DEET
-Methionine
-Carbon Disulfide (Fumigant)
-Avocado (Persea americana)
-Horse Chestnut (Aesculus)
-Buckeye (Aesculus)
-Morning glory (Ipomoea)
-Hallucinogenic and Disulfiram Type Mushrooms
-**Ethylene Glycol** (See Toxicants Causing Acidosis, III)
-Hypomagnesemia (Grass Tetany) (Wheat, Oats, Bluegrass, Alfalfa, Cornstalks, Others)
-Boric Acid (See Toxicants Affecting the Kidneys, Metals and Inorganics, VA)
-Phenothiazine Tranquilizers
-LSD
-Mescal bean (Sophora secundiflora) (See Toxicant with Nicotinic Effects, IF4)
-Cocklebur (Xanthium) (See Poisonous Plants Affecting the Liver, IXC)
-Tall Buttercup (Ranunculus) (See Plants Affecting the Gastrointestinal Tract, XIB2)

D. **Thiaminase Containing Plants and Other Substances**

-**Bracken fern** in Horses (Pteridium)
-Male Fern (Dryopterus)
-Horsetails (Equisetum)
-Kochia (Thiamine responsive polioencephalomalacia in cattle; See Poisonous Plants Affecting the Liver, IXC)
-Thiaminase and Thiamine Deficiency in Cats: Raw Fish (Especially when fed to cats)

E. **Toxicants Causing CNS Depression** (See also Toxicants with Mixed Effects on the CNS)

-White Snakeroot (Eupatorium)
-Rayless Goldenrod, Jimmyweed (Isocoma wrightii, formerly called Haplopappus)
-Opiates and Opioids
-**Marijuana**
-**Ivermectin** especially in Collies and Related Breeds
-Amitraz
-Piperazine (same mechanism as ivermectin)
-Benzodiazepines
-Phenothiazine in Small Animals (See Toxicants Affecting the Skin, XB)
-Tranquilizers
-Barbiturates
-Benzyl Alcohol or Benzoic Acid in Cats and Neonates
-Citrus Oil Extracts
-Sleepy Grass (Stipa)
-**Ethylene Glycol** (See Toxicants Causing Acidosis, III)
-Ethanol (Usually cage birds; reported in ethanol silage fed cattle)
-Methylene Chloride and Numerous Other Hydrocarbon Solvents
(See Toxicants Affecting the Respiratory System, XVII)

F. **Toxicants Affecting the Autonomic Nervous System** (and In Some Cases, Voluntary Nerves as well)

1. Toxicants Acting as Cholinergic Blockers (Anti-cholinergic Agents)

a. Tertiary Amines (No Charge, Penetrate BBB and CNS)

-Atropine (D, L hyoscyan-dne)
-Scopolamine (L-hyoscine)
-Benztropine (Cogentine)
-Aminopentamide (Centrine

b. Quaternary Amines (Charged, Do Not Penetrate BBB)

-Atropine methyl nitrate
-Scopolamine methyl bromide
-Homatropine methyl bromide
-Propantheline (Pro-Banthine)
-Glycopyrrolate (Robinul-V)

c. Plants-Introduction to Poisoning from Cholinergic Blockers including some Solanaceous Plants and Certain Mushrooms

-Belladonna (Atropa belladonna)
-Henbane (Hyoscyamus niger)
-Jimson Weed (Datura)
-Mushrooms (Amanita panterinae and A. muscaria)
-**Solanaceae** that Usually Have Primarily Atropine-like Effects
-Ground cherry (Physalis)
-Matrimony Vine (Lycium halimifolium)
-jessamine (ripe berry) (Cestrum spp.)
-Angel's Trumpet (Datura)

-Potato (Solanum tuberosum)
-Other Solanaceae that Sometimes Have Mainly Atropine Effects
-Black nightshade (S. nigrum)
-Tomato leaves, green fruit (Lycopersicon)
-Jerusalem cherry (S. pseudocapsicum)

-Note: Unlike the effects of atropine the clinical effects of the solanaceous alkaloids (solanine, solanidine, etc.) which predominate in many of the Solanaceae are largely due to gastrointestinal irritation and cholinesterase inhibition (See below).

2. Toxicants with Muscarinic Effects but No Nicotinic Effects

-Introduction to muscarinic toxicants
-Muscarine
-Pilocarpine
-Arecoline
-Methacholine
-Carbachol
-Bethanechol
-Muscarinic/Histaminic Mushrooms
-(Clitocybe dealbata)
-(Inocybe spp.)
-Amanita muscaria)-only a minority of member of this species
-(Boletus) and Others
-Moldy Red Clover (Slaframine) (Trifolium pretense infected with Rhizoctonia leguminicola)

3. Inhibitors of Cholinesterase

-**Organophosphorus Insecticides**
-**Carbamate** Insecticides
-**Blue-green algae** (Anabaena flos-aquae) [Anatoxin- a(s)] and other cyanobacteria
Solanaceous Alkaloid (Solanine and Solanidine) Containing Plants
-Black Nightshade (Solanum nigrum)
-Silverleaf Nightshade (S. carolinense)
-Horse Nettle, Bull Nettle (S. carolinense)
-European Bittersweet, Climbing Bittersweet (S. dulcamara)
-tomato (green or vine) (Lycopersicon)
-Groundcherry (Physalis)
-jessamine (unripe berry) (Cestrum)
-Matrimony vine (Lycium)

4. Toxicants with Nicotinic Effects

-Nicotine Sulfate (Blackleaf 40)
-Tobacco (Nicotiana)
-Indian Tobacco (Lobelia)
-Cardinal Flower (Lobelia)
-Giant Lobelia (Lobelia)
-**Poison Hemlock** (Conium maculatum).
-Lupine (Lupinus)
-Mescal Bean (Sophora spp.)
-Kentucky Coffee Tree (Gymnocladus dioica)
-Goldenchain (Laburnum arragycoids)
-**Levamisole**
-**Blue-green Algae** (Anabaena) (Anatoxin-a)
-Cholinesterase Inhibitors (See IIF2)

G. Toxicants Causing Paralysis (May Eventually Include Respiratory Paralysis)

-Any Nicotinic Agent Including Cholinesterase Inhibitors at High Doses
-Curare
-Succinylcholine
-Blackwidow Spider (Latrodectus spp.)
-Larkspur (Delphinium)
-Botulism
-Tick Paralysis (Dermacentor or Amblyoma)
-**Arsanilic acid**
-**Organophosphorus Compounds** (OPIDN) (not all are insecticides)
-Triortho-cresyl phosphate (TOCP)
-EPN (insecticide)
-Leptophos (insecticide-not on market)
-Haloxone (anthelmintic)
-Lathyrism-Rough Pea, Vetchlings (Lathyrus)
-Hybrid Sudan (Sorghum) (See also Methemoglobin Producers XX)
-Guajillo (Acacia berlandieri)
-Locoweed (Astragalus) (Miserotoxin = a 3-Nitro Compounds:
See Toxicants with Mixed Effects on the CNS IC)
-Coyotillo (Karwinskia)
-Citreoviridin (Mycotoxin)
-Patulin (Mycotoxin)
-Mephenesin
-Tetrodotoxin
-Puffer Fish (Tetraodon and fugu)
-Poison Dart Frogs-Central and South America
-California Newt (Taricha) (a salamander)
-European Newt (Tariturus) (a salamander)
-Unk (Bombia) (a salamander)
-Saxitoxin and Neosaxitoxin
in Paralytic Shellfish Poisoning-from cockles, mussels, clams. (Especially the Alaskan butter clam, Saxidomas giganticus) and especially oysters
-All from the Dinoflagellate (Conyaulaux spp.). Also contain the similar acting neosaxitoxin.

G. Toxicants Causing Paralysis (May Eventually Include Respiratory Paralysis) **CON'T.**
-in **Red Tide**. Same Dinoflagellate in Fishes
-in Blue-Green Algae (Aphanizomenon)-May contain both saxitoxin and the

similar acting neosaxitoxin
-Ciguatera (icthyosarcotoxin)
-Red Snapper
-Other fish
-**Sulfonamides** (peripheral neuritis) (See Toxicants Affecting the Kidneys, VI)
-Selenium (subchronic selenosis in swine (See Toxicants Causing Skin Effects Other Than Photosensitization, XC)
-Cycad Palms

H. Toxicants Primarily Causing Respiratory Paralysis
-H2S (Paralysis via CNS)
-Aminoglycoside antibiotics plus any anesthetics, muscle relaxant

II. Toxicants Causing Primary Muscle Dysfunction and /or Paralysis

-**2,4-D and other phenoxy herbicides**
-**Lasalocid** (Bovatec) in dogs (See Toxicants Affecting the Heart, Organic Compounds, XVH) and other ionophores (**monensin** etc)

III. Toxicants Causing Acidosis

-Manifestations of and Therapy for Acidosis
-**Ethylene Glycol**
-Methanol
-**Aspirin**
-D,L-Methionine (See Toxicants with Mixed CNS Effects, IC)
-**Phenolics** (See Hepatotoxic Drugs and Chemicals, IXA)
-Any Shock-Inducing Agent (Metabolic Acidosis)
-Any Prolonged Seizures (Exertion; Metabolic Acidosis)
-Any Agent Causing Severe Pulmonary Failure or Respiratory Paralysis (Respiratory Acidosis)

IV. Toxicants Causing Fevers

-Uncouplers of Oxidative Phosphorylation
-Pentachlorophenol
-Disophenol (DNP Dewormer)
-Dinitrophenol
-Any Toxicant Causing Seizures
-Halothane

V. Toxicants Affecting the Kidneys

A. Metals and Inorganics

-Cadmium
-**Zinc**
-Boric Acid
-Mercury (See Toxicants with Mixed Effects on the Nervous System, IC)
-C**opper** (See Toxicants Causing Hemolysis, XXI)
-Uranium
-Bismuth
-**Phosphorus** (See Toxicants Affecting the Liver, IX)

B. Organic Compounds

-**Vitamin K_3 (Menadione)** (in the horse)
-Cantharidin (Blister Beetles)
-Sulfonamides
-Amphotericin-B
-Nephrotoxic Antibacterials (except Sulfonamides)
  -Oxytetracycline
  -Bacitracin
  -Polymyxin-B
  -Gentamycin
  -Neomycin
-Carbamate Fungicides
-Carbon tetrachloride (See Hepatotoxic Chemicals and Drugs, IXA)
-Phenolics (See Hepatotoxic Chemicals and Drugs, IXA)
-Diquat (Herbicide)
-Stillage Liquid from Ethanol Production (in cattle) (Not confirmed)
-Analgesic Nephropathy (Nonsteroidal Anti-inflammatory Drugs)
-**Ethylene Glycol** (See Toxicants Causing Acidosis, III)
-Oxalic Acid
-Vitamin D, especially Vitamin D3 (**Cholecalciferol**)

C. Plants

-Vitamin D containing plants
-Cestrum diurnum
-Solanum malacoxylon
-Soluble Oxalate Containing Plants
-Beets (Beta)
-Rhubarb (Rheum)
-Halogeton (Halogeton)
-Greasewood (Sarcobatus)
-Curlydock (Rumex)
-Lambsquarters (Chenopodium) (See GI Plants)), (XI B)
-Kochia scovaria (See Poisonous Plants Affecting the Liver, IXC)
-Other Nephrotoxic Plants
-**Pigweed** (Amaranthus retroflexus)

C.Plants **Con't**

-Oak, **Acorns** (Quercus spp.)
-Cocklebur (Xanthium) (See Poisonous Plants Affecting the Liver, IXC)

-Lily (Lilium) and Daylily (Hemerocallis)

D. Nephrotoxic Mycotoxins

-Ochratoxins
-Fumonisins (See Toxicants with Mixed Effects on the CNS IC)
-Citrinin
-Hybrid Sudan or Sudan grass (Sorghum spp.) (Equine Cystitis, Ataxia Syndrome) Secondary to paralysis and ascending pyelonephritis) (See Toxicants Causing Paralysis, IG)

VI. Toxicants Causing Goiter

A. Iodine Imbalances
-Equine Goiter Due to Iodine Toxicity

B. Goitrogenic Plants
-Cabbage, Broccoli, **Kale, Rape (Brassica spp.)**
-Soybean (GIycine)
-Flax, linseed (Linum) (See Toxicants Inhibiting the function of Respiratory Pigments
-**Castor bean (Ricinus)** (See Plants Affecting the Gastrointestinal Tract, Toxalbumins, XIIB1)

VII. Toxicants Affecting Reproduction General Introduction to Teratogenesis

A. Teratogens

-False Hellebore (Veratrum californicum)
-Fescue (Festuca) (not proven to be teratogenic, but related to this category)
-Poison hemlock (Conium) (See Toxicants with Nicotinic Effects, IF4)
-Tobacco (Nicotiana) (See Toxicants with Nicotinic Effects, IF4)
-Lupine, Bluebonnet (Lupinus) (See Toxicants with Nicotinic Effects, IF4)
-Locoweed (Astragalus) (See Toxicants Causing CNS Depression, I)
-Hybrid Sudan or Sudan grass, Sorghum spp. (See Toxicants Causing Paralysis, IG, and See Methemoglobin Producers, XXB)
-Lathyrism (Lathyrus spp.) (See Toxicants Causing Paralysis, IG)
-Potato (Solanum tuberosum) Questionable to Doubtful Teratogen
-Mercury (See Toxicants with Mixed Effects on the CNS, IC)
-Corticosteroids
-Thallidomide
-Halogenated Dioxin and Related Halogenated Aromatics (See Toxicants Affecting the Skin)

B. Abortion Inducing Toxicants
-**Macrocarpa** (Cypressus macrocarpa) and hybrids
-Westem Yellow Pine, Ponderosa Pine (Pinus)
-Western Broomweed (XanthoceT)halum)
-Monterey Cypress (Cupressus)
-Sumpweed (Iva augustifolia)
-Subterranean clover (Trifolium) (See Estrogenic Toxicants, VIIC)
-Locoweed (Astragalus) (See Toxicants Causing CNS Depression, IIE)

-Lupine (Lupinus) (See Toxicants with Nicotinic Effects, IF4)
-Hybrid Sudan (Sorghum spp.) (See Toxicants Causing Paralysis, IIG, and Methemoglobin Producers, XX)
-**Nitrate** (See Methemoglobin Producers, XX)
-Carbon Monoxide (See Toxicants Inhibiting the Function of Respiration XX)
-Corticosteroids
-Halogenated Dioxins and Related Compounds, Includes Highly Chlorinated Naphthalene
-Lead (See Toxicants With Mixed Effects on the CNS, IC)
-Phenothiazine (See Toxicants Causing Skin Damage by Primary Photosensitization, XB)

C. Estrogenic Toxicants
-Mycotoxicoses
-**Zearalenone and Zearalenol**
-Subterranean and Other Clovers (Trifolium)
-Diethylstibesterol (DES)--Also a Transplacental Carcinogen
-ECP
-Wheat Germ
-Estrogen Induced Pancytopenia in the Ferret

D. Masculinization by Toxicants

-Anabolic Steroids in Mares
-Halogenated Dioxins in Mares

E. Testicular Degeneration (Toxic)

-Gossypol (Sterilant in Human Males) (See Toxicants Affecting the Heart XVH)
-Highly Chlorinated Naphthalene
-Anabolic Steroids in Horses
-Acute Cadmium Toxicosis (See Toxicants Affecting the Kidneys, V)

F. Infertility and Reproductive Failure Caused by Toxicants

-See Estrogenic Toxicants
-See Goitrogenic Plants
-Trichothecenes mycotoxin zearalenone (See alsoToxicants Affecting the Gastrointestinal Tract, XIC)

VIII. Toxicants Affecting Peripheral Circulation (some of which have the potential to cause sloughing) and/or that may cause reduced lactation

-Rattlesnakes and Other Pit Vipers
-Brown Recluse Spider Venom
-Gangrenous Ergotism (Mycotoxin)
-Tall Fescue (Festuca) (Apparent Mycotoxin)
-Thallium (See Toxicants Affecting the Skin, XCL)
-Buttercup (Ranunculus) (See Toxicants Affecting the Gastrointestinal Tract, XIB2)
-Phenothiazines (See Toxicants Causing Skin Damage by Primary Photosensitisation, XB)
-PCBs, PBBs (See Hepatotoxic Chemicals and Drugs, IXA)
-Black Walnut (Juglans nigra) (cause of laminitis in horses)
-Hoary Alyssum (Berteroa incana)

IX. Toxicants Affecting the Liver

General Introduction to Mechanisms of, Effects of, and Therapy for Hepatotoxicosis

A. Hepatotoxic Chemicals and Drugs

-**Iron** Dextran and Other Iron Compounds
-**Phosphorus**
-Carbon Tetrachloride
-Coal Tar, Pitch, Clay Pigeons, **Phenolics**
-**Acetaminophen/Paracetamol** (See Methemoglobin Producers, XX)
-Tannic Acid
-**Copper** (See Toxicants Causing Hemolysis, XXI)
-Carbon Disulfide (See Toxicants with Mixed Effects on the CNS, IC)
-Halogenated Hydrocarbons including Halogenated Dioxins (See Toxicants Affecting the Skin, Other Organic Compounds, XIC2) -Vitamin A (See Toxicants Causing Dystrophic Mineralization, XXV)
-Carbamate Fungicides (See Toxicants Affecting the Kidney, VIB)

B. Mycotoxins Affecting the Liver

-Aflatoxins
-Sterigmatocystin
-Rubratoxins A and B
-**Sporidesmin (Facial Eczema)**
-Penicillic Acid
-Cyclopiazonic Acid (See Other Mycotoxins, Bacterial Toxins, and Zootoxins, XID)
-F. moniliforme contaminated corn in the horse (See "Fumonisins" under Toxicants Causing Mixed Effects in the CNS, IC)

C. Poisonous Plants Affecting the Liver
-Cocklebur (Xanthium)
-**Pyrrolizidine Alkaloid Containing Plants, Ragwort (Senecio)**
-Groundsel (Senecio)
-Rattlebox (Crotalaria)

-Fiddleneck (Amsinckia)
-Viper's Bugloss (Echium)
-Heliotrope (Heliotropium)
-Comfrey (Symphytum)
-Trichodesma
-Hound's Tongue (Cynoglossum)
-**Blue-Green Algae** (Microcystis, Nodularia spumigena) (also Inhibitors of Cholinesterase, IF2)
-Lantana (Lantana).
-Sneezeweed (Helenium spp.)
-Bitterweed (Hymenoxys spp.)
-Kochia scoparia
-Alsike Clover (Trifolium) (See Estrogenic Toxicants, VIIC)
-Birdsfoot Trefoil (Lotus)
-Cycad Palm (Cycas and Zamia spp.)
-Mushrooms (Amanita phalloides) (See Gastrointestinal, Hepatotoxic, Nephrotoxic, Neurotoxic Mushrooms, XIB1O)
-Gossypol (Cottonseed meal) (See Toxicants Affecting the Heart, XV)
-Rapeseed (Brassica) (See Goitrogenic Plants, VI)

D. Hepatogenous Photosensitizers
-Horsebrush (Tetradymia glabrata or T. canscens especially when sensitized with black sage Artimesia salina)
-Panic Grasses (Panicum spp.)
-Puncture Vine (Tribulus terrestris)
-Sacahuiste, Bunchgrass (Nolina texana)
-Agave (Agave lecheguilla)
-**Sporidesmin** (Mycotoxin) (See Mycotoxin Affecting the Liver, IXB)
-**Pyrrolizidine Alkaloid Plants** (See Poisonous Plants Affecting the Liver, IXC)
-Lantana (Lantana) (See Poisonous Plants Affecting the Liver, IXC)
-Moldy post-frost Florida Bermuda Grass (Cynodon)
-**Blue-green Algae** (Microcystis spp.) (See Poisonous Plants Affecting the Liver, IXC)
-Rape (Brassica) (See Goitrogenic, Plants, VII)
-Kochia (Kochia scolparia) (See Poisonous Plants Affecting the Liver, IXC)
-Alsike Clover (Trifolium hybridum) (See Estrogenic Toxicants, VIIC)
-Congenital Liver Anomale-Southdown sheep

X. Toxicants Affecting the Skin

A. Plants Causing Photosensitization Uncertain Pathogenesis

-Crimson Clover (Trifolium incarnatum)*
-Red Clover (Trifolium pretense)*
-Burclover (Medicago denticulate)*
-Subterranean clover (Trifolium subterraneum)*
*(See Estrogenic Toxicants, VIIC)
-Storksbill
-Blue Panic Grass (Panicum antidotale) (See Hepatogenous Photosensitizers, IXD)
-Spotted spurge (Eyebane; Euphorbia maculata)
-Sulfonamides (See Toxicants Affecting the Kidneys, V)

B. Toxicants Causing Skin Damage by Primary Photosensitization

-Agave (See Poisonous Plants Affecting the Liver, IXC)
-St. Johnswort (Hypericum perforatum)
-Buckwheat (Fagopyrum esculentum)
-Spring Parsley (Cymopterus watsonii)
-Phenothiazine (Calves, occasionally Swine)
-**Tetracyclines, esp. Doxycycline**

C. Toxicants Causing Skin Effects Other Than Photosensitization

1. Metals

-Thallium
-Inorganic and Aryl Mercury Cods. (See Toxicants with Mixed Effects on the CNS,IC)
-Arsenite (Topical)
-Chromates (Topical)
-Iodine Cmpds. (EDDI; ethylenediamine dihydroiodide)
(See Toxicants Affecting the Respiratory System, XVII)
-**Selenium**
-Molybenum (Excess molybdenum/deficient copper in ruminants)

2. Other Organic Compounds

-Halogenated Dioxins and Related Halogenated Aromatics
-Highly Chlorinated Naphthalenes
-PCBs and PBBs
-Turpentine
-Diesel fuel
-Kerosene
-Other Solvents
-Phenolics (See Toxicants Affecting the Liver, IXA)
-Formalin

3. Selenium Containing Plants

-Prince's Plume (Stanleys)
-Locoweed (Astragalus)
-Woody Aster (Xylorrhiza)
-Salt Brush (Atriplex)
-Goldenweeds (Oonopsis)
-Aster (Aster)

. Other Plants

-Hairy Vetch (Vicia spp.)
-Poison Ivy (Rhus)
-Poison Oak (Toxicodendron)
-Black Walnut (Juglans nigra)
-Manchineel Tree (Hippomane)

5. Trichothecene Mycotoxins (See Trichothecenes under XIC)

-T-2 toxin*
-Diacetoxyscirpenol*
-Other More Potent Trichothecenes, not Deoxynivalenol*
*(See Toxicants Affecting the Gastrointestinal Tract, XIC)

D. Plants Causing Skin Trauma

-Wild Barley (Hordeum spp.)
-Bromes (Bromus spp.)
-Sandburg (Cenchrus pancufloris)
-Goatheads (Tribulus terrestris) (Hepatogenous Photosensitizers, IXD)
-Burdock (Arctium lappa)
-Numerous Cacti
-Foxtail Awns (Setaria)
-Yellow Bristle Grass

XI. Toxicants Affecting the Gastrointestinal Tract

General Information on Mechanisms of, Effects of, and Therapy for Toxicoses Affecting the Gastrointestinal Tract

A. Chemicals and Drugs Affecting the Digestive Tract

1 . Radiation

2. Metals, Other Elements, and Inorganic Compounds

-**Arsenic**
-Antimony
-Chromates
-Elemental and Inorganic Salts of Mercury (See Toxicants with Mixed Effects on the CNS, IC)
-**Lead** (Initial) (See Toxicants with Mixed Effects on the CNS, IC)
-Thallium (Acute)
-**Cadmium** (Acute) (See Toxicants Affecting the Kidneys, V)
-**Copper** (Acute) (See Toxicants Causing Hemolysis)
-**Phosphorus** (Initial) (See Toxicants Affecting the Liver, IX)
-**Zinc** (See Toxicants Affecting the Kidneys, VA)
-Zinc Phosphide (Initial) (See Toxicants Associated with Stimulation or Seizures, IB)
-Fertilizer

3. Organic Compounds

Differential list

-**Nonsteroidal Anti-inflammatory Drugs** (Also see the section Analgesic Nephropathy under Toxicants Affecting the Kidneys, Organic Compounds, VB)
-**Cardioglycosides** (See Toxicants Affecting the Heart, XVA)
-Fluoroacetate (Initial (Canidae) (See Toxicants Causing Seizures, IA)
-Cholinesterase Inhibitors (See Toxicants Affecting the Autonomic NS, IF)
-Rotenone (See Toxicants With Mixed Effects on the CNS, IC)
-Carbon Tetrachloride (See Toxicants Affecting the Liver, X)
-**Chlorophenoxy Herbicides** (See Toxicants Affecting Primary Muscle Dysfunction and/or Paralysis, II)
-Blister Beetles (Epicauta) (See Toxicants Affecting the Kidneys, V)
-5-flurouracil (Effudex) Topical Creme (When Ingested) (See Toxicants Associated with Seizures, IA)
-ANTU

B. Plants Affecting the Gastrointestinal Tract

1. "Toxalbumins"
-Rosary Pea, Precatory Bean (Abrus)
-Castor Bean
-Black Locust (Robinia)
-American Mistletoe (Phoradendron)
-European Mistletoe (Viscum)

2. Irritant Oils
-Buttercup (Ranunculus)
-Marsh Marigold (Caltha)

3. Saponin Containing Plants
-Pokeweed (Phytolacca)
-Bouncing Bet (Saponaria)
-English Ivy (Hedera)
-Corn Cockle (Agrostemma)
-Rattlebox esbania)
-Buckeye or Horsechestnut (Aesculus) (Toxicants with Mixed Effects on the CNS, IC)

4. Gallotannis
-Oak (Quercus spp.) (See Nephrotoxic Plants, VC)

5. Purgative Glycosides
-Christmas Rose (Helleborus niger)

6. Irritating Resins
-Euphorbia Family
-Cyprus Spurge (Euphorbia Cyparissias)
-Candelabra Cactus (Euphorbia)
-Snow-On-The-Mountain (Euphorbia marginata)
-Poinsettia (E. pulcherima)
-Mayapple (Podophyllum)
-Milkweeds (Asclepias) (See Toxicants Associated with Stimulation or Seizures,IIB)

-Manchineel Tree (Hippomane)

7. Isothiocyanates
-Brassica (Mustards and Related Plants) (See Goitrogenic Plants, VI)

8. Carboxyatractyloside
-Cocklebur (Xanthium strumarium) (See Poisonous Plants Affecting the Liver, IXC)

9. Cardioglycoside and Andromedotoxin Plants (See Toxicants Affecting the Heart)

10. Miscellaneous Plants

-Holly Berries (Ilex)
-Hydrangea (Hydrangea)
-Daffodil, Jonquil (Narcissus)
-Elderberry (Leaves and stems) (Sambucus)
-Privet (Ligustrum vulgars)
-Autumn Crocus (Coichicum autumnals)
-Daphne (Daphne)
-Hyacinth Bulbs (Hyacinthus)
-Lambsquarter (Chenopodium)
-Mushrooms (Amanita phalloides)
-Pepper Plant (Capsicum)
-Jerusalem Cherry (Solanum pseudocapsicum)
-Other Solanaccous Plants
-Bitterweed (Hymenoxvs odorata) (See Poisonous Plants Affecting the Liver, IXC)
-Sneezeweed (Helenium amarum) (See Poisonous Plants Affecting the Liver, IXC)
-Nicotinic Plants (See Toxicants with Nicotinic Effects, IF4)
-Cycad Palms (See Poisonous Plants Affecting the Liver, IXC)

C. Trichothecenes

-**Deoxynivalenol** (Vomitoxin)
-T-2 Toxin, HT-2 Toxin
-Diacetoxyscirpenol (DAS)
-Others

D. Other Mycotoxins, Bacterial Toxins, and Zootoxins

-Cyclopiazonic Acid (Mycotoxin)
-Bacterial Toxins (Food Poisoning; Most Garbage Poisonings; Most Carrion Toxicoses)
-Endotoxins and Enterotoxins
-Staphylococcal Enterotoxins
-Clostridial Enterotoxins
-Antibiotic Induced Colitis
-Scombroid Fishes (slightly deteriorated tuna, bonito, mackerel) (Histidine → Histamine)

XII. Toxicants Which May Affect the Oro-pharyngeal Cavity and Gastrointestinal Tract

A. Chemical Agents

-Corrosives
-Acids
-Alkalis
-Sodium Hypochlorite (Clorox) and Related Hypochlorites
-Phenolics (See Coal Tar and others under Hepatotoxic Chemicals and Drugs, IXA)
-Formaldehyde
-Moldy Red Clover (Slaframine) (Toxicants-Muscarinic Effects, No Nicotinic Effects, IF3)
-Cholinesterase Inhibitors (See Inhibitors of Cholinesterase, IF3)

B. Miscellaneous Plants Causing Irritation of the Oral Cavity and Skin

-**Nettles** (Urtica and Laportea)
-Nettle Spurge (Cnidocolus)
-Burdock (Arctium)
-Wild Barley (Hordeum)
-Bromes (Bromus)
-Sand Burs (Cenchrus)
-Goatheads (Tribulus)
-Numerous Cacti

C. Plants containing oxalate crystals and histamine releases (of the family Araceae)
-Jack-in-the-Pulpit (Arisaema triphyllum)
-Dumbcane (Diefenbachia)
-Philodendron (Philodendron spp.)
-Elephant's Ear (Colocasia spp.)
-Alocasia (Alocasia spp.)
-Split Leaf Philodendron (Monstera deliciosa)
-Wild Calla (Calla)
-Skunk Cabbage (Symplocarpus)

XIV. Toxicants Causing Bloat in Ruminants

-Sweet crude oil (See Toxicants Affecting the Respiratory System)
-Ammonia toxicoses (urea) (See Toxicants With Mixed Effects on the CNS, IC)
-Lucerne or Alfalfa (Medicago sativa)
-Diet Changes
-Others

XIV. Toxicants Causing Shock

General Mechanisms of, Effects of, and Therapy for Shock
-Garbage (Food Poisoning (Endotoxins, Enterotoxins) (See Other Mycotoxins and Bacterial Toxins)
-Arsenic (See Toxicants Affecting the Gastrointestinal Tract)
-Iron Dextran (See Toxicants Affecting the Liver, IX)
-Sulfonamides (See Toxicants Affecting the Kidneys, V)
-Polysorbate 80 in dogs (Histamine Releaser) (Drug Vehicle)
-Numerous biologicals (Anaphylaxis as with corticosteroids used for inducing parturition)

XV. Toxicants Affecting the Heart

A. **Cardioglycosides**
-Digitalis

-Digoxin
-Digitoxin

B. Cardioglycoside Containing Plants, Plant Derivatives and Animals

-**Foxglove (Digitalis)**
-**Oleander (Nerium oleander)**
-Lily-Of-The-Valley (Convallaria)
-Dogbane, Indian Hemp (Apocynum)
-Poisonous Toads (Bufo spp.)
-Red Squill (Rodenticide)
-Scilliroside (Rodenticide)
-Possibly some milkweeds (Asclepias) (Toxicants Associated with Simulation or Seizures IB)

C. Andromedotoxin Containing Plants (Heath, Ericaccae Family of Plants)

-Azalea (Rhododendron)
-Rhododendron (Rhododendron).
-Laurel (Kalmia)
-Lambkill (Kalmia)
-Sheepkill (Kalmia)
-Calfkill (Kalmia)
-Japanese Pieris (Pieris japonica)

D. Cardioglycoside-Like Plants

-Monkshood (Aconitum)
-Mistletoe (some) (Phoradendron) (See Plants Affecting the GI Tract, XIBI)

E. **Fluoroacetate (1080)** and Fluoroacetate Containing Plants

-**Fluoroacetate (1080)** and Fluoroacetamide (1081) (Toxicants Associated With Seizures, IA)
-Gifbiaar (Dichavetalum spp.), a Plant of South Africa (Contains Fluoroacetate)
-Gidyea (Acacia georginae), a Plant of Australia (See Toxicants Causing Paralysis, IG)

F. Other Plants

-**Yew,** Ground Hemlock (Taxus)
-Senna (Cassia occidentalis)
-Death Camas (Zygadenus)
-White Snakeroot in the Horse (Eupatorium ruzosum) (Toxicants Causing CNS Depression,IE)
-Jerusalem Cherry (Solanum pseudocapsicum) (See Cholinergic Blockers, IFc)
-Kleingrass (Panicum) (See Toxicants Affecting the Skin)
-False Hellebore (Veratrum califomicum) (See Teratogens, VIIA)
-Avocado (Persea americana) in cage birds (also toxic to horses, donkeys)

G. Metals
-Cobalt

H. Organic Compounds

-**Monensin** (Rumensin^{R})
-**Lasalocid** (Bovatec^{R})
-Gossypol (Constituent of Cottonseed meal)
-Blister Beetles (See Toxicants Affecting the Kidneys, V)
-Urea (See Toxicants with Mixed Effects on the CNS, IC)
-Tricyclic Antidepressants (See Toxicants **with** Mixed Effects on the Nervous System, IC)
-Cocaine (See Toxicants Associated with Stimulation or Seizures, IB)
-Diphemanil methyl sulfate (Diathal^{R}) and Anesthetics
-Cyclopiazonic acid (Mycotoxin) (Unlikely)
-Citreoviridin (Mycotoxin) (Unlikely)
-Moniliformin (Mycotoxin) (Unlikely)

XVII. Toxicants Affecting the Respiratory System

A. Metals

-**Selenium** and Selenium Containing Plants (Acute) (See Toxicants Causing Skin Effects Other Than Photosensitization, XC4)

B. Inorganic Compounds

-Nitrogen oxides
-Ammonia
-HCI
-HF
-Zinc Phosphide (See Toxicants Associated with Stimulation or Seizures, IB)
-**Overheated Teflon** or Silverstone Cookware (in Birds)
-**Paraquat**
-Kerosene, Gasoline and Other Petroleum Distillates
-Iodine Compounds, Such as Ethylene, Diamine Dihydroiodide (EDDI)
-Pennyroyal Oil (Ketone pulegone) (Insecticide)
-Smoke and Heat Inhalation
-**Organophosphorus or Carbamate** Insecticides (See Autonomic NS, Inhibitors of Chlorinesterase, IF, IF2)
-Freon (Fluorocarbons, Chlorofluorocarbons)
-Formaldehyde
-**Fumonisins** (See Toxicants with Mixed Effects on the CNS, I)

D. Plants

-**Rapeseed or Forage (Brassica)** (See Goitrogenic Toxicants, VI)
-3-nitro containing Locoweed (Astragalus and Oxvtropis) (Some species of these plants cause emphysema in sheep) (See Toxicants with Mixed Effects on the CNS, IC)
-3-Substituted Furans (**Atypical Bovine Pulmonary Emphysema-trytophan**)
-Purple Mint (Perilla frutescens)
-Com (Zea Mavs)
-Lush Pastures
-Moldy Sweet Potatoes (Ipomea batatas and.Fusarium solani)
-Fumonisins (See Toxicants with Mixed Effects on the CNS IC)

XVIII. Toxicants Causing Asphyxia

-Nitrogen
-Nitrous Oxides
-Nitrogen Oxides
-CO2
-Helium
-Hydrogen
-Aliphatic Hydrocarbons (also explosive!)
    -Methane
    -Ethane
-Hydrogen Sulfide

XIX. Toxicants Inhibiting the Function of Cytochromes
-Cyanide, Hydrogen Cyanide = Prussic Acid (Calcium Cyanide)
-Cyanogenic Glycoside Containing Plants
    -Wild Black Cherry (Prunus)
    -Chokecherry (Prunus)
    -Plum (Prunus)
    -Peach (Prunus)
    -**Sudan** (Sorghum) (See Methemoglobin Producers, XX)
    -Arrowgrass (Triglochin)
    -White Clover (Trifolium)
    -Flax or Linseed Plant (Linum)
    -Some Spurges (Euiphorbia) (Rare)
    -Elderberry (Leaves and stems) (Sambucus) (See Plants Affecting the Gastrointestinal Tract, XIB10)
    -Hydrogen Sulfide

XX. Toxicants Decreasing the Ability of Hemoglobin to Carry Oxygen

A. Carbon Monoxide

    -Smoke Inhalation

B. Methemoglobin Producers

    -**Acetaminophen/Paracetamol** in cats
    -Naphthalene (Mothballs)
    -Local Anesthetics
    -Other Oxidant Drugs (Phenazopyridine [Pyridium I and Others)
    -**Nitrate and Nitrite**
    -**Nitrate Accumulating Plants**
    -Sudan, Sorghum (Sorghum)
    -Corn, especially Green Chop (Zea mays) -Pigweed (Amaranthus) (Toxicants Affecting the Kidneys, V) (Rare)
    -Lambsquarter (Chenopodium) (See Toxicants Affecting the Kidneys, V) (Rare)
    -Oats (Avena sativa)
    -Wheat (Triticale)
    -Fescue (Festuca)
    -Beets (Leta) (See Toxicants Affecting the Kidneys, V)
        -Kochia (See Poisonous Plants Affecting the Liver, IXC)

-Locoweeds (Organic Nitrates) (See Toxicants with Mixed Effects on the CNS, IC)
-Fiddleneck (Amsinckia)
-Chlorates
-Red Maple (Acer) (See Toxicants Causing Hemolysis, XXI)

XXI. Toxicants Causing Haemolysis

-Red Maple (Acer)
-Onions and Garlic (Allium)
-**Copper**
-**Zinc** (See Toxicants Affecting the Kidneys, VA)
-Phenothiazine (See Toxicants Causing Skin Damage by Primary Photosensitisation, XB)
-Other Oxidant Drugs (Acetanilid and Others)
-Saponin Containing Plants (See Gastrointestinal Tract, XIB)
-Brassica spp. (See Goitrogenic Toxicants, VII)
-Kale, Brussel Sprouts, Rapeseed, and Forage (Brassica)
-Rattlesnakes and Other Pit Vipers (Phospholipase A)

XXII. Toxicants Causing Polycythaemia
-Cobalt

XXIII. Toxicants Affecting Haemostasis

A. Toxicants that Influence the Function of Vitamin K
-Damaged or Moldy Sweet Clover (Melilotus)
-Moldy Lespedeza (Lespedeza)
-**Coumarin and Indandione Anticoagulant Rodenticides** and Pharmaceuticals
-Idiopathic, Vitamin K-responsive Coagulopathy in Swine

B. Toxicants which Affect the Liver and Secondarily Cause a Coagulopathy

-Aflatoxin (See Mycotoxins Affecting the Liver, IXB)
-Many others

C. Toxicants which Harm the Bone Marrow
-**Bracken Fem** (Pterydium)
-Trichloroethylene-Extracted Soybean Oil Meal
-Benzene (Bone Marrow Effect)

D. Toxicants which may Cause Severe Shock and Eithcr Disseminated Intravascular Coagulation or Other Coagulopathy
-Garbage Toxicoses (See Toxicants Causing Shock, XIV)
-Pit Vipers (See Toxicants Causing Shock, XIV)

XXIII. Toxicants Affecting the Teeth and Skeletal System

-**Fluoride-**associated with volcanic ash fallout and superphosphate fertiliser application
-Tetracyclines
-Cadmium (See Toxicants Affecting the Kidneys, V)
-Molybdenum Toxicoses/Copper Deficiency
-Congenital Porphyria
-Iron (See Toxicants Affecting the Liver, IX)
-Cyclopiazonic Acid

XXV. Toxicants Causing Dystrophic Mineralization

-Vitamin D – Cholecalciferol (See Toxicants Affecting the Kidneys, Organic Compounds, VB)
-Vitamin A
-Miscellaneous Cardiotoxins (Mineralization in the Damaged Myocardium)

XXVI. Toxicants Causing Blindness

-**Ivermectin** (see toxicants causing CNS Depression, IE)
-Ammonia-Induced Comeal Damage in Poultry
-**Arsinilic acid** (See Toxicants Causing Paralysis, IG)
-**Lead** (See Toxicants with Mixed Effects on the CNS, IC)
-Hexachlorophene (See Toxicants with Mixed Effects on the CNS, IC)
-Methanol in Primates
-Rapeseed (Brassica) (See Goitrogenic Toxicants, VII)
-Cocklebur (Xanthium) (See Poisonous Plants Affecting the Liver, IXC)
-Phenothiazine-Induced Corneal Damage
-Other Photosensitizers

XXVII. Toxicants Causing Immunosuppression

-Aflatoxin (See Mycotoxins Affecting the Liver, IXB)
-Trichothecenes (See Toxins Affecting the Gastrointestinal Tract, XIC)
-Halogenated Aromatics (Dioxins, etc.) (See Teratogens Under Toxicants Affecting Reproduction, VIIA; Also see Toxicants Affecting the Liver, Other Organic Compounds, XIC2)

XXVIII. Toxicants Causing Adrenal Gland Cortical Hypoplasia
-o,p-DDD (See DDT under Estrogenic Toxicants, VIIC)

XXIX. Carcinogens (Other Types; See also Toxicants Affecting the Liver, IX, includes Aflatoxin, Nitrosamines)
-Diethylstilbesterol (Transplacental Carcinogen)
-Polynuclear Aromatic Hydrocarbons (i.e., Constituents of Some Smokes such as Benzo-a-pyrene, etc.)
-Aflatoxins (See Mycotoxins Affecting the Liver, IXB)
-Nitrosamines (See Hepatotoxic Chemicals and Drugs, IXA)