

# INTRODUCTION TO TOXICOLOGY

195.401  
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# Introduction

- Course Objectives
- Textbook, handout
- Assignment
- Examination: Toxicology FINAL

# Introduction to Toxicology

- Toxicology
  - The study of harmful interactions between chemicals and biological systems.
  - The dose makes the poison

# Introduction to Toxicology

- Prevalence of poisonings in vet practice?
- What issues or questions arise in cases of poisoning?
- Examples?

# Introduction to Toxicology

- What factors affect toxicity?
- What is a LD<sub>50</sub>?
  - dose that is lethal to 50% of animals
- What is a toxicity rating?
  - Extremely toxic      LD<sub>50</sub> = < 1mg/kg to
  - Relatively harmless LD<sub>50</sub> = > 15 gm/kg
- How does the exposure alter the toxicity? (e.g. oral vs dermal)

# Case example of a “poisoned” dog:

Owner thinks the dog has eaten a rodenticide.

- What questions do you need to ask?
- If the dog ate 4 blocks of Talon, what do you need to know?



# PRINCIPLES OF TOXICOLOGY

- Limit Exposure
- Limit absorption
- Stabilise the animal
- Promote elimination
- Identify the poison

# LIMIT EXPOSURE

Oral Route of Exposure

Emetic?

Activated Charcoal?

Gastric lavage?

# LIMIT EXPOSURE

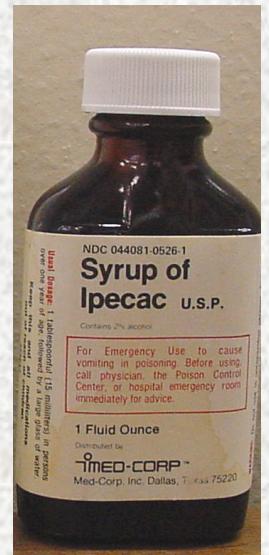
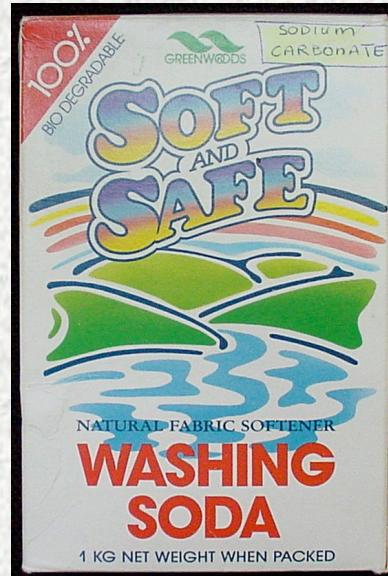
## Emetics

### Contraindications:

- Caustic or Corrosive?
- Petroleum?
- CNS depression?
- CNS seizures?

# LIMIT EXPOSURE

- Emetics
- In The Home:
  - Washing soda (Na Carbonate)
  - Hydrogen Peroxide (3%)
  - Dishwashing liquid in water
  - Ipecac
  - Table salt ??



# LIMIT EXPOSURE

- Emetics
  - In the Veterinary Clinic:
  - Apomorphine
  - Xylazine



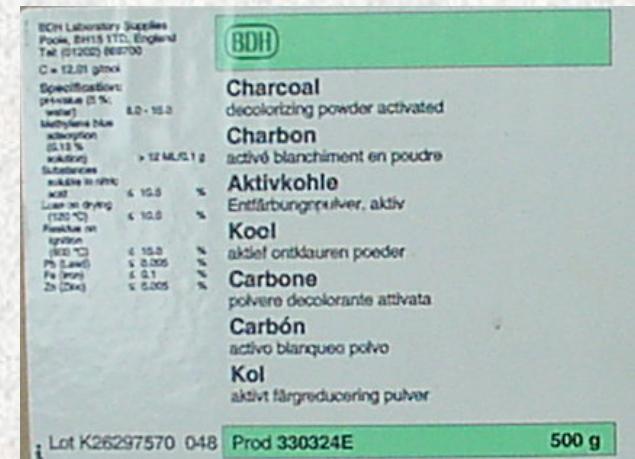
# LIMIT EXPOSURE

- Gastric Lavage:
- Intubate to prevent aspiration
- Right lateral recumbency
- Body inclined 20 degrees (head down)
- Warm water or saline flushes

# LIMIT ABSORPTION

## Activated Charcoal

- Black powder slightly soluble in water
- Activated charcoal is made by pyrolysis of organic matter such as wood pulp and exposure to steam or oxygen
- Surface area is  $1,000 \text{ M}^2$



# LIMIT ABSORPTION

## Activated Charcoal



- Constipating effect
  - Binding to poison is reversible
  - Laxative (e.g. sorbitol) to aid elimination

Adsorbs materials from water and air

Do not mix and allow to stand

# LIMIT ABSORPTION

## Activated Charcoal (Carbosorb)

- Exceptions to efficacy:
- Acids and alkalies
- Alcohol and ethanol
- Petroleum
- Metals like iron, mercury



# LIMIT ABSORPTION

## Activated Charcoal (Carbosorb)

### Contraindications:

- No bowel sounds
- Corrosive ingestion
- Abdominal trauma
- Hypotension, dehydration (with Sorbitol)

# LIMIT ABSORPTION

## Activated Charcoal (Carbosorb)

### Adverse effects:

- Black Stools
- Constipation
- Diarrhoea (sorbitol)
- Electrolyte imbalance (sorbitol)

# LIMIT ABSORPTION

## Ion Exchange Resins

- Cholestyramine (Questran)
- Efficacy:
  - Antibiotics, phenobarbital
  - Digoxin, thyroxine, pesticides
  - E. coli enterotoxin, warfarin



# LIMIT ABSORPTION

## Cholestyramine (Questran)

- Contraindications:
- Dehydration
- Constipation



# DECONTAMINATION

## EYES

- Copious amounts of physiologic saline
- OR warm water
- Flush for 15 minutes

# DECONTAMINATION

DERMAL

NON-OILY COMPOUNDS



- Wash with copious amounts of water
- Mild detergent as needed, rinse well

# DECONTAMINATION

## DERMAL - OILY COMPOUNDS

- Cooking oil or liquid paraffin
- Wash with mild detergent
- Rinse with warm water



# DECONTAMINATION

## "ANTIDOTES"

- Atropine (or glycopyrrolate) (OPs)
- Acetyl cysteine (Parvolex) (paracetamol)
- Acetamide (1080)
- Ethanol (ethylene glycol)
- 4-methylpyrazole (ethylene glycol-dogs)

# DECONTAMINATION

## CHELATORS

- British Anti-Lewisite (BAL) (lead, arsenic)
- Calcium EDTA (lead, zinc)
- d-Penicillamine (lead, zinc, copper, iron )
- Dimercaptosuccinic acid (DMSA) (arsenic, copper, lead)

Poison Information:

New Zealand Poison Centre

Urgent only    0800 764 766

Non-urgent 03 479 7248 (9-5)

USA - National Animal Poison  
Control Center

[www.apcc.aspca.org](http://www.apcc.aspca.org)

# DECONTAMINATION

## SUMMARY

- THOROUGHLY DECONTAMINATE
- Emetics (apomorphine, xylazine)
- Activated Charcoal and sorbitol
- “Treat the Patient not the Poison.”