

BREAKFAST FOR THE BRAIN[®]

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OPENING MESSAGE

This is the ninth issue of **Breakfast for the Brain[®]**, Volume 1, **Toxicology**, January 2002, which deals with the science of toxicology. Continuing the theme from Issue No. 8, we offer you in this issue additional articles, lesson plans and resources on the subject of product safety and poison control & prevention.

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Breakfast for the Brain[®] ARTICLE

Companion Animal Poisoning

Dogs and cats -- being the most populous of companion animals -- make up the majority of animal poisoning cases reported to poison control centers. A list of the most common substances that may cause poisoning in companion animals is below.

Medications

Tylenol, Ibuprofen, aspirin, other pain relievers

Prescription drugs
Veterinary drugs
Vitamins with iron

Foods/Plants

Chocolate
Onions, garlic
Outdoor mushrooms
Plants

Examples of toxic plants include amaryllis, azalea, ginkgo, holly, hydrangea, mistletoe, peony, poison ivy, poison oak, poison sumac, rhododendron, and wisteria. Pets, especially cats and dogs, frequently ingest plants. In fact, of all the pet-related calls received by poison control centers, about 20 percent involve a plant. If a plant is known to be poisonous to humans, it's a safe bet it can also be harmful to your pet. On the other hand, because a plant is considered nontoxic to humans, it does not follow that it will not have any ill effects on animals. Nontoxic plants can often cause vomiting and other related symptoms in dogs and especially cats.

Consumer/Household Products

Antifreeze
Rat poison
Ant traps/pesticides
Herbicides/fertilizer
Cleaning supplies
Personal care products

Catnip “Poisoning” in Cats

Nepeta cataria, commonly known as catnip, is a member of the mint family and has been widely cultivated in Europe and North America. Catnip is well known for its ability to cause what appears to be a euphoric reaction in cats. While serious poisoning from catnip is unlikely, the effects of this plant on cats sometimes causes concern in pet owners. The following describes what is known about the effect of catnip in cats.

Fresh catnip contains 0.3 - 1.0% volatile oil, which include the ingredient responsible for the effect seen in acts. While the exact mechanism of this substance is unknown, we do know that the sense of smell is essential for the reaction to occur. And, while all species of cats respond to catnip, individual cats may not. This is because the ability of cats to experience the catnip response in an inherited trait. For example, the results of one study found that one-third of cats did not respond to catnip. In another report, only 50% of cats responded to catnip. Also, cats do not develop the response until about 3 months of age.

The result of toxicology studies has suggested that serious poisoning from eating the fresh plant is nearly impossible. On the other hand, briefly sniffing, licking or chewing fresh or dried plant material or item sprayed with a catnip extract will immediately produce the catnip reaction in cats.

In cats, the reaction begins by sniffing, licking or chewing the catnip. In some cats, the reaction progresses to first rubbing their chin and cheeks on the catnip and eventually rubbing their entire bodies on it. The reaction lasts for 5-15 minutes and cannot occur again until an hour or more has passed. While it cannot be determined what a cat is actually experiencing, the behaviors produced have been compared to the sexual response of female cats prior to mating. The effects are only temporary and short-lived.

Mushroom Poisoning in Dogs

The word “mushroom” is used to describe the fruiting body of various types of fungi. They cannot synthesize their own energy as plants do, but depend on decaying organic matter for their energy. That’s why they’re commonly found around decaying vegetable matter, such as manure or rotting roots and stumps. The growth of mushrooms is favored by cool, moist weather. Thus, they are most abundant in spring and fall.

Identifying mushrooms is usually very difficult process because few individuals have the special training needed to accurately identify mushrooms. For this reason it is often easier to assume an unknown mushroom is poisonous and empty the stomach.

Mushrooms can be poisonous in many different ways. Members of the *Gyromitra* family, such as the false morel, contain a substance, which may cause vomiting, abdominal pain and bloody diarrhea. More serious signs may include seizures, coma and death. Other mushrooms, such as *Psilocybe* species, contain a hallucinogen. People who have accidentally eaten these mushrooms had suffered vivid hallucinations that may be pleasant or terrifying. The most poisonous mushrooms are members of the *Amanita*, which are responsible for most of the mushroom-related deaths that occur each year. These mushrooms contain a substance, which causes liver damage. They are so poisonous that it is estimated that one mushroom cap from an *Amanita* can kill a man. Tragically, these mushrooms do not produce symptoms until many hours after they are eaten. By that time, treatment is usually of little value. In addition, mushrooms may also cause illness because they are spoiled. Eating spoiled mushrooms will cause illness similar to other types of food poisoning.

After eating a mushroom, treatment must be started as soon as possible to make sure an animal does well. If a dog is known to have eaten a mushroom, contact your veterinarian as soon as possible. If a dog is already exhibiting symptoms, it may be necessary to bring the animal to the veterinarian for treatment. Your poison center can assist your veterinarian by suggesting appropriate treatment.

Because mushrooms can literally appear overnight, inspect your yard for mushrooms before allowing your pet outside and be wary of mushrooms when in public places, such as parks and woods.

Tips for Preventing Companion Animal Poisonings

- Antifreeze tastes and smells sweet and even small amounts can be fatal. Always clean up spills of all automobile supplies. Discard empty containers after use.
- Keep household cleaning supplies, herbicides, pesticides, personal care products, etc, away from animals in cupboards or high shelves. Do not leave liquids in buckets or bowls that animals may drink from.
- Keep medications out of reach in a cupboard or cabinet. Child-resistant caps can easily be chewed off by a playful puppy or kitten. Pick up any pills dropped on the floor quickly, as animals often wait around for things to drop.
- Many animals will chew on plants. Cats will climb up to hard to reach spots to chew them. Identify the plants in your home and yard. Find out if they are poisonous. For a guide to poisonous plants, go to http://www.mnpoison.org/plant_guide.htm. Remove or make inaccessible any dangerous plants.
- Ant traps and rat poisons are attractive to animals. Place these products where animals cannot get to them. Be sure and pick them up and dispose of them when done using.
- Companion animals often get into trouble because they have a strong urge to chew, especially when they are young. Give them plenty of safe, non-toxic chews and toys to occupy them and satisfy their taste for chewing.
- Do not give companion animals medications meant for humans. Medicines that are safe for humans may have adverse effects on animals, and the doses are not the same. Consult with a veterinarian if your animal companion is sick.
- Do not give chocolate as a treat to your companion animal. Chocolate may be toxic to animals. Chocolate goodies are a favorite around the holidays, causing an increase in pet poisonings.
- Confine your companion in a crate or small pet-proof area while you are not home. Most poisonings occur when companion animals are not supervised.

Action in the Event of Companion Animal Poisoning

- Try to identify the toxic substance. Look for traces in or around the mouth. Empty bottles or containers may be a clue. Check for distinctive odors.
- If the animal vomits, note carefully the appearance of the vomitus. If there are pill or plant fragments, put them in a plastic baggy for identification.
- Try to estimate the amount that the animal has eaten. Some things are only toxic in large doses.
- Note any symptoms that your companion animal may be having.
- Call your veterinarian or poison center.
- Do not induce vomiting unless advised to do so by your veterinarian.

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FOCUS ON LEAD

Lead is a metal that has been used for more than 1,000 years in pottery and plumbing products, among other uses. More recently, lead has been used in car batteries, paints, gasoline, and other products. Lead is useful because it is soft enough to be pliable and it resists corrosion. However, swallowing or breathing in too much lead can result in lead poisoning.

Earlier, scientists thought that a measurement of 60 micrograms of lead (a very small amount) in the blood was an unhealthy exposure. Now, we think that just 10 micrograms can cause problems, especially for young children and pregnant women. To meet this public health challenge, scientists are working to:

- reformulate products to remove lead;
- clean up the environment;
- make workplaces safer with less lead exposure;
- determine hazardous levels of lead in products and the environment; and
- develop new treatments for people exposed to harmful levels of lead.

A familiar example is the phase-out of leaded gasoline, which pollutes the air. Scientists and engineers developed new gasoline mixtures and designed new engines that would run on cleaner fuels. As a result, lead pollution of the air has dropped dramatically.

Lead poisoning from paint has been a hazard to small children. Lead poisoning can result when children swallow flakes from lead-based paint, used in older homes. Chemists have now developed lead-free formulas for house paints. Lead paint is still useful in preventing corrosion of outdoor structures. Today, workers making or using leaded products must take safety precautions. They wear protective clothing and use special equipment to protect their lungs (like respirators and masks).

After high levels of lead exposure, the body may have problems with coordination and strength, manufacture of red blood cells, high blood pressure, and other troubles. Even low levels of lead exposure may be harmful for infants or young children. Researchers have found a link between increased levels of lead in children's baby teeth and poor performance in school.

Toxicologists and other scientists have also studied the effects of lead on young rats and frogs. The effects of lead poisoning include stunted brain growth, and interference with signal transmission in the central nervous system. These and other animal studies provide better understanding about what happens in humans, leading to new treatments for lead poisoning.

What's the treatment for lead poisoning?

Special chemicals that bind with lead can be used. Then the body can eliminate lead naturally, preventing hazardous buildup. This chelation therapy can take months. Eliminating lead from a person's environment is also part of the treatment. Researchers continue searching for ways to prevent and treat lead poisoning.

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CUTTING-EDGE TOXICOLOGY

Massachusetts Research Hospital Forges New Field of Pediatric Toxicology

The Lead and Toxicology Clinic at Boston's Children's Hospital has long been a leader in addressing toxic poisoning in children. In recent years, however, the number of non-lead-related cases seen at the clinic has increased. More children are now being followed for the effects of environmental and occupational toxic exposure. The program mirrors the rise of an emerging area of pediatric medicine -- pediatric toxicology -- born of a heightened public awareness of environmental toxins. Responding to chemical exposure in children is a special field of study for a number of reasons. Children may face developmental effects from emerging problems, such as the potential effects on endocrine systems from pesticides and industrial chemicals. Children are more at risk from toxic substances because their immune systems are still developing and because their skin is more permeable and their airways are more reactive than those of adults. Children also consume more food and fluids, relative to their body size, than adults. And children's unique behavior -- crawling on the ground or playing outdoors -- generally exposes them more to environmental pollutants than adults. The field of pediatric toxicology is still in its infancy. As the Children's Hospital clinic builds its own literature of pediatric case studies in toxicology, the need for more basic toxicology research has become evident. The theme that repeats itself over and over... basic biomedical and biological research offers the best hope for a safe and healthy future.

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LESSONS OF THE DAY

What's in a Label?©

Grade Level

Middle and High School

Lesson Objectives

The objectives of this lesson are:

1. to learn about types of information contained on products labels;
2. to convey that label information is obtained through toxicology research;
3. to clarify the concept of "cruelty-free;" and
4. to use cross-curricular skills to understand product labeling.

Materials Needed

See *What's in a Label?©* lesson plan attached (PC format, MS Word file).

Lesson Activities

See *What's in a Label?©* lesson plan attached (PC format, MS Word file).

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MSMR ANNOUNCEMENTS

The MSMR offers a full-range of programs and materials to classroom educators on topics in biomedical science, biotechnology, and the use of animals in research and testing. Most of the MSMR's outreach programs and materials are available free of charge to K-12 educators throughout the Northeast (New England and New York). To request a copy of the MSMR's catalogue of programs and materials, send an e-mail request to Leslie Nader, Ph.D., *Vice President for Education*, at lnader@concentric.net.

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OPEN FORUM

Henry J. Esber, Ph.D., a toxicologist at Charles River Discovery & Development Services in Worcester MA, writes:

*I thoroughly enjoy receiving and reading the Toxicology issues [of **Breakfast for the Brain**®]. I truly appreciate your effort.*

Contribute! Send comments, questions, interesting Web sites, lesson plans, quotes, trivia, or articles that you would like to share with other educators to Leslie Nader, Ph.D., *Editor*, **Breakfast for the Brain**®, at lnader@concentric.net. Subscriber feedback will be included through the **Open Forum** section of **Breakfast for the Brain**®, as well as guest articles, and other venues.

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To subscribe to **Breakfast for the Brain**®, send an e-mail request to Leslie Nader, Ph.D., *Vice President for Education*, Massachusetts Society for Medical Research, Inc. at lnader@concentric.net. We heartily welcome new subscribers and ask you to forward this message to any colleagues who might be interested. For paying subscribers, payment must be received prior to commencement of subscriptions.

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Keep your eye out for the next issue of **Breakfast for the Brain**®, Volume 1 – **Toxicology**, in which we'll look at careers in toxicology.

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