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Welcome to our newsletter specific to radiation, laser safety and X-Rays. Each bi-monthly newsletter will cover educational topics to assist lab personnel and students that work with radioactive isotopes or use lasers within the lab.

Radiation,X-Rays,and Laser Safety Focus

In the News

Have the Chernobyl Animals Developed Superpowers?

The site of the Chernobyl nuclear disaster is a radioactive wasteland. But somehow, stray dogs have managed to survive there for years, and now scientists know why. An estimated 900 stray dogs live in the area, and many of them are likely the descendants of pets left behind following the mass evacuation of Chernobyl residents. Dogs living near the site of the Chernobyl nuclear disaster have mutated to develop a new superpower - they are immune to radiation, heavy metals and pollution. Scientists collected blood samples from 116 stray dogs living in the Chernobyl Exclusion Zone (CEZ), finding two different populations that were both genetically distinct from other dogs in the surrounding area. This suggests they have adapted to withstand long-term exposure to this toxic environment and would explain why they have continued to thrive in the deserted area. Understanding how the dogs developed their genetic superpower could help better understand the health impacts of living in a highly toxic environment with multiple environmental hazards, not just in dogs but also in humans.

Following the tragic event, humans were evacuated from Chernobyl and the surrounding areas to avoid the extreme levels of radiation. Their absence allowed wildlife to flourish and thrive in the CEZ, which contains 11.28 millirem of radiation – six times the allowed exposure amount for human workers.

But dogs are not the only CEZ animals found to have developed genetic superpowers. There is evidence that suggests mutant

wolves living in this toxic habitat are uniquely resilient to cancer-causing radiation exposure. Studying these animals will help scientists understand the genetic effects of prolonged exposures to both radiation and non-radiation toxic exposures.

Is γ-radiation the cause of Lightning?

Physicists have discovered a new form of γ-ray radiation that emerges from tropical thunderstorms — and shown that such invisible bursts of energy are more common on Earth than previously thought.

More energetic than X-rays, γ-radiation is found around black holes, and other extreme cosmic environments. It is also seen on Earth, and its origins could help to explain what initiates lightning. The trigger for lightning has remained a mystery for centuries because observations struggle to find electric fields strong enough to initiate it.

Scientists had previously documented two kinds of γ-ray phenomenon in storms — seconds-long glows and higher-intensity bursts known as terrestrial γ-ray flashes (TGFs), which last just millionths of a second. The mechanisms behind either are not well understood, nor is their relationship. Lightning strikes happened after most glows and flickering flashes, and at the same time as TGFs.

This newly observed radiation could be key to understanding how γ-rays come about on Earth. Scientists have known since the 1980s that storms can emit γ-rays. It happens when electric fields of around 100 million volts develop inside churning clouds, creating a natural particle accelerator. When cascades of electrons, zooming at close to light speed, collide with air molecules, they release γ-ray radiation. But where so many of these electrons come from remains uncertain.

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Know your Inventory!

A hospital in Connecticut was recently fined by the NRC for accidentally disposing of a vial of lutetium-177 which is used for targeted nuclear medicine therapy for certain tumors and prostate cancer. The vial was detected when radiation alarms went off at a lead disposal facility. The vial was located within the lead pig. In addition to the vial, several empty lead pigs with external lutetium-177 contamination were also found. The NRC cited the hospital for two violations: The first was failure to appropriately dispose of NRC licensed materials and the second was a failure to adequately monitor the materials prior to disposal. In total the violations cost the hospital $9,000 for the error.

New Regulations Regarding Methylene chloride

As a result of a recent Environmental Protection Agency regulation, there is a complete ban on using methylene chloride in non-laboratory settings, particularly in products like paint strippers, adhesives, degreasers and paints. Methylene chloride use is still permitted in lab settings under new stringent guidelines to ensure safety.
Case Western Reserve University non-laboratory teams must dispose of methylene chloride through the university's Department of Environmental Health and Safety (EHS) hazardous waste disposal system. Lab personnel wishing to continue using methylene chloride under new guidelines should visit the department's webpage for further details.

Got E-Waste?

The Environmental Health and Safety office is charged with ensuring that all labs and work areas are safe for staff and visitors. Sometimes, the accumulation of non-functioning equipment in small lab spaces creates challenges to the workers. If you have any E-waste or old equipment that can be recycled, please contact Jeff Neistadt at jxn393@case.edu with the following information so we can start the process of getting the equipment properly disposed of or recycled. Please include a description of the E-waste, quantity, location, and if possible, any pictures of the item(s).

Training Needs?

Are you caught up on your mandatory EHS training? Environmental Health and Safety (EHS) offers several courses for training the Case Western Reserve community in safe practices. Pre-registration is required for all training (in person or zoom) and class sizes may be limited. Training includes:

- Biosafety
- Driver Safety
- Formaldehyde
- Hazard Communication
- Hazardous Materials Shipment
- Laboratory Safety
- Laser Safety
- Radiation Safety
- Respiratory Protection
- Ultraviolet Safety
- X-Ray Safety

Go to case.edu/ehs/training for more information.