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## Radiation Detector Testing & Evaluation Facility



At RADTEC, radiation detectors sense the radioactive source carried within this panel truck.

- RADTEC, or Brookhaven National Laboratory's Radiation Detector Testing and Evaluation Facility, is where off-the-shelf homeland-security technology developed by the government or industry is assembled, operated, tested, and compared.
- RADTEC defines the strengths and weaknesses of different types of detectors and compares their performance and ease of use.
- RADTEC's findings can be used to develop the most comprehensive protection system using detectors in and around the New York metropolitan area.
- After testing is over, the detectors are set up for field trials at facilities in New York and New Jersey, such as the toll plazas of bridges and tunnels, shipping yards, and airport freight hangars.

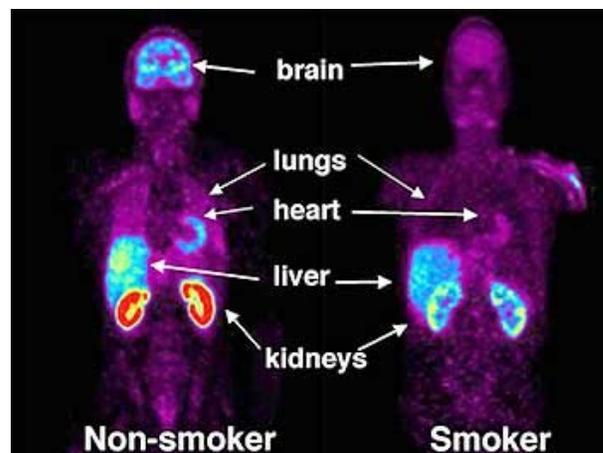
## Brookhaven Researchers Explore the Arctic Ocean

- Brookhaven is taking part in an effort paid for by the National Science Foundation, the Navy, and the Coast Guard to explore the seas to the west and north of Alaska and north of the Bering Strait.
- They are trying to understand how the movement, exchange, and mixing between water masses interacts with the supply of food (nutrients) and seasonal changes in ice cover and solar insulation to support the area's abundant biological communities.
- A wide variety of mammals and birds travel thousands of miles each year to take advantage of the bounty produced during a short period of growth. Much of this primary production (the growth of microscopic plants) is not consumed by animals in the water, even though it is very intense, but rather, sinks to the bottom where it supports a substantial benthic community.
- The project is seeking to know how the system works and how it might be affected by climate changes, such as the amount and extent of ice cover.
- Visit <http://bnlpo.das.bnl.gov/SBI/> for information on the project specifics.

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## Smoking Damages the Kidneys, Heart, and Spleen

- It is well known that smoking harms the lungs and heart, but researchers at the Laboratory, using Positron Emission Tomography (PET) scans, showed that it also affects the kidneys and spleen.
- Smoking causes injuries throughout the body by lowering the levels of an enzyme called monoamine oxidase B, or MAO-B that is important to physical- and mental-health.
- This marked reduction in a major body enzyme at sites far removed from the lungs alerts us to the fact that smoking, which is highly addictive, exposes the whole body to the thousands of chemicals in tobacco smoke. With such widespread exposure, we need to be aware that all these compounds may contribute to the detrimental effects of smoking.



Whole body PET scans showing the distribution of radiolabeled MAO-B. Red is the highest radiotracer concentrations; purple is the lowest. Images are scaled so that they can be compared directly.

## Roderick MacKinnon Awarded 2003 Nobel Prize in Chemistry

- Roderick MacKinnon, M.D., a frequent and welcome visitor to the National Synchrotron Light Source (NSLS) at Brookhaven National Laboratory shared this year's Nobel Prize in Chemistry with Dr. Peter Agre (Johns Hopkins University) for their innovative work explaining how a class of proteins helps to generate nerve impulses – the electrical activity that underlies all movement, breathing, sensation, and probably even thought.
- These proteins, called ion channels, are tiny pores on the surface of nerve cells that rapidly open and close in a millisecond cascade to allow the passage in and out of molecules like potassium, calcium, sodium, and chloride. This burst of activity moves electrical impulses from the brain to nerve endings throughout the body.
- The far-reaching research leading to the prize was done primarily at the Cornell High Energy Synchrotron Source and the NSLS. Interestingly, these protein channels are very similar in many animals, from primitive organisms living in thermal vents, to scorpions and tarantula, to humans. Nature seems to have hit upon an efficient way to transmit nerve impulses, and has retained it throughout evolution.
- Congratulations Dr. MacKinnon!