Zinc may treat box jellyfish stings
Creature’s lethal venom strikes red blood cells, study finds

By Nathan Seppa

A zinc compound sometimes taken to treat the common cold might have a second career as emergency treatment for anyone unlucky enough to get stung by an Australian box jellyfish.

Box jellyfish (Chironex fleckeri), which roam the seas off northern Australia, deliver some of nature’s most potent venom. Researchers have proposed that the venom attacks heart muscle cells, which would explain why sting victims sometimes suffer cardiac arrest. But in a study published online December 12 in PLOS ONE, Angel Yanagihara and Ralph Shohet of the University of Hawaii report that pores form in red blood cells exposed to the box jellyfish’s venom.

“These are structurally sound rings of pores that are catastrophic for cells,” says Yanagihara, a biochemist. Her lab experiments showed that red blood cells formed the pores within 20 minutes of exposure to the venom, triggering potassium discharge. That, she suggests, alters the delicate balance of electrolytes that govern the electrical signals that keep the heart beating. Too much potassium in the blood is fatal.

Mice given the venom had aberrant heartbeats within 90 seconds, and their hearts showed steadily deteriorating ability to contract afterward. That is consistent with potassium poisoning. But when the scientists treated eight mice with zinc gluconate after exposure to the venom, four survived more than 12 hours. Untreated mice exposed to the venom died within an average of 19 minutes. Mice receiving a standard box jellyfish antivenin died as fast as those getting no medication.

The zinc compound blocks assembly of the pores, stanching potassium discharge, tests in red blood cells show.

The findings offer a “plausible explanation” for the rapid death sometimes seen after box jellyfish stings, says Kenneth Winkel of the University of Melbourne in Australia.

9/11 dust tied to some cancers
Workers have higher rates of three kinds of malignancies

By Nathan Seppa

Rescue and recovery workers exposed to airborne debris from the 2001 attack on the World Trade Center in New York City are, overall, no more likely to develop cancer than unexposed people are, a new analysis of medical data shows. But a closer look at the records finds that three malignancies stand as exceptions: cancers of the thyroid and prostate and a blood cancer called multiple myeloma.

Meanwhile, bystanders and other people exposed to the dust have so far experienced no increased risk for any of 23 cancers, researchers report in the Dec. 19 Journal of the American Medical Association. The study was based on data from a registry that includes 55,000 New York residents exposed to the dust from the twin towers’ fall.

Why three cancers showed up in workers and the other 20 didn’t is unclear, says coauthor Steven Stellman, an epidemiologist at the New York City Department of Health and Mental Hygiene and Columbia University. But any cancer increase raises the concern that exposures during the rescue and months-long cleanup operation may pose future risks.

“For most cancers, the latency period is quite long,” he says. “And this is very early in the process.”

People who worked amid the dust include first responders, cleanup crews and barge and landfill workers who removed the rubble. By 2007 and 2008, these people showed a slightly increased risk for prostate cancer, a doubled risk of thyroid cancer and a nearly tripled risk of multiple myeloma when compared with the incidence rates in the general population of New York State.

The registry receives federal funding and is supported by the National Institute of Occupational Safety and Health. “We’re encouraged to see new research and peer-reviewed studies” on the 9/11 rescue and recovery workers, says Fred Blosser, associate director for communications at NIOSH in Washington, D.C.

“This kind of information is extremely useful for us in administering the health-monitoring and treatment programs.”

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