

New findings on combined radiation injury from nuclear disaster

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A nuclear bomb or nuclear reactor accident can produce a deadly combination of radiation exposure and injuries such as burns and trauma.

Now the first study of its kind in 50 years is providing new insights into this phenomenon, called combined radiation injury (CRI).

Researchers at Loyola University Chicago Stritch School of Medicine have shown how CRI causes the intestines to leak bacteria into surrounding tissue. The study also showed that radiation and burns have a synergistic effect that make them far more deadly when they act in combination.

The study is published in the October, 2013 issue of the journal *Shock*.

Findings could lead to new treatments for victims, as well as pretreatments for first responders, said senior author Elizabeth Kovacs, PhD. First author is Stewart Carter, MD.

"The use of [nuclear technology](#) and the potential for its implementation in warfare and terrorism highlight the importance of this study. . . ." researchers concluded. "Insight into the effects of combined radiation injury on the gut will help direct management of survivors of nuclear disaster."

Normally, cells that line the lumen of the intestine prevent bacteria and

bacterial products from leaking out. The cells are held together by "tight junctions." Radiation can damage and kill these cells, and a burn injury can trigger an inflammatory response that breaks down tight junctions. This effectively opens up the protective lining, allowing bacterial products to leak out of the intestine. Such leaks can cause death by sepsis.

In the study, researchers found that combined radiation and thermal injury triggered 100 times greater leakage of bacteria across the intestinal lining than the leakage seen in control groups exposed to [radiation](#) alone, burn alone or no injury at all.

"To our knowledge, we are the first to present gastrointestinal findings of this nature in any CRI model, with the exception of early studies on CRI in the 1960s," researchers wrote.

Kovacs added: "We hope we never will have to respond to a [nuclear disaster](#). But if such a disaster were to occur, our findings could be part of our preparedness."

Provided by Loyola University Health System

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