

Manipulation of molecule protects intestinal cells from radiation

June 4 2008

A new study identifies a signaling molecule that plays a major role in radiation-induced intestinal damage. The research, published by Cell Press in the June issue of the journal *Cell Stem Cell*, may lead to new strategies for protecting normal tissues from radiation during cancer therapies.

Although radiation is one of the most effective treatments for cancer, damage to the cells that line the gastrointestinal tract is a major limiting factor for patients undergoing pelvic or abdominal radiotherapy. The specific mechanisms that underlie radiation-induced gastrointestinal toxicity, known as gastrointestinal (GI) syndrome, are not well understood. Previous studies have suggested that damage to intestinal stem cells and/or damage to intestinal blood vessel cells, called endothelial cells, are involved in the pathogenesis of GI syndrome.

The group led by Drs. Jian Yu and Lin Zhang from the University of Pittsburgh Cancer Institute and School of Medicine found that the protein “p53 upregulated modulator of apoptosis” (PUMA) plays a key role in the radiation-induced damage of intestinal cells. PUMA is an established player in the apoptosis pathway, a process by which cells undergo a type of programmed self-destruction.

Dr. Yu and colleagues found that mice with a deficiency of PUMA exhibited impaired apoptosis in intestinal stem and progenitor cells, and enhanced intestinal regeneration following injury. The mutant mice thus retained better intestinal integrity and survived longer following lethal

doses of radiation. Although endothelial cells displayed a rapid induction of PUMA upon exposure to radiation, deletion of the protein did not alter apoptosis in these specific cells.

These results provide a mechanistic explanation of intestinal radiosensitivity and suggest that apoptosis of epithelial cells, and not endothelial cells, is the primary event that underlies the rapid onset of GI syndrome. “We were really excited to learn that deficiency in a single gene significantly protects against GI syndrome,” explains Dr. Yu. “Selectively curbing radiosensitivity in the normal tissues transiently by PUMA inhibitors might be particularly beneficial in cancer therapy.”

Source: Cell Press

Citation: Manipulation of molecule protects intestinal cells from radiation (2008, June 4)
retrieved 3 May 2024 from <https://phys.org/news/2008-06-molecule-intestinal-cells.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.