

# Stem-cell-protecting drug could prevent the harmful side effects of radiation therapy

September 6 2012

---

Radiation therapy is one of the most widely used cancer treatments, but it often damages normal tissue and can lead to debilitating conditions. A class of drugs known as mammalian target of rapamycin (mTOR) inhibitors can prevent radiation-induced tissue damage in mice by protecting normal stem cells that are crucial for tissue repair, according to a preclinical study published by Cell Press in the September issue of the journal *Cell Stem Cell*.

"We can exploit the emerging findings for the development of new preventive strategies and more effective treatment options for patients suffering this devastating disease," says senior study author J. Silvio Gutkind of the National Institute of Dental and Craniofacial Research.

In response to [radiation therapy](#), cancer patients often develop a painful condition called mucositis—tissue swelling in the mouth that can leave these patients unable to eat or drink and force them to rely on opioid-strength [pain killers](#). Radiation therapy may cause this debilitating condition by depleting normal stem cells capable of repairing damaged tissue.

In the new study, Gutkind and his team found that the mTOR inhibitor rapamycin protects stem cells taken from the mouths of healthy individuals (but not [cancer cells](#)) from radiation-induced death and DNA damage, dramatically extending the lifespan of these normal stem cells and allowing them to grow. Rapamycin exerted these protective effects by preventing the accumulation of harmful molecules called reactive

[oxygen species](#). Moreover, mice that received rapamycin during [radiation treatment](#) did not develop mucositis.

Because rapamycin is approved by the [Food and Drug Administration](#) and is currently being tested in clinical trials for the prevention and treatment of various types of cancer, the new findings could have immediate and important implications for a large proportion of cancer patients. "Mucositis prevention would have a remarkable impact on the quality of life and recovery of cancer patients and at the same time would reduce the cost of treatment," Gutkind says. "Our study provides the basis for further testing in humans, and we hope that these findings can be translated rapidly into the clinic."

**More information:** Iglesias-Bartolome et al.: "mTOR inhibition prevents epithelial stem cell senescence and protects from radiation-induced mucositis." [DOI:10.1016/j.stem.2012.06.007](https://doi.org/10.1016/j.stem.2012.06.007)

Finkel et al.: "Relief with Rapamycin: mTOR Inhibition Protects against Radiation-Induced Mucositis"(In Translation Article)

Provided by Cell Press

Citation: Stem-cell-protecting drug could prevent the harmful side effects of radiation therapy (2012, September 6) retrieved 9 May 2024 from <https://medicalxpress.com/news/2012-09-stem-cell-protecting-drug-side-effects-therapy.html>

<p>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.</p>
--