Nature Reviews Clinical Oncology **11**, 121 (2014); published online 28 January 2014; doi:10.1038/nrclinonc.2014.7

RADIOTHERAPY

DNA repair—a marker of late toxicity

Radiotherapy is an effective treatment for many patients, but some of them experience significant radiation toxicity, which limits the dose that they can receive. Thus, it is important to identify patients with enhanced susceptibility for developing radiation toxicity. Previous work in prostate cancer patients indicated that genetic factors could be important for radiation toxicity. As a large number of patients with prostate cancer are irradiated, the distribution of clinical risk factors is relatively homogenous, and treatment can produce many long-term survivors, this approach is suitable in this patient group.

Now, the researchers have investigated the differences in radiation responses in patients with prostate cancer using gene-expression profiling and γ-H2AX foci assay, which is a marker of DNA damage. "The decay of γ-H2AX foci was significantly higher in non-responding (NR) radioresistant patients compared with over-responding (OR), radiosensitive patients, indicating more-efficient DNA double-strand-break repair in patients that eventually do not develop late toxicity," explains van Oorschot. Using gene-expression profiling the researchers showed that the genes involved in DNA repair were more strongly induced in NR patients compared with OR patients.

van Oorschot and colleagues "have started a prospective study in 200 patients with newly diagnosed prostate cancer to validate our findings." They hope this test will allow better decision making on radiation treatment dosing.

Lisa Hutchinson

Original article van Oorschot, B. *et al.* Reduced activity of double-strand break repair genes in prostate cancer patients with late normal tissue radiation toxicity. *Int. J. Radiat. Oncol. Biol. Phys.* doi:10.1016/j.ijrobp.2013.11.219