

Multi-tasking imatinib boosts radiotherapy for bladder tumours

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Cancer drug imatinib (Glivec) could boost radiotherapy treatment to destroy bladder cancer that has spread to the bladder wall, reveals research published in *Cancer Research*.

Researchers at the Universities of Leeds and Oxford, co-funded by Cancer Research UK and Yorkshire Cancer Research, showed that adding imatinib to bladder cancer cells blocks an important DNA damage repair route. This makes cancer cells more responsive to radiotherapy – by preventing them from repairing [radiation damage](#) – while sparing healthy cells which have alternative survival routes.

Imatinib is a [tyrosine kinase inhibitor](#) used to treat some leukaemias and

soft tissue sarcomas.

The team showed that the drug prevents a protein called RAD51 from repairing DNA damage in bladder cancer via a process called homologous recombination. A separate key [DNA repair](#) process is faulty in aggressive bladder cancer cells, but not in healthy cells. This means that both repair processes are knocked out in cancer cells but healthy cells still have one route to repair damage, avoiding radiotherapy harm.

The research suggests that imatinib could make radiotherapy better at killing aggressive bladder cancer cells with fewer side effects.

Study author Dr Anne Kiltie, Cancer Research UK scientist at the University of Oxford**, said: "These exciting results show that imatinib which is used to treat a range of [cancer types](#) may have untapped potential to treat more.

"We've found that bladder [cancer cells](#) have a weak spot that [imatinib](#) can zero in on and exploit - to enhance radiotherapy treatment.

"This is early research in the laboratory so the next stage is to confirm these results in larger studies, with the hope of speeding up the development of better ways to treat bladder cancer – increasing survival with fewer side effects."

More than 10,500 people are diagnosed with bladder cancer each year in the UK with about 4,900 annual deaths from the disease.

Kathryn Scott, head of research funding at Yorkshire Cancer Research, said: "Without early stage research, treatments for bladder cancer could not be improved in this way to enhance the effectiveness of radiotherapy and give more patients hope of a cure. By understanding the molecular mechanisms behind the disease, scientists and clinicians are beginning to

understand how to combine drugs in new and innovative ways and maximise their tumour killing potential. This is an exciting discovery and we look forward to seeing how it progresses."

Dr Julie Sharp, Cancer Research UK's senior science information manager, said: "This important work adds another piece in the puzzle to help our understanding of bladder cancer.

"There's a real need for new ways to treat and diagnose the disease. At diagnosis around three in 10 bladder cancers have already spread into the muscle layer of the bladder – when the disease is harder to treat successfully.

"And survival from advanced disease is still poor – around half of these patients will survive for longer than three years following diagnosis.

"Radiotherapy is a vital part of cancer treatment and we hope these latest findings can be used to make it more effective for treating [bladder cancer](#) and save more lives."

More information: Qiao, B., Kerr, M., Groselj, B., Teo, M., Knowles, M., Bristow, R., Phillips, R., & Kiltie, A. (2013). Imatinib Radiosensitizes Bladder Cancer by Targeting Homologous Recombination, *Cancer Research*. [DOI: 10.1158/0008-5472.CAN-12-1170](https://doi.org/10.1158/0008-5472.CAN-12-1170)

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