

Diabetes drug metformin with chemo and radiation may improve outcomes in lung cancer patients

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Treating aggressive lung cancer with the diabetes drug metformin along with radiation and chemotherapy may slow tumor growth and recurrence, suggests new preliminary findings from researchers at the Perelman School of Medicine at the University of Pennsylvania being presented during an oral abstract session October 28 at the 15th World Conference on Lung Cancer.

The preclinical and clinical results, which have set the stage for a first-of-its-kind prospective study, point to [metformin](#) as an effective radiosensitizer—a drug that makes tumor cells more sensitive to [radiation therapy](#)—to treat stage III non-small cell [lung cancer](#) (NSCLC). Because of poor local response and five-year survival rates around 15 percent in late-stage NSCLC patients, well-tolerated, combination therapies are greatly needed.

The abstract is being presented by Ildiko Csiki, MD, PhD, an assistant professor of Radiation Oncology at Penn's Abramson Cancer Center.

Metformin, the most-widely used drug for type-2 diabetes, has been shown to have anti-cancer effects on a number of cancers, including prostate and colon. It activates AMP-related pathways, leading to inactivation of mTOR and suppression of its downstream effectors, a crucial signaling pathway for proliferation and survival of cancer. However, little data exists to support its role in NSCLC. And its role as a

radiosensitizer in lung cancer is even less understood.

For this study, clinical evidence from 16 diabetic patients treated at the Hospital of the University of Pennsylvania between June 2008 and June 2013 with stage III A and B NSCLC and diabetes demonstrated that chemoradiation therapy in combination with metformin dramatically improved local recurrence. With a median follow-up time of 10.4 months, only two local recurrences have occurred.

Researchers also observed a survival benefit with the combination.

"Our clinical experience demonstrates patients receiving definitive chemoradiation for stage III NSCLC who took metformin for diabetes had improved local control and overall survival compared with our patients not taking metformin and compared with historical controls," said Dr. Csiki.

On the preclinical side, Penn researchers developed a mouse model of lung cancer to evaluate the [tumor growth](#) delay after using metformin as a radiosensitizing agent. They tracked tumor size in mice injected with metformin undergoing radiation and chemotherapy. Tumor measurements were taken every other day and tumor growth delay was plotted.

Early data from those experiments supports the use of metformin as a radiosensitizing agent, said Dr. Csiki.

"Such findings, along with our clinical retrospective data, will lead to institutional prospective clinical trials, for the first-time, using metformin as a radiosensitizing agent in combination with [radiation](#) therapy and chemotherapy in the treatment of lung and potentially other cancers," the authors write.

More information: This study is one of a 13 Penn Medicine studies and talks being presented at the International Association for the Study of Lung Cancer's 15th World Conference on Lung Cancer.

Provided by University of Pennsylvania School of Medicine

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