

Inhalation therapy for lung cancer shows promise in study

June 10 2013, by Robin Lally



Animal studies indicate that delivering chemotherapy through inhalation kills more cancer cells than traditional intravenous chemotherapy. The next step: clinical trials in humans.

(Medical Xpress)—Lung cancer kills about 1.5 million men and women around the world – more than the number of people who die from breast, colon, pancreatic and prostate cancers combined.

This happens, in part, because many patients with lung cancer are not diagnosed until they are in the advanced or metastatic stage of the disease and treatment options are limited mainly to surgery and conventional intravenous chemotherapy.

A new [drug delivery system](#), developed by researchers at Rutgers University, which allows inhalation of [chemotherapeutic drugs](#) that more accurately targets specific [cancer cells](#) in the lungs, could change this.

In animal studies performed at Rutgers and Oregon State University, it appears that this inhalation therapy reduces systemic damage done to healthy [lung cells](#) and other organs while significantly improving the treatment of [lung tumors](#).

"The development of additional more effective and safe approaches to treatment of this disease is vitally important," says Tamara Minko, professor and chair of the Department of Pharmaceutics at Rutgers and a member of the Cancer Institute of New Jersey, who has been leading a team of researchers on the project since 2006. "Up until now, limited clinical efficiency and significant toxicity have represented two critical barriers restricting progress in the therapy of advanced lung cancer."

Minko says that with conventional [chemotherapy treatment](#) for lung cancer, the drugs tend to accumulate in the liver, kidney and spleen – with less making it to the lungs. But in this study, 83 percent of the drugs delivered via inhalation therapy, as compared to 23 percent with the intravenous injection, were delivered directly to the lungs and predominantly accumulated in [tumor cells](#).

Researcher, Olga Garbuzenko and graduate students Andriy Kuzmov and Milin Shah, who worked with Minko and Oleh Taratula from Oregon State University, were able to enhance the efficacy of lung cancer treatment by using a combination of tiny nanoparticles of existing cancer drugs – smaller than a speck of dust—and small interfering molecules that shut down the ability of the cancer cells to resist attack. In the most recent four-month animal study, published in the *Journal of Controlled Release*, the lung tumors of mice treated with inhalation therapy virtually disappeared.

The next step, says Minko, would be to conduct clinical trials to determine whether the same positive effects would occur in humans. Currently, those being treated for lung cancer must deal with severe toxic side effects of conventional chemotherapy. Minko says developed nanoparticle-based lung cancer inhalation therapy would enable those being treated to use the same type of inhaler prescribed to people suffering with asthma.

"The proposed novel treatment much more effectively killed resistant cancer cells when compared with conventional anti-cancer drugs and showed superior efficiency over the traditional chemotherapy," Minko says.

Provided by Rutgers University

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