Potential lung cancer vaccine shows renewed promise

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Researchers at UC Davis have found that the investigational cancer vaccine tecemotide, when administered with the chemotherapeutic cisplatin, boosted immune response and reduced the number of tumors in mice with lung cancer. The study also found that radiation treatments did not significantly impair the immune response. The paper was published on March 10 in the journal *Cancer Immunology Research*, an American Association for Cancer Research (AACR) publication.

Though tecemotide, also known as Stimuvax, has shown great potential at times, the recent Phase III trial found no overall survival benefit for patients with non-small cell lung cancer (NSCLC). However, further analysis showed one group of patients, who received concurrent chemotherapy and radiation followed by tecemotide, did benefit from the vaccine. As a result, tecemotide's manufacturer, Merck KGaA, is sponsoring additional post-clinical animal and human studies, so far with good results.

"There aren't any good options for patients with inoperable stage III lung cancer following mainline chemotherapies," said UC Davis Professor of Medicine and lead author Michael DeGregorio. "We are looking at tecemotide as a potential maintenance therapy to prolong survival and improve quality of life."

Tecemotide activates an immune response by targeting the protein MUC1, which is often overexpressed in lung, breast, prostate and other cancers. The vaccine stimulates production of interferon gamma and MUC1-targeted killer T-lymphocytes, which seek out and destroy MUC1 cancer cells.

The team, which included investigators from the UC Davis School of Veterinary Medicine and the Department of Radiation Oncology, wanted to know if cisplatin/tecemotide treatments, along with radiation therapy, could boost the immune response and alter lung cancer's trajectory, stabilizing the disease.

The study produced a number of positive results. Tecemotide increased interferon gamma levels and boosted the T-cell response to MUC1-expressing cancer cells. When administered by themselves, both tecemotide and cisplatin reduced the number of lung tumors. However, combining these therapies enhanced their impact, suggesting that tecemotide may increase cisplatin's anticancer activity.

Though radiation therapy did reduce the number of lymphocytes, it did not appear to hamper the immune response. In addition, interferon levels actually increased several hours after radiation treatments.

"Radiation may actually be helpful by exposing targets for the vaccine," said DeGregorio.

While this study revives hope for tecemotide as a potential NSCLC therapy, there are still questions to be answered. Researchers need to further refine these therapies to determine which protocols provide the best survival benefits. In addition, tecemotide can only be effective if it does not exhaust the immune system in the process. Still, the research provides a ray of hope for patients with few options.

"We believe this vaccine could be coupled with standard treatments to create a maintenance therapy," said DeGregorio. "If we can help patients with a life expectancy of 18 to 20 months increase that to 30 months or more, with a high quality of life, that's a big benefit."

Provided by UC Davis