Promising candidate protein for cancer prevention vaccines found

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Researchers at the University of Pittsburgh School of Medicine have learned that some healthy people naturally developed an immune response against a protein that is made in excess levels in many cancers, including breast, lung, and head and neck cancers. The finding suggests that a vaccine against the protein might prevent malignancies in high-risk individuals.

Mice that were vaccinated to boost their immune response against this cell cycle protein, called cyclin B1, were able to reject a tumor challenge in which they were exposed to a cancer cell line that overproduced it, explained senior author Olivera Finn, Ph.D., Distinguished Professor and chair of the Department of Immunology at the Pitt School of Medicine. The results are reported this week in the online version of the Proceedings of the National Academy of Sciences.

"Cyclin B1 is known to be produced in excess amounts in several kinds of cancer," she said. "While we were studying it, we noted that many healthy people already had an immune response, or antibodies, against the protein, even though they'd never had cancer."

According to the researchers, the immune response most likely developed during a childhood viral infection, when inflammatory responses are strong. Cells infected with chicken pox virus, for example, look very much like tumor cells because they, too, overproduce cyclin B1. The virus actually packages the host protein, which ultimately gets shown to the immune system as a marker of infected cells that must be

destroyed.

"Because cyclin B1 is a 'self' protein, there have been concerns that boosting the immune response against it would produce autoimmunity and create new problems," Dr. Finn said. "But now that we know that perhaps 20 to 30 percent of people already recognize it as abnormal when made in excess, we can be more confident about the safety of a vaccine strategy to immunize high-risk groups against it."

She is working with collaborators to open, by the end of the year, a clinical trial of a cyclin B1 treatment vaccine in lung cancer patients, and she plans to assess it in the future as a prevention strategy in patients with pre-malignant lung lesions.

Natural immunity to other tumor-specific proteins has been found before, Dr. Finn noted. Her team developed a vaccine to boost response against MUC1, a protein that is abnormally produced in colon cancer and in precancerous polyps. The MUC1 colon cancer prevention vaccine is being tested in a clinical trial led by colleagues at UPMC.

"In previous work, we found that women who developed an immune response to MUC1, typically after pelvic surgery, mumps or mastitis, have a much lower risk for ovarian cancer," Dr. Finn said. "Cyclin B1 and MUC1 are part of a big family of self-proteins that become over-produced during cancer development, so they have great potential as targets in prevention vaccines."

Source: University of Pittsburgh Schools of the Health Sciences (news : web)

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