Mechanisms involved with tumor relapse identified

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Researchers at Virginia Commonwealth University's Massey Cancer Center studying the interaction between the immune system and cancer cells have identified interferon gamma as one of the signaling proteins involved with tumor relapse.

The findings may help researchers develop tailored vaccines and other immunotherapeutic strategies to fight a number of cancers. Immunotherapy involves the manipulation of the immune system – by introducing an antibody or lymphocytes, or immunization with a tumor vaccine – to recognize and eradicate tumor cells.

Using a transgenic mouse model of breast cancer, researchers found that interferon gamma, a cytokine or chemical messenger that is produced by cells of the immune system upon activation, plays a role in tumor relapse. In humans, interferon gamma is also produced by white blood cells of the immune system in response to invasion by pathogens or tumors in order to protect the host against infection or cancers. Production of interferon gamma by lymphocytes against tumors is considered a sign of good prognosis; however, recent study findings indicate that this may not be the case. The findings were reported in the March 2007 issue of the European Journal of Immunology, the official journal of the European Federation of Immunological Societies.

"By understanding the molecular mechanisms involved with tumor relapse, we can create tailored vaccines that can induce specific types of immune responses in patients, rather than inducing a broad range of

immune responses - some of which may be detrimental or may induce tumor relapse," said lead investigator, Masoud H. Manjili, D.V.M., Ph.D., a member scientist with the Massey Cancer Center.

"Ultimately, we hope to offer a new polypeptide vaccine approach that induces tumor killing without causing HER-2/neu loss. Loss of HER-2/neu is a mechanism that tumors utilize to escape the immune-mediated destruction," he said.

Since 2000, Manjili and his colleagues have been employing animal models of breast cancer to evaluate anti-tumor efficacy of a vaccine formulation they created. This vaccine formulation combines a heat shock protein 110 (HSP110), as an adjuvant, with a tumor antigen HER-2/neu, as a protein target expressed in breast tumors. Adjuvants are agents that are able to modify another agent – basically working as a chemical catalyst.

Source: Virginia Commonwealth University