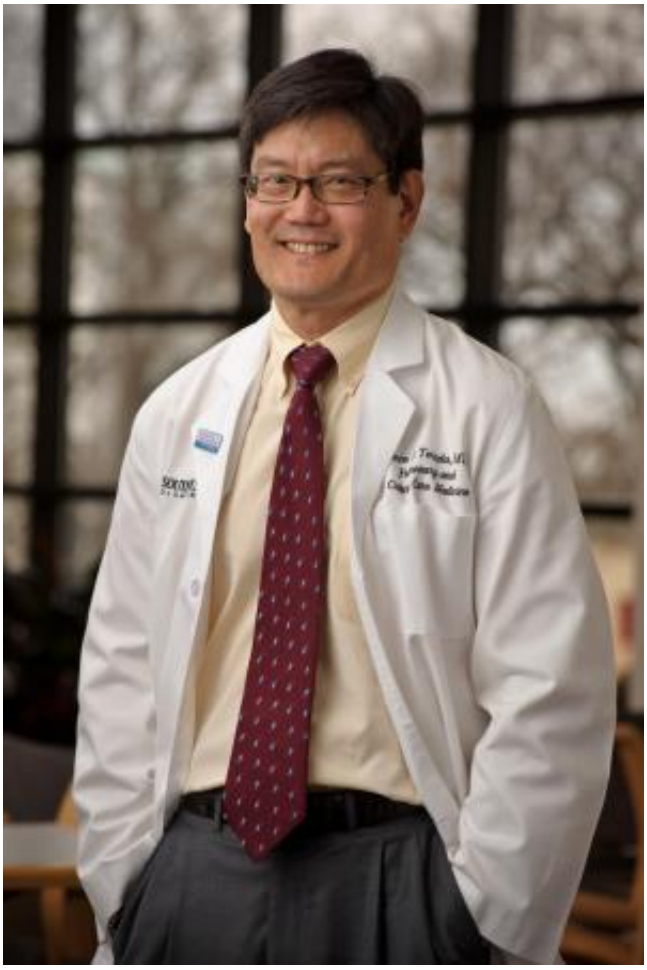
Team highlights new mechanism explaining how cancer cells spread

May 28 2014



This image depicts Dr. Lance Terada, Professor of Internal Medicine and Chief of the Division of Pulmonary/Critical Medicine at UT Southwestern. Credit: UT Southwestern Medical Center

UT Southwestern Medical Center cancer researchers have identified a protein critical to the spread of deadly cancer cells and determined how it works, paving the way for potential use in diagnosis and eventually possible therapeutic drugs to halt or slow the spread of cancer.

The protein, Aiolos, is produced by normal blood cells but commits a kind of "identity theft" of blood cells when expressed by cancer cells, allowing the latter to metastasize, or spread, to other parts of the body. Metastatic cancer cells have the ability to break free from tissue, circulate in the blood stream, and form tumors all over the body, in a way acting like blood cells.

"This is an important discovery because the metastatic spread of tumors accounts for the vast majority of cancer-related deaths. Now that we know the role of Aiolos, we can look toward therapeutic intervention," said Dr. Lance Terada, Professor of Internal Medicine and Chief of the Division of Pulmonary/Critical Medicine at UT Southwestern.

The research, available online and in the journal *Cancer Cell*, found that Aiolos, which frequently is expressed in lung cancers, is a predictor of a markedly worse prognosis in lung cancer patients.

Aiolos is a member of a class of proteins called transcription factors—proteins that control which genes are turned on or off by binding to DNA and other proteins. Once bound to DNA, these proteins can promote or block the enzyme that controls the reading, or "transcription," of genes, making genes more or less active.

Aiolos decreases the production of cell adhesion proteins and disrupts critical cell adhesion processes, including processes that allow tissue cells to anchor to their physical environment, a necessary requirement for cells to survive and spread. Metastatic cells don't need this adhesion, allowing them to proliferate instead. Aiolos also represses another

protein called p66Shc, which otherwise would suppress metastatic ability, which is the ability of the cancer cells to spread.

"Despite their importance, cellular behaviors that are largely responsible for cancer mortality are poorly understood," Dr. Terada said. "Our study reveals a central mechanism by which cancer cells acquire blood cell characteristics to gain metastatic ability and furthers our understanding in this area."

Provided by UT Southwestern Medical Center