Pathway transforms normal cells into aggressive tumors

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A biological pathway that transforms normal cells into aggressive tumors has been discovered by researchers at Cleveland Clinic's Lerner Research Institute.

This research, led by Philip Howe, Ph.D., of the Cancer Biology Department of the Lerner Research Institute of Cleveland Clinic, was recently published in a recent issue of *Molecular Cell*.

This research helps define the cellular events that lead to metastasis. While the study used breast cells, the pathway offers characteristics that are applicable to cancers in general. It is hoped that this improved understanding of cancer development will lead to better diagnostic, preventative, and therapeutic procedures for the disease.

These studies build on those published by the same group last year in Nature Cell Biology, which identified the components of a molecular complex that prevents the processing of genetic material necessary for tumor development – and a protein that reverses this to permit tumor-forming ability.

The current publication further defines this mechanism by showing evidence in a mouse model that tumor progression hinges on the role of a specific molecular factor called "hnRNP E1." Mice lacking hnRNP E1 developed metastatic tumors when challenged with normal, non-invasive breast cells: mice with hnRNP E1 did not.

The genetic material whose expression is regulated by this mechanism is necessary for what is known as the epithelial-mesenchymal transition (EMT). EMT describes how cells that are normally stationary become mobile. This process is essential for embryonic development. Once development is complete, the process is silenced – except when a tumor forms. That is when the "safety" (i.e. hnRNP E1) is removed from the EMT-blocking complex, and the ensuing cell mobility promotes tumor progression.

Since EMT is not necessary in the normal adult, identifying the status of hnRNP E1 may be useful as a diagnostic approach for cancer. Furthermore, a strategy that prevents removing it from the complex may make it possible to specifically target cancerous versus normal tissue.

Provided by Lerner Research Institute