cancer can form long after a primary tumor has been removed. The study, led by investigator Katrina Podsypanina and Memorial Sloan Kettering President Harold Varmus, was published in *Science* in September. [PubMed Abstract]

For many cancers, metastasis to vital organs is the major cause of death. The commonly held belief has been that cancer cells gain the ability to spread when the disease is at a more advanced stage, but this does not explain how metastases can develop months or even years after a tumor has been surgically removed.

The research was made possible using mouse models that mimic the spread of breast cancer to the lungs The mice were genetically engineered to turn on genes that transform mammary cells into cancer when fed the antibiotic doxycycline. Healthy mammary cells were removed from the mice and injected into new recipients via tail veins, which lead directly to the lungs. The recipient mice were given doxycycline in their diets, and after only a few weeks breast tumors had formed in the lungs, even though the donor cells had not been cancerous when they were injected

In another experiment the mice were kept off doxycycline for four months after the mammary cells were

injected into their tails. However, when they were started on the doxycycline diet, tumors formed within two weeks. This showed that noncancerous mammary cells can live in the lung for as long as 17 weeks.

“The major conclusion of our work is that activation of cancer genes is not required for mouse breast cells to colonize other tissues once they gain access to the bloodstream,” said Dr. Podsypanina. “However, we don’t yet understand the conditions under which normal cells can gain access to circulation, or if they can do so at all. And we don’t know whether human breast cells have the same abilities. That’s something we are interested in exploring in the future.”

Memorial Sloan Kettering co-authors on the study were Yi-Chieh Nancy Du, Martin Jechlinger, Levi J. Beverly, and Dolores Hambardzumyan.