

Study links cardiac hormone-related inflammatory pathway with tumor growth

June 28 2013

(Medical Xpress)—A cardiac hormone signaling receptor abundantly expressed both in inflamed tissues and cancers appears to recruit stem cells that form the blood vessels needed to feed tumor growth, reports a new study by scientists at the University of South Florida Nanomedicine Research Center.

The research may lead to the development of new drugs or delivery systems to treat cancer by blocking this receptor, known as natriuretic [peptide receptor](#) A (NPRA).

The findings appeared online recently in the journal *Stem Cells*.

"Our results show that NPRA signaling by [cancer cells](#) produces some molecular factors that attract stem cells, which in turn form blood vessels that provide oxygen and nutrients to the tumor," said the study's principal investigator Subhra Mohapatra, PhD, associate professor in the Department of Molecular Medicine. "We showed that if the NPRA signal is blocked, so is the angiogenesis and, if the tumor's blood supply is cut off it will die."

Using both cultured cells and a mouse model, Dr. Mohapatra and her team modeled interactions to study the association between gene mutations and exposure to an inflammatory tissue microenvironment.

The researchers demonstrated that cardiac hormone NPRA played a key role in the link between inflammation and the development of cancer-

causing tumors. Mice lacking NPRA signaling failed to induce tumors. However, co-implanting tumor cells with [mesenchymal stem cells](#), which can turn into cells lining the inner walls of blood vessels, promoted the sprouting of blood vessels (angiogenesis) needed to promote tumor growth in NPRA-deficient mice, the researchers found. Furthermore, they showed that NRPA signaling appears to regulate key [inflammatory cytokines](#) involved in attracting these stem cells to [tumor cells](#).

Dr. Mohapatra's laboratory is testing an innovative [drug delivery system](#) using special nanoparticles to specifically target cancers cells like a guided missile, while sparing healthy cells. The treatment is intended to deliver a package of molecules that interferes with the cardiac hormone receptor's ability to signal.

More information: [onlinelibrary.wiley.com/doi/10 ...
2/stem.1376/abstract](https://onlinelibrary.wiley.com/doi/10.1002/stem.1376/abstract)

Provided by University of South Florida

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