

Trapping prostate cancer cells to keep them from spreading provides hope

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When prostate cancer stem cells (CSCs) were enclosed in self-assembling nanomaterials made of peptides (SAP), the SAP stopped cancer stem cell colony formation and also stopped the division of cancer cells in laboratory cultures (in vitro). According to the international team of researchers who built and tested the nano-sized traps and published their results in a recent issue of *Cell Transplantation* (20:1), which is freely available on-line, the cancer cells grew and multiplied after they were "liberated" from their SAP prisons.

In their article, the researchers suggested that CSCs may be the origin of prostate tumor metastasis, making them an "ideal target" for inhibiting disease metastasis. The group's previous work in building nanomaterials showed that by using SAPs they were able to control the proliferation, elongation and maturation of cells in vitro.

"In this study, we have shown that prostate CSCs can be placed into stasis for an extended period of time without causing them to differentiate," said study corresponding author Dr. Rutledge Ellis-Behnke of the Heidelberg University-based [Nanomedicine](#) Translational Think Tank. "If cells are prevented from migrating away from the treatment, they could be subjected to additional targeting."

For the researchers, the isolation of cancer cells with stem-like characteristics "provides solid evidence" that CSCs may exist within the tumor. Additionally, CSCs may account for some treatment failures when treatments are unable to successfully target cancer [stem cells](#),

which may be resistant to chemotherapy drugs. Too, CSCs have been found to be more invasive than non-CSCs. The authors speculated that by injecting the material directly into the tumor, it may be possible to stop the spread of metastatic cells.

The research team also suggested that trapping CSCs in the nanomaterial would allow for loading of the SAP with chemotherapy agents, thus offering an increased effectiveness of a localized treatment when targeted cancer cells were unable to 'escape' their chemical enemies. This approach for treating metastatic hormone refractory [prostate cancer](#) (HRPC) - a cancer for which all current therapies fail - may offer hope as a successful treatment.

"The goal of cancer therapy is to reduce the ability of [cancer cells](#) to divide and migrate," said Dr. Ellis-Behnke. "Accordingly, we have shown that SAP can completely inhibit a prostate CSC from self-renewal while preserving its viability and stem cell properties."

Their study concluded that SAP may be "an effective nanomaterial for inhibiting cancer progression and metastasis."

"The ability to sequester cancer stem cells in SAP to prevent the spread of a prostate cancer is a big step toward finding effective treatments for cancer," Shinn-Zong Lin, professor of neurosurgery at China University Medical Hospital, Taiwan and chair of the Pan Pacific Symposium on Stem Cell Research where this work was first presented. "It will be of considerable interest to see how this technology develops."

More information: Ling, P. M. T.; Cheung, S. W. H.; Tay, D. K. C.; Ellis-Behnke, R. G. Using Self-Assembled Nanomaterials to Inhibit the Formation of Metastatic Cancer Stem Cell Colonies In Vitro. *Cell Transplantation* 20(1):127-131; 2011.

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