Nanoparticle blocks key molecule involved in spread of breast cancer

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Ongoing clinical trials have shown that a peptide known as PHSCN can slow or prevent the spread of metastatic breast cancer in over a third of patients treated with the drug. This drug works by binding to an activated receptor found on the surface of breast tumor cells but not normal cells.

Now, investigators at the University of Michigan, led by Donna Livant, have shown that attaching the PHSCN peptide to a spherical polymeric nanoparticle increases the drug's potency by as much as 6,700 fold compared to the free drug in a test designed to measure breast cancer cell invasiveness. The researchers reported their findings in the journal Breast Cancer Research and Treatment.

To improve the promising performance of PHSCN, Dr. Livant and her colleagues attached eight molecules of this peptide to a polymer nanoparticle known as a dendrimer. Tests using cultured breast tumor cells showed that this construct was far more potent at preventing the invasion of those cells into an artificial membrane. Further tests in mice showed that the dendrimer-linked peptide reduced the ability of metastatic breast cancer cells to colonize the lungs of animals receiving this nanoscale construct by 3- to 5-fold compared to when animals received free PHSCN.

This work is detailed in a paper titled, "The PHSCN dendrimer as a more potent inhibitor of human breast cancer cell invasion, extravasation, and lung colony formation." An abstract of this paper is available at the journal's website.

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