

'Fertilizing' bone marrow helps answer why some cancers spread to bones

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Researchers found that administering a common chemotherapy drug before bone tumors took root actually fertilized the bone marrow, enabling cancer cells, once introduced, to seed and grow more easily.

The findings provide valuable insight as to why some cancers metastasize to bone, and could eventually result in new metastasis-prevention drugs, said Laurie McCauley, professor in the Department of Periodontics and Oral Medicine at the University of Michigan School of Dentistry and principal investigator on the study.

The really good news is that researchers reversed the tumor-friendly effect of the drug, called cyclophosphamide, by inhibiting another cell-communicating protein in the bone marrow, called CCL2.

"This work is early and still at the pre-clinical level," said McCauley, who also has an appointment in the Department of Pathology at the U-M Health System. "However, the biggest potential impact is in metastasis preventive strategies.

"If we better understood the specific mediators, or conditions, in the bone marrow that support tumors, we could develop more effective therapeutics to prevent local cancers from spreading and hence reduce metastasis to the bone."

The study highlights the potential for the bone marrow to provide the right environment for tumors to metastasize, said Serk In Park, first

author and a postdoctoral fellow in McCauley's lab. Many cancers, such as prostate and [breast cancer](#), are fond of spreading, or metastasizing, to bones.

Researchers administered the chemotherapy drug cyclophosphamide experimentally to manipulate the environment inside the bone marrow prior to exposing experimental tumors. Cyclophosphamide therapy is used in certain cancers to slow cell growth, and McCauley's group experimented with its use in a pre-metastatic mode using a [prostate cancer](#) model.

While effective at attacking [tumor cells](#), a side effect of cyclophosphamide (and many other [chemotherapy drugs](#)) is that it suppresses certain [bone marrow cells](#) that help the immune system and increases some harmful cells. Researchers hypothesized correctly that the drug would make the bone marrow more tumor-friendly.

More information: The paper, "Cyclophosphamide Creates a Receptive Microenvironment for Prostate Cancer Skeletal Metastasis," appears in the journal *Cancer Research*.

Provided by University of Michigan

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