

Cancer stem cells similar to normal stem cells can thwart anti-cancer agents

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Current cancer therapies often succeed at initially eliminating the bulk of the disease, including all rapidly proliferating cells, but are eventually thwarted because they cannot eliminate a small reservoir of multiple-drug-resistant tumor cells, called cancer stem cells, which ultimately become the source of disease recurrence and eventual metastasis.

Now, research by scientists at the University of Pittsburgh School of Medicine suggests that for chemotherapy to be truly effective in treating lung cancers, for example, it must be able to target a small subset of cancer stem cells, which they have shown share the same protective mechanisms as normal lung stem cells. They are presenting this ground-breaking research at the Tissue Engineering and Regenerative Medicine International Society (TERMIS) North American Chapter meeting being held June 13 to 16 at the Westin Harbor Castle conference center in Toronto.

The University of Pittsburgh researchers, led by Vera Donnemberg, Ph.D., assistant professor of surgery and pharmaceutical sciences, University of Pittsburgh Schools of Medicine and Pharmacy, used cell surface markers and dyes to identify cancer stem cells as well as normal adult stem cells and their progeny in samples obtained from normal lung and lung cancer tissue samples. The researchers identified a very small, rare set of resting cancer stem cells in the lung cancer samples that looked and behaved much like normal adult lung tissue stem cells. Both the cancer and normal stem cells were protected equally by multiple drug resistance transporters, even if the bulk of the tumor responded to chemotherapy.

According to Dr. Donnemberg, the very fact that cancers can and do relapse after apparently successful therapy indicates the survival of a drug-resistant, tumor-initiating population of cells in

many types of refractory cancers. "Because of the similarities between the way that normal stem cells and cancer stem cells protect themselves, cancer therapies have to be designed specifically to target cancer stem cells while sparing normal stem cells," she explained.

Source: University of Pittsburgh Schools of the Health Sciences

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