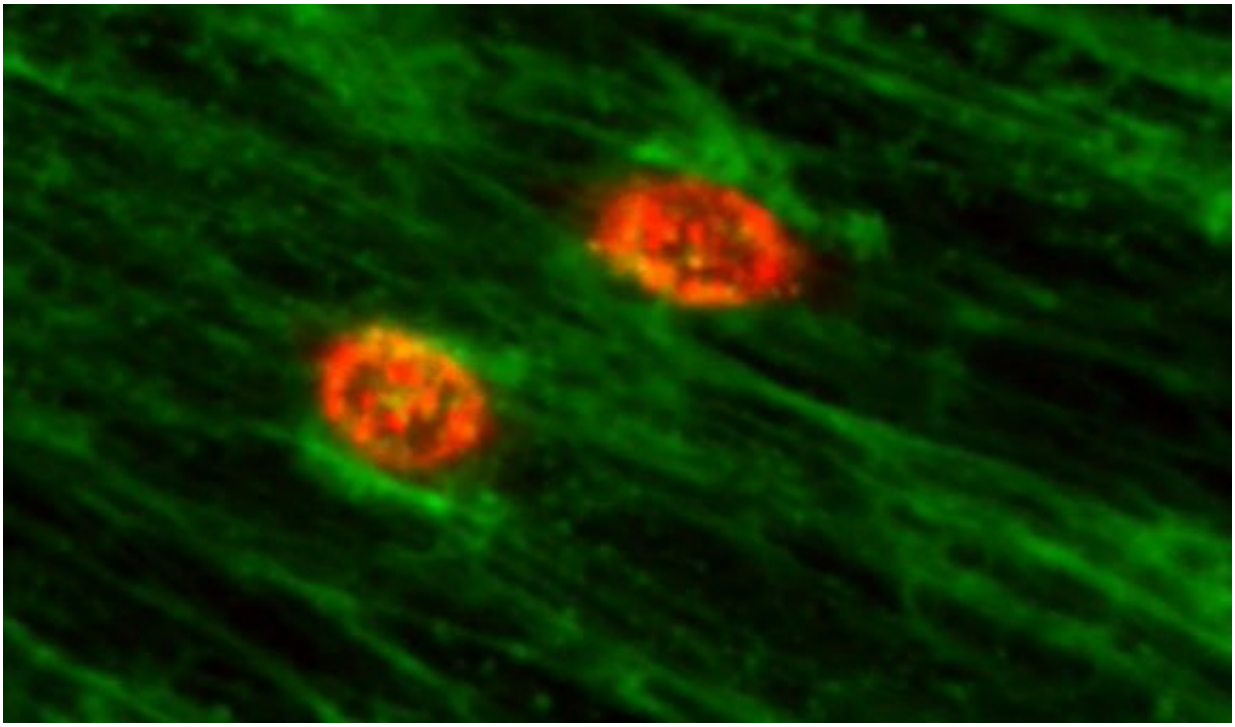
MedicalXpress

Cancer cell collaborators smooth the way for cancer cells to metastasize

December 13 2015



At ASCB 2015, Vanderbilt researchers show how metastasizing tumors use non-cancerous fibroblasts to make a migration highway through surrounding extracellular matrix.

To get moving, metastasizing cancer needs to enlist non-cancerous

collaborators. Suspicions about where these secret cancer allies might be lurking have long been directed at the fibroblasts, the cells that secrete and organize the extracellular matrix (ECM), the ground on which surrounding cells can get a grip. Increasing evidence suggests that fibroblasts near growing tumors are actively assisting cancer cells in spreading locally and metastasizing elsewhere. But exactly how these cancer-associated fibroblasts (CAFs) provide aid to the cancer enemy was not known until a recent discovery by Begum Erdogan and colleagues in Donna Webb's lab at Vanderbilt University—CAFs clear a highway through the ECM for migrating cancer cells. The researchers will present their work at ASCB 2015 in San Diego on Sunday, December 13 and Tuesday, December 15.

The roadway that CAFs arrange is made of parallel fibers of fibronectin (Fn), a major protein in the ECM mix secreted by all fibroblasts. The Vanderbilt researchers observed CAFs rearranging Fn into parallel bundles instead of the dense mesh that normal tissue fibroblasts (NAFs) make. Taking cancer cells grown from prostate as well as head and neck tumors, the researchers plated them on ECM from CAFs and NAFs. The cancer cells on the CAF matrix were better at moving in a single direction.

But why? CAFs rearrange the matrix into a road because they get a better grip on Fn fibers, the researchers discovered. Using traction force microscopy, they were able to measure the difference. CAFs were stronger than NAFs because they were better at delivering force from the motor protein, myosin II, through connectors called integrins to Fn fibers. CAFs had higher levels of a Fn-binding integrin plus a switched-on GTPase called Rac, which is critical to cell movement. Inhibiting myosin-II activity with a drug deprived CAFs of their super traction powers and the ECM reverted to its normal disorder. These results solve a longstanding puzzle about cancer metastasis and point to the matrix as a possible target for drugs to stop cancer in its tracks.

More information: Cancer-associated fibroblasts promote directional migration of cancer cells via parallel organization of the fibronectin matrix, ASCB 2015.

Provided by American Society for Cell Biology

Citation: Cancer cell collaborators smooth the way for cancer cells to metastasize (2015, December 13) retrieved 6 May 2024 from https://medicalxpress.com/news/2015-12-cancer-cell-collaborators-smooth-cells.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.