

Clumped cancer cells spread more efficiently through the body than lone ones

November 21 2014, by Mohit Kumar Jolly



Better together. Credit: dellspics, CC BY-NC-SA

Nine out of ten cancer patients die because cancer cells enter the blood circulation, spread and form tumours at distant organs. In circulation, cells can move individually or in a cluster. It is believed that cells moving individually pose the highest risk of forming tumours and are the primary "villains".

A recent study we published in the *Journal of Royal Society Interface* shows that this may not be true. Instead, cells that move in a <u>cluster</u> might be the primary "villains", hence asking for new ways of fighting



the spread of cancer.

Cells in most primary tumours are usually immovable and tied to each other. But some of them lose their adhesion and start invading their neighbouring tissue, gaining access to blood vessels and entering circulation.

All in it together

A few cells that move individually also attain special properties that allow them to adapt to a new environment and seed a new tumour there. These traits are similar to the traits of <u>stem cells</u> – that's why these cells are called as 'Cancer Stem Cells'. They are resistant to all current cancer therapies, and can start a new tumor in any organ.

We found that cells moving collectively are more likely to become Cancer Stem Cells and thus are the primary "villains" of metastasis – the spread of cancer to different organs. This occurs because the mechanism by which <u>cancer cells</u> decide to move collectively also triggers the mechanism which converts it into stem cells, but if cancer cells decide to move individually, their mechanism to gain properties of stem cells can be shut down. Therefore, cells moving in a cluster in the bloodstream pose a much higher risk of starting a new tumour at a distant organ than those moving individually.





Brain metastasis. Credit: Nephron, CC BY

This finding means that to fight metastasis, we need new drugs that can breakdown clumps of cancer cells, not lone agents.

Team work has benefits

Posing a higher risk of metastasis is not the only advantage of moving collectively for a cancer. Cells moving individually in circulation die more frequently than those moving as a cluster, thus more clusters than <u>individual cells</u> reach the metastatic site.

Also, when these cells grow into a new tumour, they need to settle down in their new place quickly. This is because cells can't multi-task efficiently – they can either divide or move. After reaching the new site, they want to start dividing, and doing that is much easier for cells moving collectively. They adhere to each other, rather than find something settle down.

Leaving their primary home, surviving in the harsh conditions in the human bloodstream, and then settling down and seeding a new home (a secondary tumor) at a distant organ, is not easy. And cancer seems to prepare its "soldiers" well for this by instructing them to move in a group or cluster.

Collective migration of cells is a well-planned strategy adopted by cancer for its utmost benefit – <u>cells</u> moving collectively die less in <u>circulation</u>, find it easy to settle down in a new organ, and most importantly, are more drug-resistant and potent to start a new tumour.



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