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Bone marrow protein a 'magnet' for passing prostate cancer cells

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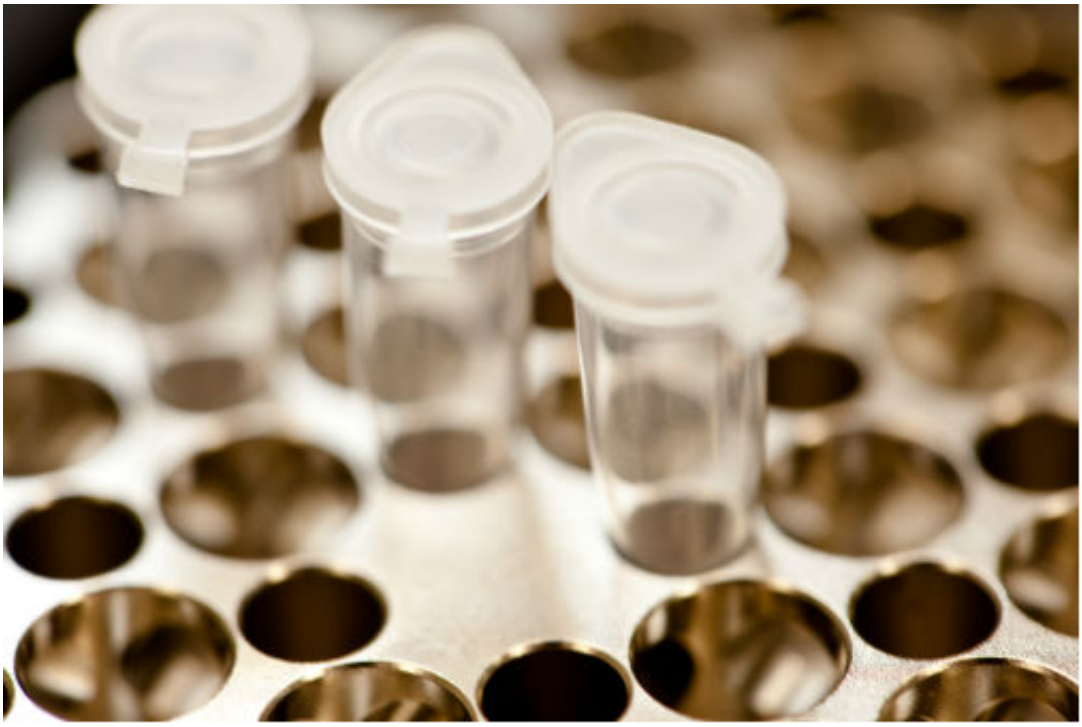

The team blocked a signal in the cancer cell with a non-toxic drug. Credit: University of York

Scientists at the University of York have shown that a protein in the bone marrow acts like a 'magnetic docking station' for prostate cancer cells, helping them grow and spread outside of the prostate.

Now that this mechanism has been identified, however, scientists at

York have found a way to block the signal in the cancer cells, disabling the cell and preventing it from multiplying at a new site in the body.

Their research showed that the protein, which normally functions to reduce inflammation after infections, has a key-like structure that locks on to opposite receptors on the stem cells of prostate cancer. This allows cancer cells that have spread from the prostate to 'dock' with the protein in the bones and multiply to form a new tumour.

Once the prostate cancer has attached to the protein, a signal is sent from the surface of the cancer to the nucleus of the cell, telling it that it can start to grow.

Like a 'space rocket'

Professor Norman Maitland, from the University's Department of Biology, said: "We have always known that the two places where prostate cancer spreads are the bones and lymph nodes, but we have not fully understood why these two locations are preferred.

"If we imagine the prostate cancer cell as a floating 'space rocket' and the only way for it to perform its mission is to 'dock' with another 'space vehicle', we start to get a picture of what happens when a cancer cell moves around the body in search of a new home.

"Without this docking station, the 'ship', or cell, will just float around, not causing any further harm. The receptors on the 'docking station', or the protein in bone, act like a magnet for the receptors on the stem cells of the cancer and once it is 'docked', getting rid of the cancer becomes much harder."

Blocking the signal

Replicating this 'docking process' in human prostate cancer cells, the team were able to identify the signal going into the nucleus of the cancer cell and blocked it with a non-toxic drug that has previously been tested for treatment of Allergic Asthma.

They found that the drug inhibits the signal, allowing the cancer cell to survive, but ultimately disabling its ability to spread. This could mean that cancer spread can be slowed down or be made more receptive to cell death following traditional treatments such as chemotherapy.

Drug discovery

Professor Maitland said: "We know that this works in human cancer cells, but what we now need to find is the correct dosage of the drug in patients, and whether it will buy a man more time to fight his cancer or even stop the spread of cancer altogether".

"Clinical trials are some way off, but this is a positive and exciting step forward in tackling this disease and reducing the number of deaths."

The research is published in the journal *Oncogenesis*.

More information: G Nappo et al. The immunosuppressive cytokine interleukin-4 increases the clonogenic potential of prostate stem-like cells by activation of STAT6 signalling, *Oncogenesis* (2017). DOI: 10.1038/oncsis.2017.23

Provided by University of York