

Researchers discover 'instruction manual' that tells cancers how to hide from immune system

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A mechanism that creates an “invisibility cloak” for certain cancer cells and allows them to hide from the immune system has been uncovered by a team of researchers at the University of British Columbia.

Prof. Wilfred Jefferies and his team found that metastatic tumours (cancers that spread from primary site) can evade the immune system via a process called chromatin remodeling. The invisibility mechanism operates in malignant carcinomas that include ovarian, prostate, melanoma and cervical cancers and is particularly active in breast and lung cancers.

“This discovery begins to address the mysteries of how cancer hides from the immune system and spreads – it helps explain 20 years of observations in the field,” says Jefferies, a member of UBC’s Michael Smith Laboratories and Biomedical Research Centre. “It may offer whole new avenues for therapies.”

Human DNA is packaged within each cell by chromatin, which is made up of DNA that encases proteins called histones. The UBC team discovered that in tumours, chromatin remodelling changes the structure of chromosomes by altering the histone codex or “instruction manual.” These changes reduce production of receptors called MHC I molecules that display cancer-specific signals, or tags, recognized by the immune system.

When cancer-specific tags are not displayed, the cancer cells become “invisible” to the immune system and no defenses are mobilized – the tumour cells are free to grow and spread. Furthermore, the high incidence of MHC I loss can be used as a predictor of rapid tumour growth progression and survival rates.

The research has recently been published in Molecular and Cellular Biology. Jefferies is a UBC professor of Medical Genetics, Microbiology and Immunology and of Zoology.

Jefferies says the findings may lead, within five to 10 years, to new therapies that will force the cancer cells to “drop the cloak of invisibility” and be recognized by the immune system.

Source: University of British Columbia

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