

# Research identifies on-off switch for key 'factor' in heart disease and cancer

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Scientists at the University of Hull have identified a cellular 'on-off' switch that may have implications for treating cardiovascular disease and cancer.

The team has found the mechanism which controls the inclusion of a protein called tissue factor into endothelial microparticles, tiny vesicles which are released from [cells](#) in the lining of blood vessels.

"Although tissue factor is part of the body's natural healing process, helping create clots to stop bleeding and repair injuries, high levels circulating in the blood stream can be harmful," says lead researcher Dr Camille Ettelaie. "Excessive tissue factor is linked to [cardiovascular disease](#), including the formation of irregular [blood vessels](#) and higher risk of thrombosis, leading to [heart attack](#) and stroke."

Dr Ettelaie and co-researcher Dr Mary Collier found that two tandem [amino acids](#) within tissue factor work like an 'on-off switch' within the cells, controlling how and when it is incorporated into the microparticles and released. When a phosphate molecule is added to the first one of these two amino acids, the process starts and when added to the other, it stops.

By blocking the addition of the phosphate [molecules](#) to the first amino acid, the researchers were able to stop the process – opening up the possibility of controlling when and how much tissue factor is released in microparticles.

"The aim of the research was to see if there might be a way to control the output of tissue factor from endothelial cells into microparticles," says Dr Ettelaie "This project focused on the vascular system and is helpful in controlling [thrombosis](#), but tissue factor is also released in microparticles from cancer cells and linked to cell proliferation – so our findings could have implications for treating cancer as well.

"Tissue factor is exploited by cancer cells – they use it to speed up their growth directly, and also increase the growth of blood capillaries which supply the tumour with nutrients – but if levels of tissue factor are too high within a cell, then the cell will die. If we could use this switch to stop cancer cells getting rid of excess tissue factor, it might be possible to kill them without causing detrimental effect to the body's normal cells."

The findings from the research – which was partly funded by Yorkshire Cancer Research and the Castle Hill Hospital Cancer Trust Fund – are published in the latest issue of *Journal of Biological Chemistry* (April 8).

Provided by University of Hull

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