

Discovery of protein that fuels breast cancer growth could lead to targeted treatment

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(Medical Xpress)—Cancer Research UK scientists have discovered how a key protein fuels breast cancer growth by boosting numbers of cancer stem cells in tumours that have low levels of a protein called claudin, accounting for up to 10 per cent of all breast cancers.

This raises the prospect that treatments currently being developed to inhibit this key protein – called [Transforming Growth Factor Beta](#) (TGF-beta) – could be used to treat this group of women, who tend to have

poorer survival and for whom there are currently no targeted treatments.

The study is published in *Nature Communications* today.

Earlier this year the same team, from Cancer Research UK's Cambridge Research Institute, published a groundbreaking study showing that breast cancer was not one disease, but ten, each defined by its own unique '[genetic fingerprint](#)'.

In this study they used this knowledge to explore, for the first time, how the network of genes activated by TGF-beta differs among different types of breast cancer.

This revealed that, in cancers with low levels of the protein claudin, TGF-beta activates a specific network of genes that boosts the number of breast cancer [stem cells](#) – which promote cancer spread and are associated with poor survival.

TGF-beta does this through the regulation of two other proteins – Smad and SRF – and with the help of a third – NEDD9 – which helps to assemble the three into their active form.

Dr Alejandra Bruna, senior author on the study, said: "For years scientists have been puzzling how TGF-beta can be seen to both fuel and suppress the growth of cancer. And now, thanks to the improved understanding we are building of the different genetic types of [breast cancer](#), we can pinpoint one of the specific pathways that account for these differences."

Study leader Professor Carlos Caldas, added: "Crucially this study highlights the role of TGF-beta in one particular subtype that accounts for up to 10 per cent of all breast cancers. A number of promising treatments are already in early phase trials to target TGF-beta, meaning

there is genuine hope of improved treatment options for this group of women in the near future. The next step will be to design the appropriate clinical trials."

Dr Julie Sharp, senior science information manager at Cancer Research UK, said: "This study provides us with important insights into TGF-beta's 'split personality' and how it can both prevent and fuel the growth of cancer cells. Our scientists have been at the forefront of research into the role of growth factors in cancer and it's immensely heartening to see this now paving the way for powerful new treatments with the potential to benefit patients."

More information: Bruna A. et al, TGF β induces the formation of tumour-initiating cells in claudinlow breast cancer, *Nature Communications*, 2012, [DOI: 10.1038/ncomms2039](https://doi.org/10.1038/ncomms2039)

Provided by Cancer Research UK

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