New target for prostate cancer therapy

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(Medical Xpress) -- Researchers at Imperial College London have discovered a molecule that plays an important role in driving prostate cancer growth, and could be a target for new therapies.

About 36,000 men are diagnosed with prostate cancer each year in the UK, making it the most common cancer in men. The cancer depends on male hormones to progress, as these hormones stimulate the cancer cells to divide, enabling the tumour to grow.

The new study, published in Human Molecular Genetics, found that male hormones increase the production of a molecule called miR-27a in prostate cancer cells in the laboratory, and that this molecule stimulates the cells to grow. An inhibitor of miR-27a halved the growth rate of prostate cancer cells, suggesting that such a molecule might have therapeutic potential.

miR-27a belongs to a class of molecules called microRNAs – short strands of genetic material which are increasingly understood to play an important role in regulating gene activity. MicroRNAs are appealing as therapeutic targets since compared with proteins, it is much easier to design and synthesise inhibitory molecules that can get into cells easily. Another microRNA inhibitor is already being tested in humans in combination with chemotherapy for prostate cancer.

“This is a promising first step towards a possible new therapy, but there are many hurdles to overcome first,” said Claire Fletcher, the study’s first author, who is studying for a PhD in Dr Charlotte Bevan’s lab in the

Department of Surgery and Cancer at Imperial.

“MicroRNAs have only been known about for the last 10 years, but we’re now realising how important they are in regulating which genetic messages are read and thus which proteins are produced. This study shows that miR-27a is an important intermediary that links hormones with prostate cancer growth. We’ve demonstrated that inhibiting this molecule can suppress prostate cancer growth in the lab. The next step is to test that concept in an animal model. It will be several years at least before we can test any new treatments in humans.”

The subset of genes that are turned on in a cell determine how the cell behaves. If a gene is switched on, its code is copied onto a messenger molecule and the message is translated to make a protein, which carries out a specific function. MicroRNAs work by interfering with the messenger so that the protein does not get made.

Each microRNA can regulate many genes. The new study found that one of the targets of miR-27a is a tumour suppressor called prohibitin, which the Imperial team previously discovered is a regulator of prostate cancer growth.

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More information: CE Fletcher et al. ‘Androgen-regulated processing of the oncomir MiR-27a, which targets Prohibitin in prostate cancer.’ *Human Molecular Genetics* (2012) 21 (14):3112-3127.doi: 10.1093/hmg/dds139

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