Prostate cancer drugs hold potential for treating COVID-19

July 1 2021, by Ryan O'hare

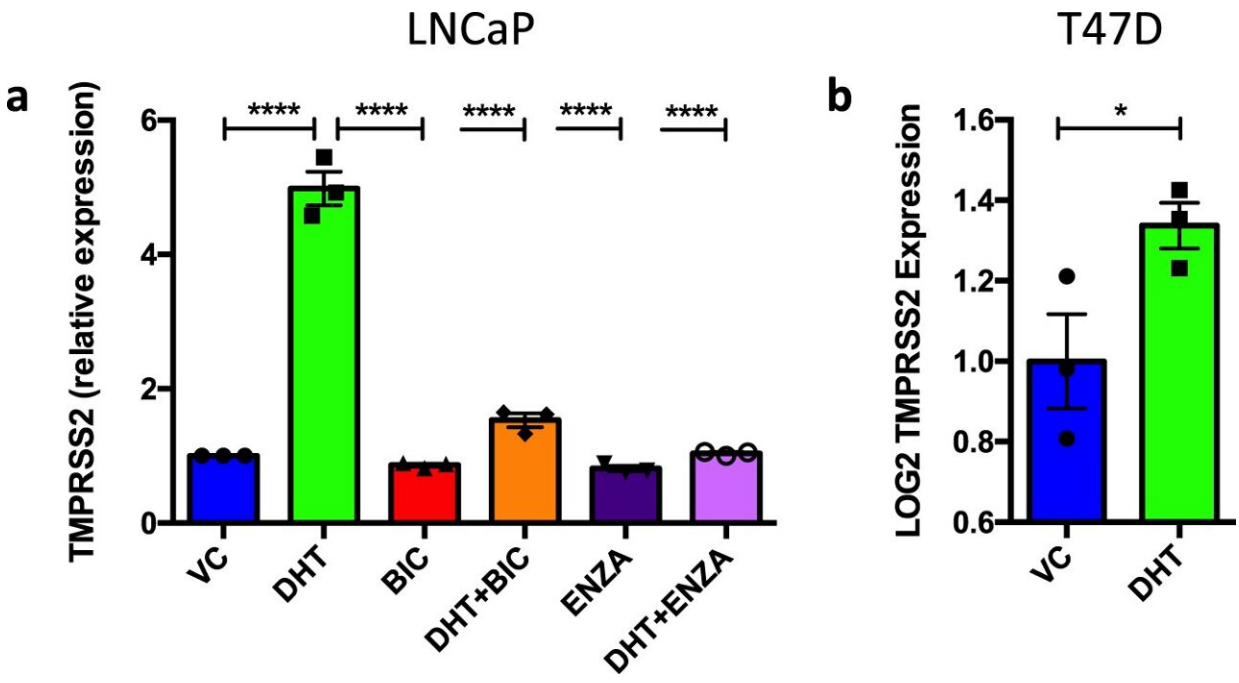

Fig. 1: TMPRSS2 is an androgen-regulated gene in cells from different tissues. From: The antiandrogen enzalutamide downregulates TMPRSS2 and reduces cellular entry of SARS-CoV-2 in human lung cells

Drugs typically used to treat prostate cancer could be explored for treating patients with COVID-19, following encouraging new findings.

Researchers found that the treatment, a type of testosterone-blocker, also

reduced the ability of the SARS-CoV-2 coronavirus to infect lung cells in the lab.

The work, carried out by cancer researchers at Imperial College London and the University of Essex, is part of larger efforts to find existing drugs which can block COVID-19 by reducing the ability of the virus to enter cells.

The team says the study adds to a growing body of evidence from groups around the world, supporting further clinical trials to assess the efficacy of the drugs, called anti-androgens, in the treatment of patients with COVID-19.

Their findings are published in the journal *Nature Communications*.

Blocking infection

SARS-CoV-2, the virus which causes COVID-19, has been shown to attack multiple organs in the body, but is most destructive to the lungs. In the latest study, researchers focused on one of the proteins used by the virus to enter lung cells, called TMPRSS2, to see if reducing levels could block infection.

Male sex hormones, or androgens, are known to increase levels of TMPRSS2 in several tissues, most notably in the prostate. But drugs used to manage prostate cancer can block androgens, so countering the increase in TMPRSS2 and potentially offering a new treatment option to explore for COVID-19.

The team, co-led by Imperial's Professor Charlotte Bevan and Dr. Greg Brooke from Essex, found that the androgen-blocking drug enzalutamide—a well-tolerated drug widely used in advanced prostate cancer—reduced TMPRSS2 levels in lab cultures of human lung cells.

Importantly, they found that the treatment significantly reduced SARS-CoV-2 entry and infection in lung cells. The researchers say their study adds to a growing body of evidence from groups around the world, supporting further clinical trials to assess the efficacy of anti-androgens as a potential treatment for COVID-19.

Potential treatment

Professor Charlotte Bevan, from the Department of Surgery & Cancer, said: "This study not only supports further clinical investigation of these prostate cancer drugs but suggests other drugs we can test that could be useful in the COVID-19 effort. As we have learnt from cancer, it is important to have a range of drugs available in the armory. And drugs that are tried-and-tested and approved in other diseases have the advantage that they can be re-purposed in this way relatively quickly."

Dr. Greg Brooke, from the School for Life Sciences at the University of Essex, explained: "Men are more likely to become seriously unwell and die from COVID-19 compared to women. This suggests the male sex hormone androgen may play a role in SARS-CoV-2 severity.

"For many years I have been working on the role of androgens in cancer so was able to use this knowledge to investigate if antiandrogens, drugs used for the treatment of prostate cancer, reduce SARS-CoV-2 infection.

"We demonstrated that these drugs reduce the ability of the virus to enter the lungs and, therefore, our data supports clinical trials to investigate if antiandrogens can reduce COVID-19 severity in people infected with the virus."

Two clinical trials assessing anti-androgens in the treatment of COVID-19 are already underway in the United States as well as Sweden,

with early findings expected later this year.

"The antiandrogen enzalutamide downregulates TMPRSS2 and reduces cellular entry of SARS-CoV-2 in human lung cells," by et al is published in *Nature Communications*.

More information: D. A. Leach et al, The antiandrogen enzalutamide downregulates TMPRSS2 and reduces cellular entry of SARS-CoV-2 in human lung cells, *Nature Communications* (2021). DOI: 10.1038/s41467-021-24342-y

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