Hypoxia drugs join the fight against COVID-19

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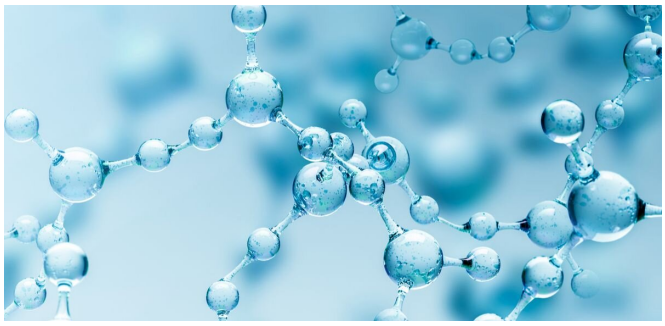

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Oxygen is essential to all life forms, even viruses.

Oxygen is fundamental to all cells, impacting key functions such as metabolism and growth. Our cellular response to oxygen levels is tightly regulated and one important pathway is controlled by the Hypoxia Inducible Factors (HIFs), that activate certain genes under low oxygen conditions (hypoxia) to promote cell survival. Drugs that activate HIF are currently in use to treat anemia caused by kidney disease.

The novel coronavirus SARS-CoV-2 needs no introduction and literally stopped the world in 2020, with more than 2 million fatalities to date. A defining feature of severe COVID-19 disease is low oxygen levels throughout the body, which may lead to organ failure and death. A cure for this virus is urgently needed.

Dr. Peter Wing and Dr. Tom Keeley, working in the laboratories of Prof Jane McKeating, Prof Peter Ratcliffe and Dr. Tammie Bishop in the Nuffield Department of Clinical Medicine, discovered that a low oxygen environment supressed SARS-CoV-2 entry into cells that line the lungs and reduced viral propagation and shedding.

Importantly, drugs that activate HIF such as Roxadustat had a similar effect on the virus. This study provides the first evidence for repurposing HIF mimetics that could reduce SARS-CoV-2 transmission and disease development. The oxygen dependency of this virus is a new vulnerability that we could exploit.

Research continues to expand our understanding of the interplay between oxygen sensing and COVID-19 and is published in *Cell Reports*.

More information: Peter AC. Wing et al. Hypoxic and pharmacological activation of HIFs inhibits SARS-CoV-2 infection of lung epithelial cells, *Cell Reports* (2021). DOI: 10.1016/j.celrep.2021.109020

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