Aspirin and other common anti-inflammatory drugs could help prevent COVID-19 deaths, says pharmacy researcher

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Pharmacologist Ayman El-Kadi is encouraging clinical trials of six commonly used anti-inflammatory drugs, including aspirin, to find out whether they can help prevent the most severe and life-threatening symptoms of COVID-19. Credit: University of Alberta

A University of Alberta pharmacologist is encouraging the trial of common anti-inflammatory medications such as aspirin to treat the most harmful outcomes of COVID-19.

Most people infected with SARS-CoV-2 recover without serious symptoms, reported Ayman El-Kadi, professor in the Faculty of Pharmacy and Pharmaceutical Sciences, in a recently published academic paper. However, some patients develop inflammation in the lungs, causing coughing and shortness of breath, and a few develop hyperinflammation that can lead to organ failure and death.

Men, people over the age of 60 and those with metabolic disorders such as obesity and diabetes are known to be more vulnerable to this hyperinflammation, El-Kadi said. COVID-19 can interfere with their natural immune response, causing their bodies to produce more inflammatory molecules than anti-inflammatory molecules. El-Kadi aims to interrupt this process using medications that have already been approved for other uses.

"Our idea is to either prevent the molecules that promote inflammation or increase the molecules that have an anti-inflammatory effect, and there are many drugs that are already on the market that modulate this," El-Kadi said.

"Rather than developing new compounds to treat COVID-19, which can be very costly, we can potentially repurpose existing drugs and use them to reduce or prevent the inflammation that is the cause of mortality."

Timing is everything

El-Kadi, who is also associate dean of research and graduate studies, has spent his career looking at how anti-inflammatory drugs interact with various diseases including cancer and heart disease. He recommends that

clinical trials be carried out to assess the impact of these drugs on COVID-19 inflammatory disease. He would also like to see trials to deliver the drugs using nanoparticles that can be targeted within a patient's body.

"COVID-19 affects several organs, including the liver, kidneys and brain, but the primary target is the lung," he said. "Because the antibacterial molecules are fragile, by delivering them with nanomedicine we can make sure they are delivered to this target."

El-Kadi warned in a previous paper that anti-inflammatory medicines are not recommended early in the course of a COVID-19 infection because they can interfere with the body's ability to fight the virus, but he said they might be useful later if hyperinflammation takes over.

He pointed out that these drugs may have fewer side-effects than other front-runner COVID-19 treatments such as remdesivir and dexamethasone.

"These (anti-inflammatory) medications are very safe. Some, like aspirin, are even available over the counter," he said. "We want to avoid higher toxicity drugs, especially for high-risk populations."

Along with aspirin, the paper lists five other drugs that might be repurposed: the cholesterol drug fenofibrate, the antifungal fluconazole, an antibacterial agent called isoniazid, the nutritional supplement resveratrol and 2-methoxyestradiol, an experimental drug that has been used to treat breast cancer, ovarian cancer and rheumatoid arthritis.

El-Kadi was part of a U of A team that worked to develop a detection kit for the first SARS virus, a coronavirus-caused illness first identified in 2003 that eventually killed nearly 800 people worldwide. He said while vaccines against SARS-CoV-2 have been developed quickly, mutations

make it unlikely the disease will disappear completely, meaning treatments will continue to be needed.

More information: Sherif M. Shoieb et al, Targeting arachidonic acid–related metabolites in COVID-19 patients: potential use of drug-loaded nanoparticles, *Emergent Materials* (2020). DOI: 10.1007/s42247-020-00136-8

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