

## Cough: It's All in Your Head

Cough is getting a lot of attention these days as a defining symptom of COVID-19—the dreaded “dry cough”. But, as it turns out, very little is known about most of the over-the-counter medicines flying off the shelves. Surprising, some may actually worsen COVID-19, according to new laboratory research.

Dextromethorphan is the active ingredient in many leading over-the-counter drug products. If you opt for an over the counter remedy, this is what you will most likely get.

According to research in monkey cells published in Nature this April<sup>1</sup>, dextromethorphan helps coronavirus spread. In a 2007 JAMA study in children with cough, dextromethorphan, actual honey, and no treatment were compared. Honey improved cough, yet honey-flavored dextromethorphan did not<sup>2</sup>.

Over-the-counter cough medicines have been on the market for many decades. Despite being an \$8B industry (US alone), nothing has proven to work in countless clinical studies. The desperate search for relief has even fueled the opioid crisis,<sup>3</sup> reports a 2019 NY Times article.

Oddly enough, according to science, cough is not the simple respiratory problem it seems to be. Cough is a protective reflex involving the central nervous system as well as the respiratory system. It starts with the vagus nerve, a large cell traveling from the brain to the nose and throat, and then all the way down to the intestines. The most common cough medicines on the market today, including dextromethorphan, actually work on the brain<sup>4</sup>. Dextromethorphan is so addictive that it has at times been pulled off the shelves or formulated to have an unpleasant taste in order to discourage abuses.

To further explain how complicated this can become: some cough treatments such as codeine and dextromethorphan land on sigma receptors, a little-known class of receptors located in the brain and throughout the body. Hydroxychloroquine targets sigma receptors, but despite numerous clinical studies, we still don't know if it's effective for COVID-19 and how it really works. Maybe if we learned more about sigma receptors or hydroxychloroquine, which was discovered to cure malaria over 300 years ago, we would be better equipped to handle COVID-19, or even cough today.

Unfortunately it has taken a pandemic for us to realize how little we know about seemingly simple ailments. Hopefully, we can use this as a learning experience. Scientific research should not only be focused on finding cures but also to understanding basic scientific mechanisms, the importance of which is not always immediately apparent.

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<sup>1</sup> <https://www.nature.com/articles/s41586-020-2286-9>

<sup>2</sup> <https://jamanetwork.com/journals/jamapediatrics/fullarticle/571638>

<sup>3</sup> <https://www.nytimes.com/2019/02/18/well/live/the-case-against-cough-medicine.html>

<sup>4</sup> <https://www.sciencedirect.com/sdfe/pdf/download/eid/3-s2.0-B9781437703108000129/first-page-pdf>

<sup>5</sup> <https://www.jabfm.org/content/19/3/320>