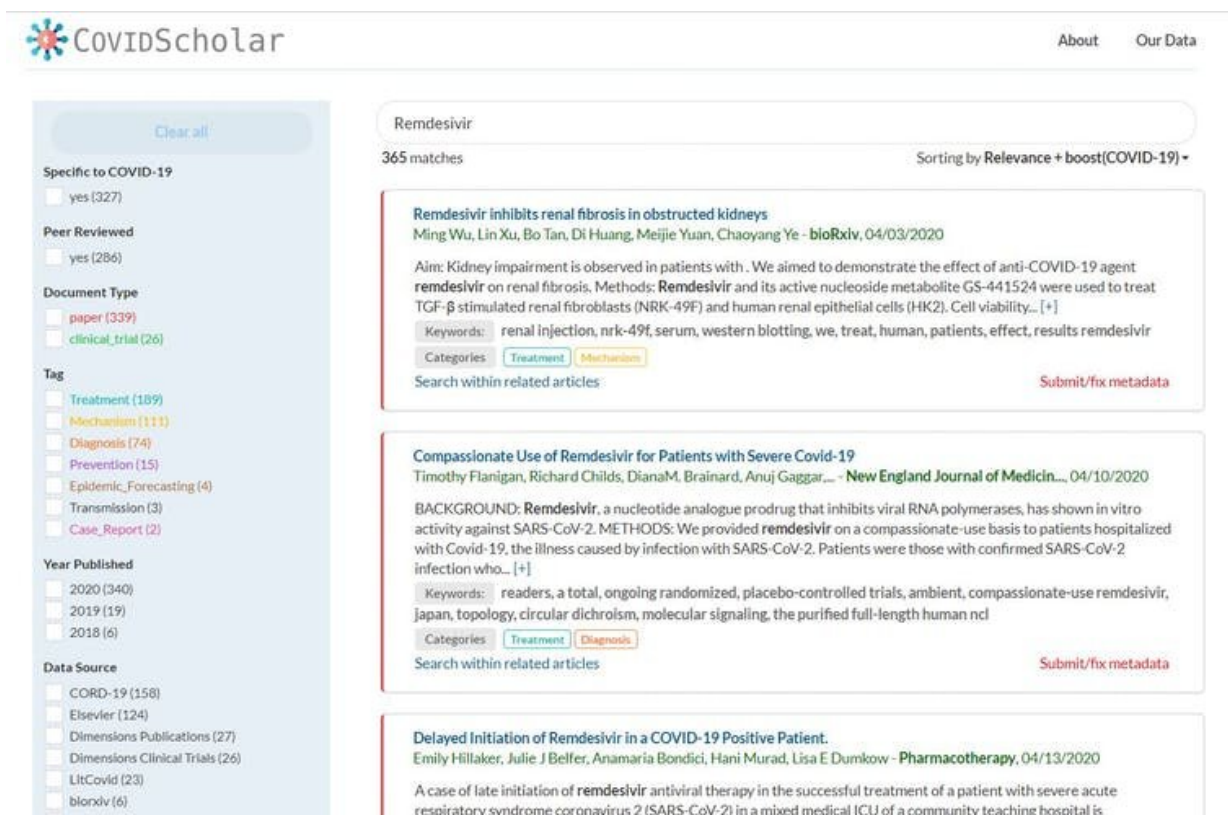


AI tool searches thousands of scientific papers to guide researchers to coronavirus insights

May 12 2020, by Amalie Trewartha and John Dagdelen



The screenshot shows the COVIDScholar search engine interface. The search term 'Remdesivir' is entered in the search bar, resulting in 365 matches. The results are sorted by 'Relevance + boost(COVID-19)'. The left sidebar contains filters for 'Specific to COVID-19', 'Peer Reviewed', 'Document Type', 'Tag', 'Year Published', and 'Data Source'. The main content area displays three search results:

- Remdesivir inhibits renal fibrosis in obstructed kidneys**
Ming Wu, Lin Xu, Bo Tan, Di Huang, Meijie Yuan, Chaoyang Ye - *bioRxiv*, 04/03/2020
Aim: Kidney impairment is observed in patients with . We aimed to demonstrate the effect of anti-COVID-19 agent **remdesivir** on renal fibrosis. Methods: **Remdesivir** and its active nucleoside metabolite GS-441524 were used to treat TGF-β stimulated renal fibroblasts (NRK-49F) and human renal epithelial cells (HK2). Cell viability... [+]
Keywords: renal injection, nrk-49f, serum, western blotting, we, treat, human, patients, effect, results remdesivir
Categories: [Treatment](#) [Mechanism](#)
Search within related articles: [Submit/fix metadata](#)
- Compassionate Use of Remdesivir for Patients with Severe Covid-19**
Timothy Flanigan, Richard Childs, DianaM. Brainard, Anuj Gaggari... - *New England Journal of Medicin...*, 04/10/2020
BACKGROUND: **Remdesivir**, a nucleotide analogue prodrug that inhibits viral RNA polymerases, has shown in vitro activity against SARS-CoV-2. METHODS: We provided **remdesivir** on a compassionate-use basis to patients hospitalized with Covid-19, the illness caused by infection with SARS-CoV-2. Patients were those with confirmed SARS-CoV-2 infection who... [+]
Keywords: readers, a total, ongoing randomized, placebo-controlled trials, ambient, compassionate-use remdesivir, japan, topology, circular dichroism, molecular signaling, the purified full-length human ncl
Categories: [Treatment](#) [Diagnosis](#)
Search within related articles: [Submit/fix metadata](#)
- Delayed Initiation of Remdesivir in a COVID-19 Positive Patient.**
Emily Hillaker, Julie J Belfer, Anamaria Bondici, Hani Murad, Lisa E Dumkow - *Pharmacotherapy*, 04/13/2020
A case of late initiation of **remdesivir** antiviral therapy in the successful treatment of a patient with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in a mixed medical ICU of a community teaching hospital is

COVIDScholar is a search engine with machine learning algorithms under the hood. Credit: Screen capture by The Conversation

The scientific community worldwide has mobilized with unprecedented

speed to tackle the COVID-19 pandemic, and the emerging research output is staggering. Every day, [hundreds of scientific papers about COVID-19 come out](#), in both traditional journals and non-peer-reviewed preprints. There's already far more than any human could possibly keep up with, and more research is constantly emerging.

And it's not just new research. We estimate that there are as many as 500,000 papers relevant to COVID-19 that were published before the outbreak, including papers related to the outbreaks of SARS in 2002 and MERS in 2012. Any one of these might contain the key information that leads to [effective treatment](#) or a vaccine for COVID-19.

Traditional methods of searching through the research literature just don't cut it anymore. This is why [we and our colleagues](#) at Lawrence Berkeley National Lab are using the latest artificial intelligence techniques to build [COVIDScholar](#), a [search engine](#) dedicated to COVID-19. COVIDScholar includes tools that pick up subtle clues like similar drugs or research methodologies to recommend relevant research to scientists. AI can't replace scientists, but it can help them gain new insights from more papers than they could read in a lifetime.

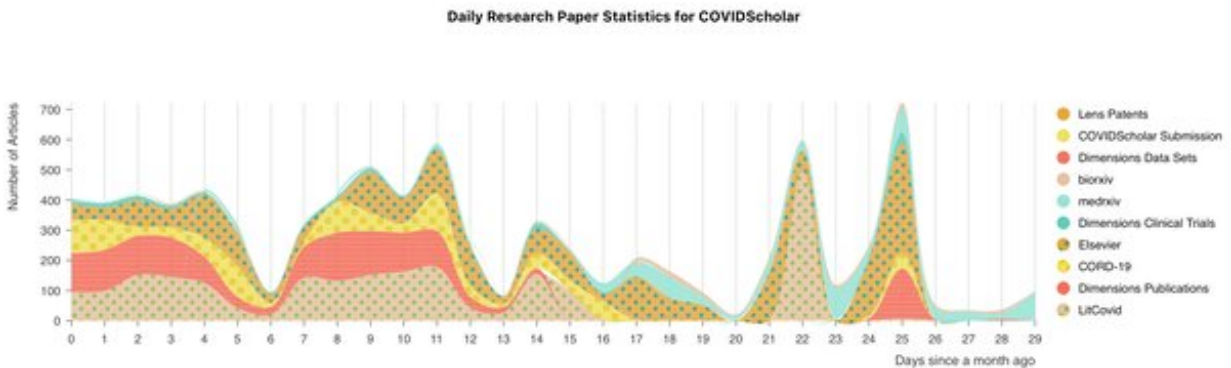
Why it matters

When it comes to finding effective treatments for COVID-19, time is of the essence. Scientists spend [23% of their time searching for and reading papers](#). Every second our [search tools](#) can save them is more time to spend making discoveries in the lab and analyzing data.

AI can do more than just save scientists time. Our group's previous work showed that AI [can capture latent scientific knowledge](#) from text, making connections that humans missed. There, we showed that AI was able to suggest new, cutting-edge functional materials years before their discovery by humans. The information was there all along, but it took

combining information from hundreds of thousands of papers to find it.

We are now applying the same techniques to COVID-19, to find existing drugs that could be repurposed, genetic links that might help develop a vaccine or effective treatment regimens. We're also starting to build in new innovations, like using molecular structures to help find which drugs are similar to each other, including those that are similar in unexpected ways.



COVIDScholar labels and categorizes about 250 journal papers a day to help researchers make connections they might otherwise miss. Credit: Kevin Cruse and Haoyan Huo, [CC BY-ND](#)

How we do this work

The most important part of our work is the data. We've built web scrapers that collect new papers as they're published from a wide variety of sources, making them available on our website within 15 minutes of their appearance online. We also clean the data, fixing mistakes in formatting and comparing the same paper from multiple sources to find the best version. Our machine learning algorithms then go to work on the

paper, tagging it with subject categories and marking work important to COVID-19.

We're also continuously seeking out experts in new areas. Their input and annotation of data is what allows us to train new AI models.

What's next

So far, we have assembled a collection of over 60,000 papers on COVID-19, and we're expanding the collection daily. We've also built search tools that group research into categories, suggest related research and allow users to find papers that connect different concepts, such as papers that connect a specific drug to the diseases it's been used to treat in the past. We're now building AI algorithms that allow researchers to plug [search results](#) into quantitative models for studying topics like protein interactions. We're also starting to dig through the past literature to find hidden gems.

We hope that very soon, researchers using COVIDScholar will start to identify relationships that they might never have imagined, bringing us closer to treatments and a remedy for COVID-19.

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