

# Fibrosis drug may offer new treatment path for COVID-19 lung distress

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A new drug for lung fibrosis that Yale pulmonologist Dr. Naftali Kaminski began developing a few years ago shows promise for treating certain life-threatening effects of COVID-19, and his research team is

rapidly laying the groundwork for clinical trials.

In [lung fibrosis](#), the drug, called sobetirome, mimics the effects of thyroid hormone therapy, which heals scarring and improves cell function in lungs—but sobetirome lacks the toxic effects of thyroid hormone on heart and skeletal muscle.

Kaminski's team—along with those of Dr. Charles Dela Cruz, director of Yale's Center for Pulmonary Infection Research and Treatment, and Dr. Patty J. Lee, a former Yale faculty member now at Duke University—recently discovered that sobetirome also showed promise in preventing and treating Acute Respiratory Distress Syndrome (ARDS), a life-threatening condition that allows fluid to leak into the lungs. ARDS is common in COVID-19 patients, particularly among [older patients](#), and the condition can lead to respiratory failure and death.

"It was surprising how effective sobetirome was in mouse models," said Kaminski. "We saw significant improvement." The drug has not yet been tested for ARDS in humans, but Kaminski added that once they secure needed funding, they can quickly move it to trial and FDA approval.

On any given day, Kaminski said, there are 20-30 patients in Yale New Haven Hospital's Intensive Care Units with ARDS.

"We have gotten good at ventilating them," he said, "but right now there are no therapies that can treat it."

Typically, Kaminski said, a patient who developed ARDS would be in and out of the ICU in three to five days. "Only a small minority linger," he added.

But patients with COVID-19 develop ARDS and related complications for weeks, he said, putting a massive strain on ICU beds and ventilators.

Kaminski hopes to capitalize on a specific aspect of COVID-19: its five to seven day incubation period.

COVID-19 has a "lurking period," Kaminski said, before patients begin experiencing shortness of breath, a drop in oxygen levels, and respiratory failure. Internally, what's happening in the body is known as a "cytokine storm," he said, a way that scientists describe a massive overreaction of the body's [immune system](#), leading to a flooding of immune cells and fluid into lungs—and hastening patient death. Sobetirome interferes in that cytokine storm.

"What if we can take advantage of the lurking period of COVID-19, protect cells, and prevent ARDS?" Kaminski said.

Kaminski and other researchers are seeking funding for clinical trials with high-risk COVID-19 patients, both at Yale New Haven Hospital and in Greece with partner Dr. Argyrios Tzouveleakis, a former postdoctoral fellow at Yale who is now associate professor of medicine at the University of Patras. Sobetirome has already been tested in humans, Kaminski said, and is already known to be safe. That would speed the drug's approval process for COVID-19, he said. Yale has ample supplies of the drug available for trials. A California biotech company that had been planning to develop sobetirome for a different use—treatment of a rare genetic disease called x-linked adrenoleukodystrophy—had a stockpile Yale has since obtained.

The work is just one part of what Kaminski and other faculty experts in a working group called the Advanced Therapies Group at Yale are doing to advance solutions to the COVID-19 crisis. The group, representing different disciplines at Yale School of Medicine, is pooling resources and expertise in a number of relevant areas, and meets biweekly via Zoom.

"This group is a new mustering ground for much of the expertise and capabilities at Yale," said Dr. Richard Bucala, Waldemar Von Zedtwitz professor of medicine (rheumatology) and professor of pathology and of epidemiology (microbial diseases), "identifying new targets, therapies, clinical approaches, and diagnostics, and pooling ideas into one resource and clearinghouse."

Sobetirome is at the top of a list of over 20 Yale compounds and devices in various stages of development that could be useful in treating the devastating impacts of COVID-19 and are being explored both by the Advanced Therapies Group and experts at the Yale Office of Cooperative Research (OCR), which manages and promotes university discoveries for commercial development. All involved are racing against the clock to get new treatments to patients in need.

"This is the first time the Office of Cooperative Research has compiled and organized innovations in a crisis mode, but it's something we regularly do in the normal course of business—positioning Yale's assets to solve problems," said David Lewin, senior associate director of business development at OCR, and part of the team compiling Yale's potential COVID-19-fighting assets. "Right now, the transactional aspects are secondary to making immediately deployable solutions available."

Provided by Yale University

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