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**SARS: CONTAINING THE OUTBREAK**

## Scientists Test Existing Drugs For Weapons Against SARS

By **MARILYN CHASE**

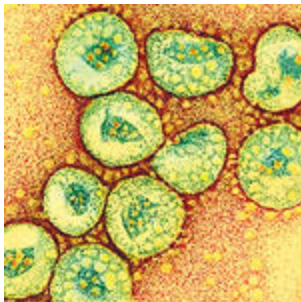
Staff Reporter of THE WALL STREET JOURNAL

Eager to join the battle against the SARS virus, laboratory scientists studying smallpox, AIDS, and the West Nile virus are helping to search for drugs that treat severe acute respiratory syndrome.

While creation of any specific treatment may be years off, scientists are hoping to find some therapies that can help SARS patients now.

The coronavirus, a group of viruses that cause the common cold, is the top suspect as the cause of SARS; other researchers are taking a hard look at paramyxoviruses, another type of virus that is also suspected of being linked to SARS.

Researchers have isolated the SARS virus itself in samples taken from patients stricken with the disease. Now scientists are scrambling to unlock its genetic makeup so they can eventually develop gene-based treatments. But that will take time, and the illness is spreading rapidly.



G. Murbi/Photo Researchers, Inc.

**Coronaviruses (green)**  
may be linked to SARS.

So, researchers John Huggins and Peter Jahrling at the U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick, Md., are gearing up to screen as many as a thousand drugs already licensed to combat other viruses, to see if might combat coronaviruses.

Academic and corporate laboratories are also scanning their product pipelines for any treatment -- including gene therapies and medications not yet approved -- that might fight coronaviruses or paramyxoviruses.

To speed the search, the first priority is testing any antiviral already on the market "because it's already on the shelf," says Catherine Laughlin, chief of virology at the National Institute of Allergy and Infectious Diseases, a unit of NIH. Also slated for testing are certain types of experimental drugs, she said, citing drug classes called nucleosides, protease inhibitors and drugs to jam the virus's genetic machinery, called messenger RNA.

One protease inhibitor, cystatin C, is "a potent inhibitor of human coronavirus" in studies, says Dr. Arlene Collins of the State University of New York at Buffalo. But she warns, it's never been tested in people, so its safety and efficacy are still unknown.

Natural biologics such as interferon, which are found in the human body, may also hold promise. "We suspect, based on cell-culture studies, that the virus is sensitive to interferon," says Dr. Jahrling of Fort Detrick.

Beyond drugs, Dr. Jahrling is studying a version of SARS in animals that will serve as test subjects for treatments or vaccines. "There is a huge push to get a vaccine out," he says, but cautions that recent efforts to make a cat coronavirus vaccine using virus killed with the chemical formalin triggered an immune disorder in test cats.

#### THE SPREAD OF SARS

- For full coverage, see [SARS: Containing the Outbreak](#)<sup>1</sup>.
- For more health coverage, visit the Online Journal's [Health Industry Edition](#) at [wsj.com/Health](#)<sup>2</sup>, and receive daily [Health e-mails](#)<sup>3</sup>.

The need to ensure researchers' safety further complicates the drug quest. "The proper level of confinement is hotly debated," Dr. Jahrling says. The Army institute at Fort Detrick has a Biosafety Level-4 laboratory -- the highest degree of containment or barrier that prevents contagious diseases from infecting researchers or escaping the lab.

Drug and biotech companies with less-secure facilities must either send their drug candidates to NIH and the Army institute or wait for other labs to unravel the virus's genetic makeup.

Scientists don't expect it will take long to map the virus's genetic sequence, which will set them on the path to designing gene-based treatments for the disease. Kathryn Holmes, a microbiology professor at the University of Colorado Health Sciences Center in Denver, predicted, "I think we're going to have data very quickly on the sequencing."

Among those focusing on the link between coronaviruses and SARS is Portland, Ore., biotechnology concern **AVI BioPharma** Inc. which previously has targeted the West Nile virus. Its research uses gene-blocking technology known as antisense, in which a compound is made to block viral RNA, thereby halting viral replication.

AVI is using its antisense treatment on a mouse coronavirus called murine hepatitis virus, says Patrick Iversen, the company's senior vice president of research and development. AVI also is teaming up with Lawrence Livermore National Laboratory in Livermore, Calif., on a cat coronavirus. Unpublished studies conducted at the Scripps Research Institute, a nonprofit biology-research organization in La Jolla, Calif., suggest AVI's drug against murine hepatitis is active against the SARS virus, Mr. Iversen says. But scientists still don't know whether either of AVI's coronavirus drugs will speed the way to a SARS gene-blocker.

Nevertheless, AVI BioPharma recently publicly touted its antisense technology as a possible SARS tool. The announcement buoyed the company's stock. At 4 p.m. on the Nasdaq Stock Market Wednesday, AVI shares closed at \$3.31, up from \$2.76 late last week.

"Their technology may have potential," says Reni Benjamin, senior analyst with Rodman & Renshaw, New York, but he noted that so far no one has developed a designer therapy against SARS.

Other groups are parlaying their work with the AIDS virus into possible SARS therapies. AIDS researcher Christopher Broder, a professor at the Uniformed Services University of Health Sciences in Bethesda, Md., wants to block a crucial step in the paramyxovirus infection process known as viral fusion. He is forming a partnership with **Trimeris** Inc. of Durham, N.C., a company that invented Fuzeon, a fusion-blocking drug against HIV sold by Switzerland's Roche Holding.

He is also collaborating with **ViroPharma** Inc., an Exton, Pa., company trying to design small molecule compounds that could lead to an oral antiviral drug against paramyxoviruses.

Marc Collett, ViroPharma's vice president of discovery research, warns that designing new custom-made drug against SARS or any emerging virus is "a five year program."