REPORTINGTEXAS
News features from UT Austin's School of Journalism

Inhalable Drug Could Bring Relief to Cystic Fibrosis Patients

February 8, 2013

Rob Neville, CEO of Savara, demonstrates the inhaler that delivers AeroVanc to a patient's lung. Photo by Oscar Ricardo Silva.

By Margaret Nicklas
For Reporting Texas

A new inhalable drug therapy developed by an Austin startup, Savara Inc., could improve the lives of thousands of cystic fibrosis patients. If it wins Food and Drug Administration approval, the antibiotic powder called AeroVanc might help an estimated one-fourth of those who have the incurable disease, which causes progressive lung damage. They have few options to rid their lungs of a drug-resistant bacterium.

Cystic fibrosis experts say that AeroVanc has promise because it is designed to take an antibiotic already shown to fight methicillin-resistant staphylococcus aureus (MRSA) and deliver it to the lungs more safely and effectively than other methods. AeoroVanc is set to begin its Phase II drug trial this year.

“If this medication works, it’s not going to be a complete game-changer, but it’s going to make a significant difference in the patients who have MRSA,” said Dr. Bennie McWilliams, an Austin pediatric pulmonologist and director of the pediatric cystic fibrosis program at Dell Children’s Medical Center of Texas. “That’s a huge area that we have an unmet need.”

Cystic fibrosis is a genetic disease that causes the body’s mucus membranes to produce unusually thick, sticky mucus that clogs the lungs, leading to chronic infections and severe lung damage, sometimes warranting transplants. The disease also affects digestive organs and interferes with absorption of nutrients.

Improved treatments in the last 30 years have lengthened the lifespan for many cystic fibrosis patients, though respiratory failure remains the most common cause of death. The condition afflicts an estimated 27,000 people in the United States and nearly 1,700 in Texas, according to the Cystic Fibrosis Foundation.

“Way back when I was in training, you were lucky to get out of your teenage years,” McWilliams said of the patients he treated in the 1980s. “Now the median survival is 37 years, and actually it’s getting to the point where it’s going to be a chronic disease.” The oldest patient in a database kept by the Cystic Fibrosis Foundation is 81, he said.

Patients are living longer partly due to improved treatment for lung infections. But those gains are diminished for the thousands affected by MRSA, which does not respond to commonly prescribed antibiotics. One recent study provides evidence that cystic fibrosis patients whose respiratory tracts contain the drug-resistant bacteria tend to die sooner than other patients. Patients with chronic MRSA infections were at a higher risk than those with short-term infections.

Despite MRSA’s prevalence among people with cystic fibrosis, little research specifically addresses it. Of 140 drug trials and studies the Cystic Fibrosis Foundation is tracking, only three involve MRSA infections.

Dr. Chris Oermann, medical director for the Respiratory Care Department at Texas Children’s Hospital in Houston, said the inhaled drug would target lung tissue more effectively than would an antibiotic taken by other methods and potentially be less toxic than those in use. The inhalable drug would require smaller doses while getting much higher concentrations of the drug into the infected airways.

Inhalable antibiotics that treat a more common bacteria called pseudomonas aeruginosa work very well, said Oermann, who also directs the Cystic Fibrosis Care Center at Texas Children’s.

"If we assume that staph behaves similarly to pseudomonas, then it's a pretty compelling case to be made," he said.

Jose Omar Jaime-Martinez, an 18-year-old patient, spends 45 minutes twice a day consuming an array of medications to help him breathe, digest food, manage allergies and fight off infection. A vibrating vest massages his lungs and helps expel mucus; an intravenous tube provides nutrition at night. Treatments including drugs to kill pseudomonas may keep him out of the hospital, except for the two-week "tune-ups" he undergoes once or twice per year to receive intravenous antibiotics and "knock down" the bacteria level in his lungs.

"Having CF is tough and challenging, and there's a lot of steps through life that there are to manage having CF, but at the end I guess it's just knowing how to live with it and how to handle it," Martinez said, who is a senior at Hendrickson High School in Pflugerville, an Austin suburb. Martinez is fortunate that relatively safe and effective treatments for pseudomonas are available. That's not the case with MRSA.

AeroVanc is a form of the antibiotic vancomycin hydrochloride, which is already used to treat MRSA. But it cannot be absorbed when taken by mouth, and intravenous delivery has been associated with such side effects as hearing loss and kidney damage.

With few good options to treat CF patients with MRSA infections, many practitioners have turned to Linezolid, which is potentially more effective than intravenous vancomycin but is costly and can have serious side effects, such as vision loss, said Elizabeth Hand, a pediatric infectious disease pharmacist at the Children's Hospital of San Antonio.

"Having a drug that you can directly deliver to the lungs and overcome that poor lung penetration that everyone is concerned with could potentially be of benefit," she said. While she did not see AeroVanc as a revolutionary breakthrough, she said, "I think it's always, the more tools we have in our arsenal, the better it is."

Long Road to Approval

Savara, founded in 2007, specializes in pulmonary drug development. It began working on AeroVanc in 2009, said its chief executive, Rob Neville. Making the drug into an inhalable powder involved overcoming a lot of technical challenges, he said. Chief among these were making the medicine particles just the right size to penetrate deep into lung tissue and producing a product that did not require refrigeration.

"We are not here trying to make as much money as possible," Neville said about Savara. "We're here trying to make a difference in the lives of these patients, and the money will follow," he said.

Neville said that AeroVanc could be on the market within five years but must clear a number of hurdles. Phase I trials conducted in Australia last year, involving both healthy subjects and those with cystic fibrosis, confirmed the drug's safety. Next, AeroVanc will be given to people who have both cystic fibrosis and chronic MRSA lung infections. Medical facilities in Austin, Houston and Tyler are being considered to participate in the trial. Subsequent trials will depends on the results from this phase.

The FDA granted AeroVanc orphan drug status last year, a designation that gives certain benefits, such as a period of market exclusivity, to companies that develop drugs to fight rare diseases. But it's no guarantee of approval. Since 1983, the FDA has granted 2,711 designations but approved just 410 orphan

drugs for market, according to Sandy Walsh, press officer at the FDA.

And the drug development process is expensive, costing from $60 million to $100 million from drug start to finish, Neville said.

He said Savara has raised roughly $16 million in investments and grants, enough to get the company through the "valley of death." That's the period between initial discovery of a drug or research on it and the point at which there's enough evidence of potential success that a company can attract venture capital. Many startups don't make it through that stage.

Current funding, which includes nearly $2 million from the Texas Emerging Technology Fund, will carry Savara through the next phase of testing, Neville said. If it's successful, the company could find a buyer or new investors.

To win FDA approval, trials must show that AeroVanc makes a significant impact in at least one of three areas for patients, on top of eliminating the stubborn bacteria. "We've got to show, hopefully, that not only do we kill the bug – or reduce what's called the CFUs, the colony forming units … but not only that, that they either feel better, function better, or survive better, " he said.

Leave a comment

Your name (required)

Email (required) The content of this field is kept private and will not be shown publicly

Comment

Submit comment

Joy Anderson

February 13, 2013 at 10:27 pm

Ironic that Vancomycin hydrochoride plays a part with AeroVanc. It was the one antibiotic that doctors relied on years ago, when patients were allergic to many medications, my mother being one. As I recall, the corrrect dilution and time of infiltation was very important. Amazing that Aero Vanc treats both cystic fibrosis and chronic MRSA lung infections, and as I understand it does not have be to refrigerated. When one of the patients was a reknown surgeon I knew it was a prime antibiotic. Now, getting it small enough to mermiate the lung tissue deep enough – what a great feat. Go Savara, Rob Neville and team.

Frank Hayden

February 16, 2013 at 12:44 am

I can't wait. I have CF and MRSA. I'm doing a Vancomycin IV as we speak. Unfortunately, I'm colonized so the infections seem never ending. I do IV Vanco every 3-4 months now. An inhaled medication would be awesome!

Joe's Mama

February 16, 2013 at 11:25 am

This is amazing! Thank you to everyone involved and the work you do. Our 2.5 year old son has CF and MRSA. Oral antibiotics haven't helped and I'm told it's just a matter of time before we start IVs. This sounds so promising in our fight to help him breath easier!

Laura Lloyd

February 16, 2013 at 1:10 pm

As a CF Mom I find thus very encouraging even though my son does not have MRSA. Great explaination about the cost and time it takes to develop a new medication. Priceless for us! My son fighting hard at 33 years old.

Crystal thebestfriend

February 16, 2013 at 2:01 pm

This is wonderful news… when one breakthrough is found another may be uncovered. I lost my BEST FRIEND to CF when he was 18 (almost 10 years ago) and still keep an eye on this kind of information because i would never want someone else to go through this!! Love for the people fighting to find a cure every day and prayers a cure is doscovered some time in the future!!

Kara's mom

February 18, 2013 at 8:25 pm

Great news. Too late for my sweet angel, but hopefully will extend the lives of many others. Don't stop working to cure this very mean disease. Thank you from Alabama.

Rob

May 8, 2013 at 2:23 pm

Clinical Trial for CF patients with MRSA now enrolling. Please click here for details:

http://clinicaltrials.gov/ct2/show/NCT01746095

Most Viewed

- On the Devil's Backbone, Ghosts Are a Constant Companion
- Anti-Bullying Law Comes to Texas Schools
- Homecoming Mums the Size of Texas
- State Board of Education Member Files Ethics Complaint
- East Texans Wonder: Is Fracking Waste Causing Quakes?
- The healing spirit of El Niño Fidencio
- Texas Schools Put iPads in Students' Hands
- Amid Barton Springs Road Development, Last Trailer Park Survives
- Large Animal Vet Holds Her Own
- UT Researchers Work to Make At-Home Diagnosis Easier

Related Stories

- Texas Ebola Expert: 'There was a breakdown in…
- In Plano as in New York City, Heroin Is a Killer
- Horses Get West Nile Protection, Humans Don't. Why?…
- Asthma and Springtime Don't Mix for Texas Children
- UT Researchers Work to Make At-Home Diagnosis Easier
