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ACHAOPEN is an emerging biopharmaceutical company focused on the discovery and development of innovative, broad-spectrum antibiotics to treat multi-drug resistant (MDR) bacterial infections, also known as “superbugs.”

South San Francisco-based Achaogen is addressing the global emergence of bacterial resistance by applying its anticipatory science to develop drugs that will combat the emerging wave of resistant pathogens, including therapies to treat multi-drug resistant (MDR) Gram-negative bacteria and methicillin-resistant *Staphylococcus aureus* (MRSA). Achaogen's most advanced compound, ACHN-490, a “neoglycoside” or next-generation aminoglycoside, is expected to be useful in multiple clinical indications, including complicated urinary tract infection (cUTI), hospital-acquired pneumonia (HAP) and blood stream infections (BSI). The compound completed a successful Phase 1 study in 2009 and is entering Phase 2 in 2010. Achaogen has several other innovative small molecule antibacterial programs rapidly nearing clinical development.

ACHAOPEN HAS NUMEROUS SCIENTIFIC PROGRAMS ADDRESSING THE GLOBAL EMERGENCE OF BACTERIAL RESISTANCE. TO DATE, ACHAOPEN HAS SECURED MORE THAN \$100 MILLION IN NON-DILUTIVE FINANCING TO SUPPORT THE DEVELOPMENT OF THESE PROGRAMS.

ACHAOPEN PIPELINE

Program	Preclinical	Phase 1	Phase 2
Neoglycosides: ACHN-490	[Progress bar]		
First-in-class LpxC Inhibitor	[Progress bar]		
Oral Anti-MRSA β-lactam	[Progress bar]		
Potent Broad-Spectrum FQ	[Progress bar]		

Combating the Chaos of Evolving Antibacterial Resistance

- According to the Centers for Disease Control (CDC), more than 70% of hospital bacterial infections are resistant to one or more classes of antibacterial drugs.
- In the United States alone, these infections cause more than 90,000 deaths per year - more than are caused by breast cancer and prostate cancer combined - and result in \$4.5 billion in excess healthcare costs.
- Globally, the WHO reports that hospital infections affect hundreds of millions of patients worldwide each year, with more than 1.4 million people becoming seriously ill or dying.

Fighting 21st Century Bacteria

Achaogen has built a robust portfolio of novel antibacterial programs, each with a different mechanism of action, to treat MDR bacterial infections. Achaogen's most advanced compound, ACHN-490, has broad-spectrum bactericidal activity, with potency against both MDR Gram-negative bacteria (*E. coli*, *K. pneumoniae*, *P. aeruginosa*, and *A. baumannii*) and MRSA. ACHN-490 retains activity against all clinically relevant mechanisms of bacterial resistance to existing antibiotics. Achaogen announced positive safety data from a Phase 1 clinical study of ACHN-490 in September 2009, and the company plans to initiate a Phase 2 clinical study of ACHN-490 in patients with cUTI as well as a HAP-enabling Phase 1 study in 2010. Other programs include: a novel, first-in-class inhibitor of MDR Gram-negative pathogens; the first oral beta-lactam with utility against MRSA; and broad-spectrum fluoroquinolones with excellent potency against resistant Gram-positive and Gram-negative bacteria. Together, these programs provide a comprehensive portfolio meeting the urgent need for new therapies to treat serious, multi-drug resistant bacterial infections in hospital and community settings.

DESPITE URGENT MEDICAL NEED AROUND THE GLOBE, THERE ARE VERY FEW NEW ANTIBIOTICS IN THE DRUG DEVELOPMENT PIPELINE.

While MRSA continues to be a major public health concern, infections caused by MDR Gram-negative bacteria such as *E. coli*, *K. pneumoniae* and *P. aeruginosa* cause more than half the infections in hospitals worldwide, and their incidence and prevalence continue to increase. At the same time, fewer companies are pursuing antibacterial research and development, FDA approvals of new agents have decreased 56% since 1983. As a result, there are almost no agents in clinical development for the treatment of infections caused by resistant Gram-negative pathogens. The drug development process for antibacterials remains attractive, as these therapies have a significantly higher clinical success rate than products in other therapeutic areas. Preclinical efficacy models have excellent predictive value for clinical outcomes, and antibacterial clinical trials are relatively short and typically involve unambiguous quantitative endpoints. These factors greatly enhance the potential for Achaogen's preclinical programs to yield clinically valuable and commercially viable therapeutics.

Management Team

- J. Kevin Judice, Ph.D.**
Chief Executive Officer and Chief Scientific Officer
- Jon B. Bruss, M.D., M.S.P.H., M.B.A.**
Chief Medical Officer and VP, Clinical Development & Regulatory Affairs
- John C. Doyle**
Chief Financial Officer and VP, Operations
- John F. Holloway**
VP, Business Development
- Heinz E. Moser, Ph.D.**
VP, Chemistry

Board of Directors

- Bryan E. Roberts (Chairman)**
General Partner, Venrock Associates
- J. Kevin Judice, Ph.D.**
Chief Executive Officer and Chief Scientific Officer
- Thomas B. King**
Chief Executive Officer, Alexza
- Kenneth J. Nussbacher**
Fellow, Affymetrix Inc.
- Scott M. Rocklage, Ph.D.**
Chairman, 5AM Ventures
- Camille D. Samuels**
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- David Livermore, Ph.D.**
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- Lynn Silver**
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- Paul Tulken**
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ADDITIONAL PRECLINICAL PROGRAMS

Membrane Biosynthesis Inhibitors Targeting LpxC

Achaogen is developing novel, first-in-class antibiotics with a novel mechanism of action: the inhibition of outer membrane biosynthesis via competitive inhibition of LpxC, an essential enzyme in the Lipid A biosynthetic pathway of Gram-negative bacteria. Achaogen's bactericidal leads have excellent potency against MDR *P. aeruginosa* and Enterobacteriaceae, and are effective against other important clinical Gram-negative pathogens as well as bioterror pathogens such as *Y. pestis*, *B. mallei* and *B. pseudomallei*. Achaogen has found no evidence of pre-existing clinical resistance to our LpxC inhibitors, and its current leads have the potential for oral as well as intravenous administration. This program is funded by the U.S. Department of Defense through Phase 1.

Oral β -lactam for MRSA

Community-Acquired MRSA (CA-MRSA) is a rapidly growing public health issue worldwide. While a number of compounds effectively treat CA-MRSA, almost none are available in oral form, and those that exist in oral form are either facing increasing resistance and lack of efficacy or have serious safety concerns. Achaogen is pursuing a safe, effective, orally bioavailable agent that is useful against CA-MRSA and other resistant pathogens.

Novel, Broad-Spectrum Fluoroquinolone

The fluoroquinolone (FQ) class is the best-selling class of antibacterials in history, and includes such blockbusters as Cipro®, Levaquin®, and Avelox®. As with other classes, however, resistance threatens to marginalize the utility of the current fluoroquinolones. Achaogen scientists have discovered novel FQs that expand both the Gram-negative and Gram-positive spectrum beyond the most effective members of the class, while retaining their excellent pharmacokinetic, safety, and oral bioavailability characteristics. These FQs are uniquely positioned to secure a significant share of the branded FQ market as Levaquin and Avelox, the two leading FQ brands, go off patent between now and 2014.

Target Product Profile: ACHN-490

DIFFERENTIATING FEATURES	<ul style="list-style-type: none"> Overcomes resistance to existing aminoglycosides and other competitor classes Improved safety: Optimized PK profile enhances efficacy and improves safety Dosing convenience. 3d-5d once daily (ACHN-490) vs. 10d (others)
PATHOGEN COVERAGE	MDR <i>E. coli</i> , MDR <i>K. pneumoniae</i> , MDR Enterobacter spp., MRSA/VRSA, <i>P. aeruginosa</i> , <i>A. baumannii</i>
INDICATIONS	cUTI, cIAI, HAP, blood stream infections
MARKET SHARE	Peak sales ~ \$1.25B (cUTI & HAP approvals)
ROUTE OF ADMINISTRATION	IV initially, potential for additional dosage forms (e.g., intramuscular, inhaled formulations, ocular drops)

Neoglycosides: New Weapons Against Tomorrow's Superbugs

Neoglycosides are Achaogen's unique, broad-spectrum, next-generation aminoglycosides to treat multi-drug resistant bacterial infections. Aminoglycosides such as gentamicin, amikacin and tobramycin have been widely used to treat serious, hospital-based infections due to their rapid bactericidal activity, predictable pharmacokinetics, and excellent stability and solubility. Recent studies have shown that over 20% of Gram-negative bacteria strains worldwide are resistant to one or more currently marketed aminoglycosides, virtually eliminating their clinical utility. As a result, there is a critical need for innovative new drugs to treat multi-drug resistant (MDR) bacterial infections effectively, including those caused by Gram-negative (e.g., *E. coli*, *Klebsiella pneumoniae*) and Gram-positive (e.g., *Staphylococcus aureus*, or MRSA) pathogens. Achaogen's neoglycosides restore clinical utility to this important class of drugs.

ACHN-490: Last Resort Against Gram-negative Superbugs? 2009 Clinical Strains of Multi-drug Resistant Bacteria

ORGANISM	AGENT	MIC90 (ug/ml)
<i>E. Coli</i> n=32	ACHN-490	2
	Amikacin	16
	Gentamicin	64
	Tigecycline	4
	Imipenem	4
	Ciprofloxacin	>8
<i>Klebsiella spp.</i> n=71	ACHN-490	1
	Amikacin	64
	Gentamicin	>64
	Tigecycline	2
	Imipenem	>8
	Ciprofloxacin	>8
<i>Enterobacter spp.</i> n=30	ACHN-490	4
	Amikacin	16
	Gentamicin	>64
	Tigecycline	4
	Imipenem	2
	Ciprofloxacin	1

Breakpoints for ACHN-490 assumed equivalent to gentamicin

● EFFECTIVE
 ● MARGINAL
 ● INEFFECTIVE

Achaogen has chemically engineered ACHN-490 and other neoglycosides to overcome existing aminoglycoside resistance mechanisms. These compounds have the potential for improved safety and effectiveness compared to legacy aminoglycosides. **These broad-spectrum agents are effective not only against aminoglycoside-resistant bacteria, but against bacteria resistant to other commonly used classes of drugs, including fluoroquinolones, cephalosporins, carbapenems, and glycopeptides.**

Additionally, much like first-generation aminoglycosides, which have been delivered effectively as drops, ointments and inhaled therapies to treat a broad range of conditions, Achaogen's neoglycosides have the potential to be utilized inside and outside the hospital setting to treat serious infections across a number of clinical contexts.