

Warp Drive Bio Forms Strategic Collaboration to Advance Novel Classes of Antibiotics to Combat Multi-Drug-Resistant Bacterial Infections

Collaboration with Roche Deploys Warp Drive's Proprietary Genome Mining™ Platform to Discover Multiple Novel Classes of Antibiotics

Warp Drive to Receive up to \$387 Million in Upfront Fees and Milestone Payments

Roche Gaining Worldwide Rights to Advance Certain Antibiotic Classes While Warp Drive Retains Worldwide Rights to Advance All Other Antibiotic Classes

CAMBRIDGE, Mass., October 16, 2017 -- [Warp Drive Bio](#), Inc., a drug discovery company developing therapeutics that exploit the molecules and mechanisms of nature, announced today that it has formed a strategic collaboration with Roche to discover and develop multiple novel classes of antibiotics. The serious global health threat of multi-drug-resistant bacterial infections has created an urgent need for new antibiotics with novel structures and mechanisms of action.

Under the collaboration, Warp Drive will deploy its proprietary Genome Mining™ Platform to advance multiple novel classes of antibiotics with activity against clinically important, drug-resistant, Gram-negative pathogens. The company's platform enables access to natural product drugs that have not been analyzed previously, owing to historical technology limitations. Warp Drive is identifying and evaluating over one hundred novel classes of potential antibiotics that were previously undiscovered and thus never analyzed for their impact on human health. There are currently ten classes of natural antibiotics that have been approved for patient use as compared to five classes of synthetic antibiotics. The last antibiotic from a novel natural class approved by the FDA was daptomycin, discovered more than 30 years ago.

“We are committed to bringing urgently needed novel antibiotic medicines to patients, and we are delighted to be collaborating with Roche in that goal,” said Laurence Reid, Ph.D., CEO of Warp Drive Bio. “Antimicrobial resistance is an extraordinary threat to global human health, and Warp Drive's unique platform allows us to access a vast reservoir of uncharacterized natural products from which to identify novel antibiotics.”

Under the terms of the agreement, Roche has an option for an exclusive worldwide license to develop and commercialize certain antibiotic classes that emerge from the collaboration, triggered upon the selection of a drug development candidate from the particular class. Warp Drive will retain worldwide rights to all other novel antibiotic classes from the collaboration. Warp Drive will receive up to \$87 million in upfront

payment, option fees, and milestone payments for preclinical events, and up to \$300 million in payments related to specific clinical, regulatory and sales milestones on products licensed to Roche. In addition, for products licensed to Roche, Warp Drive is eligible to receive tiered royalties for development candidates up to double digits on future net sales.

“It will be a notable achievement and benefit to global human health if we are able to discover the next wave of natural antibiotics,” said Karen Bush, Ph.D., Professor of Practice in Biotechnology at Indiana University. “With the innovative platform developed by Warp Drive, there is the potential to discover novel natural product antibiotics, historically hidden within microbes. These previously untapped antibiotic classes may play a key role in the future strategy to combat antimicrobial resistance.”

About Antibiotic Resistance

Antibacterial resistance represents a major threat to public health worldwide. The problem is worsening due to a slowdown in the discovery and development of new antibiotics in recent years. The lack of new effective treatment options may lead to infections becoming more difficult to treat in the future as resistance to existing therapies spreads. Such infections are particularly life-threatening for patients with weakened immune systems, who are vulnerable to an increasing range of antibiotic resistant bacteria. A 2016 UK-based project, the Review on Antimicrobial Resistance, released estimates of the near-future (by 2050) global toll of antibiotic resistance would be 10 million deaths per year, which is greater than the number of projected deaths due to cancer. The cost in terms of lost global production between now and 2050 would be an enormous 100 trillion USD.¹

In the United States, the Centers for Disease Control (CDC) estimate that more than two million patients are affected by drug-resistant infections each year, with direct healthcare costs as high as \$20 billion and with additional costs to society for lost productivity potentially doubling these figures. At least 23,000 patients die each year as a direct result of antibiotic resistance in these increasingly dangerous infectious pathogens.² The Review on Antimicrobial Resistance estimates that the actual *current* death toll per year is 700,000 patients worldwide.

According to a report published jointly by the European Medicines Agency, the European Centre for Disease Prevention and Control (ECDC) and the international network ReAct - Action on Antibiotic Resistance, at least 25,000 patients in the EU die each year from infections due to bacteria that are resistant to many medicines, and infections due to these

¹ Tackling Drug-Resistant Infections Globally: Final Report and Recommendations, The Review on Antimicrobial Resistance, May 2016.

https://amr-review.org/sites/default/files/160525_Final%20paper_with%20cover.pdf

² Centers for Disease Control, 2013, <https://www.cdc.gov/drugresistance/threat-report-2013/index.html>

bacteria in the EU result in additional healthcare costs and productivity losses of at least €1.5 billion each year.³

About Warp Drive Bio

Warp Drive Bio is exploiting the molecules and mechanisms of nature to create transformative medicines. The company operates on the core principle that nature is the world's most powerful inventor of new drugs, unconstrained by the mechanistic and synthetic limitations of traditional medicinal chemistry. Warp Drive Bio is deploying its proprietary Genome Mining™ and SMART™ (Small Molecule Assisted Receptor Targeting) platforms to discover novel medicines that have the potential to make a significant difference in patients' lives. The company was launched in 2012 through a strategic partnership with Sanofi and with financing from Third Rock Ventures and Greylock Partners. For more information, please visit www.warpdrivebio.com.

About Warp Drive Bio's Genome Mining™ Platform

Warp Drive Bio is deploying a battery of state-of-the-art, genome mining technologies to access powerful natural product drugs that have been historically "hidden" within microbes. The history of natural product pharmaceuticals has taught that most natural products derived from microorganisms cannot be detected under normal laboratory conditions. Warp Drive Bio has assembled a vast genomic database of over 135,000 strains encoding more than four million biosynthetic gene clusters. To exploit this genomic resource, Warp Drive Bio has developed a proprietary "genomic search engine" that enables hidden natural products to be revealed on the basis of their genomic signature. We then deploy our "genomes to molecule" synthetic biology platform to engineer and express novel natural products, so they can be isolated and tested for biological impact. Warp Drive Bio is thus opening - for the first time - the complete natural product armamentarium for drug discovery.

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³ European Medicines Agency,
http://www.ema.europa.eu/ema/index.jsp?curl=pages/special_topics/general/general_content_000439.jsp