

NGD CEO Paul Rhodes Announces Publication in the Journal of Clinical Microbiology Validating Machine Learning-Based Resistance Prediction

Next Gen Diagnostics, which is bringing whole genome sequencing to clinical microbiology and Vanderbilt University Medical Center announce publication in the Journal of Clinical Microbiology of a study indicating that accuracy of a machine learning model of resistance to cefepime in E. coli is greater than that of the in vitro standard of care.

NASHVILLE ([PRWEB](#)) February 08, 2023 -- Next Gen Diagnostics, which is bringing whole genome sequencing to clinical microbiology, and Vanderbilt University Medical Center announce publication in the Journal of Clinical Microbiology of a study indicating that accuracy of a machine learning model of resistance to cefepime in E. coli is greater than that of the in vitro standard of care. These results, for a clinically significant drug-species combination, add to the evidence suggesting consideration of sequence, versus in vitro tests, as the basis for selection of infection therapy.

“We have had reason to suspect that sequence will be a more information-rich and predictive basis for guidance of therapy than available in vitro testing,” said Vanderbilt Professor Romney M. Humphries, who led the validation study. “In this study we had the opportunity to confirm this proposition for a clinically critical antimicrobial agent versus the most common pathogenic Gram-negative species. In fact, the accuracy of the sequence-based prediction was greater than test-to-test repeatability of the gold standard broth microdilution method itself.”

NGD has assembled one of the world’s largest databases of bacterial sequence coupled with antibiotic susceptibility profile, and has innovated machine learning methods to build validated models predicting antibiotic resistance from sequence. In the published study 100 E. coli sequence files were furnished to NGD blind (i.e. without any other information) and the NGD ML model was applied to determine susceptibility or non-susceptibility to cefepime, a fourth generation cephalosporin. Cefepime is widely used clinically to treat highly drug resistant Gram-negative infections, yet available in vitro methods have been shown to be inaccurate for these strains

“NGD’s aim is to bring sequence-based diagnostics to clinical microbiology, and this study is a key step towards that goal,” noted NGD CEO Dr. Paul A. Rhodes. “We have many more drug-species combinations where the machine-learning model is more accurate than that reported for in vitro tests, and are developing a sequence-based testing system under the quality management framework required for clinical validation and regulatory clearance for use in patient care. From what we have seen in this and other studies, it appears that sequence will ultimately be a more accurate predictor of resistance than in vitro tests; if so, then sequence not only can but should be used to select medication to treat infection.”

The study, titled “Machine-Learning Model for Prediction of Cefepime Susceptibility in Escherichia coli from Whole Genome Sequencing Data”, was accepted on January 19 for publication in the Journal of Clinical Microbiology.

About Next Gen Diagnostics

NGD, founded by Dr. Paul A. Rhodes along with Sanger Institute group leaders, has built and validated world-leading automation of pathogen bioinformatics enabling high throughput low-cost clinical use of WGS. In



addition, NGD holds the exclusive rights to a unique microfluidic sample preparation system for clinical and commercial applications of pathogen WGS. NGD offers a high volume turn-key sequencing service to enable detection of transmission in hospitals, and is working with leading collaborators in the US, Europe and Israel to be among the first to bring WGS-based regulated diagnostics to patient care. NGD is based in the US, with subsidiaries based in Cambridge, UK and in Israel.

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