

Metagenomic Next-Generation Sequencing (mNGS) Assay for Detection of Respiratory Pathogens

Tech ID: 34506 / UC Case 2023-161-0

VALUE PROPOSITION

Recent outbreaks, including the 2019 COVID-19 pandemic from SARS coronavirus 2 (SARS-CoV-2) and the 2022 monkeypox outbreak, have underscored the importance of broad-based agnostic approaches for rapid identification of novel pathogens and for diagnosis of emerging and re-emerging infectious diseases. Accurate diagnostic tests for infections are urgently needed for the care of severely ill hospitalized patients, as up to 50% of patients with presumptive infectious disease syndromes, including meningoencephalitis, sepsis, and pneumonia, remain undiagnosed despite extensive conventional microbiological testing. Timely and accurate diagnosis of these infections can guide appropriate treatment with antimicrobial agents and improve clinical outcomes. In addition, early detection and rapid characterization of causative outbreak agents are critical to informing public health interventions, disease containment, and diagnostic test development.

TECHNOLOGY DESCRIPTION

UCSF investigators have developed a clinically validated assay (standard operating procedure) for broad-based metagenomic detection of respiratory pathogens (viruses, bacteria, fungi, and parasites), as well as optimized an agnostic respiratory mNGS assay for detection of pathogens from respiratory fluids (nasal swabs, endotracheal aspirates, and bronchoalveolar lavage fluids).

RELATED MATERIALS

- ▶ Gu, W., Deng, X., Lee, M., Sucu, Y. D., Arevalo, S., Stryke, D., Federman, S., Gopez, A., Reyes, K., Zorn, K., Sample, H., Yu, G., Ishpuniani, G., Briggs, B., Chow, E. D., Berger, A., Wilson, M. R., Wang, C., Hsu, E., & Miller, S. (2021). Rapid pathogen detection by metagenomic next-generation sequencing of infected body fluids. *Nature Medicine*, 27(1), 115–124.
- ▶ Langelier, C., Kalantar, K. L., Moazed, F., Wilson, M. R., Crawford, E. D., Deiss, T., Belzer, A., Bolourchi, S., Caldera, S., Fung, M., Jauregui, A., Malcolm, K., Lyden, A., Khan, L., Vessel, K., Quan, J., Zinter, M., Chiu, C. Y., Chow, E. D., & Wilson, J. (2018). Integrating host response and unbiased microbe detection for lower respiratory tract infection diagnosis in critically ill adults. *Proceedings of the National Academy of Sciences*, 115(52), E12353–E12362.

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OTHER INFORMATION

KEYWORDS

metagenomic, next generation sequencing, COVID, sepsis, pneumonia, meningoencephalitis, respiratory pathogens

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Bioinformatics
 - ▶ Health
- ▶ **Medical**
 - ▶ Devices
 - ▶ Diagnostics
 - ▶ Disease: Infectious Diseases
 - ▶ Research Tools
 - ▶ Screening
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