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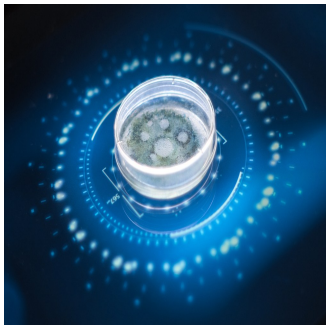
Faster, Effective Antibiotic Treatment of Sepsis Using AI



Sepsis is a life-threatening complication causing nearly 1.7 million hospitalisations and 350,000 deaths annually in the U.S. Rapid and accurate diagnosis is critical, as the risk of mortality increases by up to 8% for each hour that effective treatment is delayed. Currently, the diagnostic standard relies on culture growth, which typically takes 2-3 days. While waiting for a precise diagnosis, doctors often administer broad-spectrum antibiotics, which can have limited efficacy and potential toxicity.

A study presented at ASM Microbe introduced a novel approach to antimicrobial susceptibility testing using artificial intelligence (AI). Their system eliminates the need for culture growth by analysing bacterial whole genomes directly extracted from patient blood samples. Interim findings are based on samples collected from four hospitals in the Boston area.

Unlike traditional methods that depend on known resistance genes, the machine learning algorithms autonomously identify drivers of resistance and susceptibility using data from a continuously expanding database of over 75,000 bacterial genomes and 800,000 susceptibility test results. This enables rapid and accurate predictions of antimicrobial resistance, potentially transforming sepsis diagnosis and treatment.

The result is a first-of-its-kind demonstration of comprehensive and high-accuracy antimicrobial susceptibility and resistance predictions on direct-from-blood clinical samples. This represents a critical demonstration of the feasibility of rapid machine learning-based diagnostics for antimicrobial resistance that could revolutionise treatment, reduce hospital stays, and save lives.

The researchers emphasise the need for further study due to the limited sample size, but the findings could lead to significant advancements in patient outcomes amidst the rising threat of antimicrobial resistance and the necessity for rapid sepsis diagnosis and treatment.

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Source: American Society for Microbiology
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