

EMERGING COMPANY PROFILE

INFORMING INFECTION

By Virginia Li, Assistant Editor

Inflammatix Inc. measures gene expression patterns in host cells to diagnose and inform treatment decisions for acute infections and sepsis faster than marketed tests. By following the host response, not the pathogen, the company can distinguish bacterial from viral infections and determine the risk of sepsis.

CEO Tim Sweeney told BioCentury Inflammatix is targeting the rapid PCR-based diagnostic for point-of-care use, based on its ability to measure the immune response in under an hour. He noted that most marketed tests take multiple days to read out, leading physicians to select a treatment based on clinical symptoms rather than the nature of an infection.

Moreover, most available culture- and sequencing-based diagnostics test for the presence of specific organisms in the blood. But about 70% of infections don't reach the bloodstream, Sweeney said.

Inflammatix's technology uses bioinformatics and proprietary algorithms to read patterns of gene expression in white blood cells. It integrates the patterns into scores that can provide information on what kind of infection is present, regardless of tissue.

The company spun out of Stanford University in 2016 with an exclusive license to two tests: HostDx Fever and HostDx Sepsis.

HostDx Fever, designed for outpatient settings, uses a seven-gene host response signature that distinguished viral from bacterial infections with a 95% sensitivity and 80% specificity, as described in a 2016 *Science Translational Medicine* paper.

Sweeney said HostDx Fever will diagnose patients with sore throats or other respiratory infections to determine whether the infection is bacterial and requires antibiotics.

HostDx Sepsis, designed for inpatient settings, can detect whether an infection is present and uses a 30-gene panel to stratify patients for the risk of sepsis.

The 30-gene signature consists of the seven genes in HostDx Fever, 11 genes described by Sweeney and colleagues in a 2015 *Sci. Transl. Med.* study, and 12 more the group published this month in *Nature Communications*. The 11-gene panel differentiates between the presence or absence of infection; together with the seven-gene panel, it creates a signature that determines whether antibiotics are needed. The 12-gene signature predicts 30-day mortality in patients with community-acquired sepsis or hospital-acquired infections.

HostDx Fever and HostDx Sepsis read out in 30 and 60 minutes, respectively.

Inflammatix has more than 1,800 patients enrolled in prospective studies to validate the clinical and analytical performance of the two HostDx tests, which the company expects to bring to market in 18-24 months.

MeMed Diagnostics Ltd. markets ImmunoXpert to distinguish between bacterial and viral infections within two hours based on three immune system biomarkers. The company is also developing the point-of-care diagnostic ImmunoPoC to distinguish between infection types within 15 minutes.

INFLAMMATIX INC., Burlingame, Calif.
Technology: Rapid molecular diagnostics that read host immune response
Disease focus: Infectious disease
Clinical status: N/A
Founded: 2016 by Tim Sweeney, Jonathan Romanowsky, Purvesh Khatri
University collaborators: Stanford University
Corporate partners: Undisclosed
Number of employees: 12
Funds raised: <\$10 million
Investors: Khosla Ventures
CEO: Tim Sweeney
Patents: None issued

Sweeney declined to compare HostDx Fever to MeMed's tests, given the lack of head-to-head data.

HostDx Sepsis' main competitors are marketed diagnostics that measure host immune responses by analyzing procalcitonin levels. At least three companies market procalcitonin tests to assess sepsis risk.

However, Sweeney said those tests can't distinguish between infection and normal inflammation following traumatic injury. Preliminary data reported at the American Surgical Congress last year suggested an 11-gene subset of HostDx Sepsis could diagnose infections following traumatic injury more accurately than procalcitonin.

Inflammatix has raised an undisclosed amount under \$10 million in venture funding, which provides runway through YE18. The newco is pursuing another round of undisclosed size to take HostDx Fever and HostDx Sepsis through commercialization. ■

COMPANIES AND INSTITUTIONS MENTIONED

Inflammatix Inc., Burlingame, Calif.
 MeMed Diagnostics Ltd., Tirat Carmel, Israel
 Stanford University, Stanford, Calif.

REFERENCES

Sweeney, T., et al. "A comprehensive time-course-based multicohort analysis of sepsis and sterile inflammation reveals a robust diagnostic gene set." *Science Translational Medicine* (2015)
 Sweeney, T., et al. "Robust classification of bacterial and viral infections via integrated host gene expression diagnostics." *Science Translational Medicine* (2016)
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