T2MR® Technology

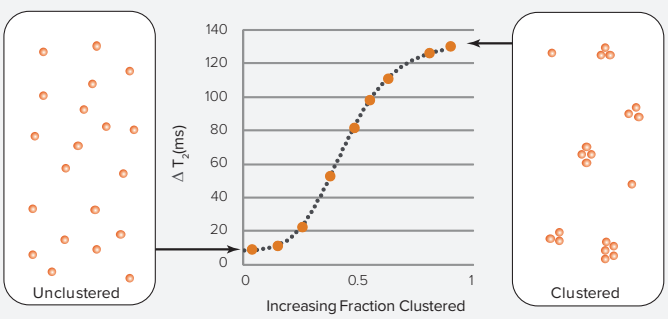
Redefining rapid, molecular diagnostics

T2 Magnetic Resonance (T2MR) is a proven diagnostic detection method–combining proven magnetic resonance with innovative nanotechnology to accurately identify molecular targets within patient samples without the need for purification or extraction. The T2MR technology platform offers a fast, simple and sensitive alternative to existing diagnostic methodologies.

How it works

T2MR technology works by measuring how water molecules react—the T2 relaxation signal—in the presence of magnetic fields, utilizing the same magnetic resonance-based approach found in MRI, but on a miniaturized scale.

1. T2MR introduces superparamagnetic particles coated with one or more target-specific binding agents to a sample.
2. In a patient sample containing the target pathogen, the particles bind to, and cluster around the target.
3. This clustering disrupts the microscopic magnetic fields experienced by the surrounding water molecules which in turn, alters the T2 relaxation signal, indicating the pathogen's presence in the sample.



Particles bind to and cluster around the target.

T2MR technology reduces steps, saves time and improves efficiency

- Detects in a variety of unpurified samples
- Direct from whole blood
  - No blood culture
  - No purification of nucleic acids
  - No extraction of nucleic acids
- Exquisite sensitivity
- Detection as low as 1 CFU/mL
- No interference from antimicrobials

Fun Fact!

T2 refers to the measurement of the reaction of water molecules in the presence of magnetic fields. This is what our T2MR technology measures and is the source of the T2 Biosystems name.

T2Biosystems®

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T2MR Technology

Early identification faster than ever

Low limits of detection & high sensitivity

T2MR offers low limits of detection–as low as 1 CFU/mL– allowing detection directly from whole blood and demonstrates an exquisite sensitivity compared to the 100 to 1,000 CFU/mL required by PCR-based *in vitro* diagnostics.

Powered by T2MR, T2Direct Diagnostics enables the lab to more accurately identify infections. In a peer-reviewed publication, the T2Candida Panel demonstrated superiority to blood culture for the detection of candidemia and invasive candidiasis[1] and recognized deep seated infections that blood culture could not detect. Additionally, T2Candida performed equally as well in the presence of antimicrobial therapy which has been shown to inhibit blood culture's ability to detect pathogens.

And, recent studies have demonstrated T2Bacteria identified more patients with infections that were missed by blood culture.[2]

T2MR for other applications

Over 200 studies published in peer-reviewed journals have featured T2MR in a breadth of applications including the direct detection and measurement in a broad range of unpurified sample types such as whole blood, plasma, serum, saliva, sputum and urine. The potential applications for T2MR extend within and outside of the *in vitro* diagnostics market, including environmental, food safety, industrial and veterinary applications.

The core of T2Direct Diagnostics™

T2Direct Diagnostics the first and only FDA-cleared suite of products utilized to identify some of the most common and deadly sepsis-causing pathogens directly in whole blood without the wait for blood culture, delivers faster, easier and more accurate results in 3 to 5 hours. With a sensitivity of over 91% and a specificity of over 98%, the laboratory can help clinicians administer targeted therapy in hours versus days.

To learn more about T2MR technology
email info@t2biosystems.com or
visit www.t2biosystems.com

1. PLoS ONE, www.plosone.org, October 2010, Volume 5, Issue 10, e13387
2. Giulia De Angelis, Brunella Posteraro, Elena De Carolis, Giulia Menchinelli, Francesco Franceschi, Mario Tumbarello, Gennaro De Pascale, Teresa Spanu, Maurizio Sanguinetti; T2Bacteria magnetic resonance assay for the rapid detection of ESKAPEc pathogens directly in whole blood, Journal of Antimicrobial Chemotherapy, Volume 73, Issue suppl_4, 1 March 2018, Pages iv20–iv26, https://doi.org/10.1093/jac/dky049

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