

PATIENT SCENARIO	KARIUS RESULTS	CASE DETAILS
Sepsis and respiratory failure	<i>Mycobacterium tuberculosis</i>	<p>Patient History An elderly male was admitted to ICU with sepsis and respiratory failure. He clinically worsened despite broad-spectrum antibiotics.</p> <p>Tests Performed CXR showed bilateral pulmonary infiltrates. Routine cultures, including from BAL, were negative. BAL AFB smear was negative.</p> <p>Clinical Hypothesis Cause of sepsis uncertain</p> <p>Karius Test Result <i>Mycobacterium tuberculosis</i></p> <p>Outcome The patient was started on antituberculosis treatment and steadily improved. AFB culture of the sputum eventually grew <i>M. tuberculosis</i> after three weeks, and a bone marrow biopsy showed granulomas, consistent with disseminated tuberculosis.</p>
Sepsis and endocarditis	<i>Kingella kingae</i>	<p>Patient History A child with history of rheumatic heart disease and placement of a prosthetic valve due to mitral valve insufficiency was admitted to ICU with fever and heart failure. He was empirically treated with linezolid/doxycycline.</p> <p>Tests Performed Echocardiogram revealed destruction of the mitral valve with severe insufficiency and a large vegetation. Blood cultures were negative.</p> <p>Clinical Hypothesis Culture-negative endocarditis</p> <p>Karius Test Result <i>Kingella kingae</i></p> <p>Outcome Linezolid was switched to cefazolin. Patient eventually underwent valve replacement. 16s rRNA PCR of the vegetation eventually detected <i>Kingella kingae</i>.</p>
Sepsis, altered mental status, and ARDS	<i>Capnocytophaga canimorsus</i>	<p>Patient History A male with history of asplenia was admitted to ICU with hypotension, altered mental status, and ARDS. Broad empiric antimicrobial treatment was initiated.</p> <p>Tests Performed Blood cultures were initially negative, but Gram stain of the buffy coat revealed Gram-negative rods.</p> <p>Clinical Hypothesis Cause of sepsis uncertain</p> <p>Karius Test Result <i>Capnocytophaga canimorsus</i></p> <p>Outcome The antibiotic regimen was streamlined. Blood culture eventually grew GNRs which were identified as <i>C. canimorsus</i> more than a month later.</p>

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Above is a description of some recent results of the Karius™ Test. Results may vary. Performance data can be found at kariusdx.com.

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Pulmonary nodule	<i>Rhizopus oryzae</i>	<p>Patient History A child with high-risk pre-B-cell ALL was admitted for fever and neutropenia. She was found to have <i>Klebsiella pneumoniae</i> bacteremia. Fevers initially improved with antibiotics but subsequently recurred.</p> <p>Tests Performed Chest CT revealed a large pulmonary nodule.</p> <p>Clinical Hypothesis Invasive fungal infection suspected</p> <p>Karius Test Result <i>Rhizopus oryzae</i></p> <p>Outcome Targeted antifungal therapy was initiated as a result of the Karius test.</p>
Multiple lung nodules	<i>Coccidioides posadasii</i>	<p>Patient History A child with history of relapsed leukemia and bone marrow transplant was admitted with two weeks of fever, cough, and thigh pain. The patient was treated empirically with broad-spectrum antibacterial and antifungal therapy.</p> <p>Tests Performed Chest CT showed multiple lung nodules and MRI of his legs showed microabscesses. Bronchoalveolar lavage cultures were initially negative.</p> <p>Clinical Hypothesis Invasive fungal infection suspected</p> <p>Karius Test Result <i>Coccidioides posadasii</i></p> <p>Outcome Patient was placed on targeted antifungal treatment. Bronchoalveolar lavage cultures eventually grew <i>Coccidioides sp.</i>, confirmed to be <i>C. posadasii</i> weeks after the Karius result.</p>
Brain abscess	<i>Toxoplasma gondii</i>	<p>Patient History An adult male with newly diagnosed HIV was found to have a brain abscess.</p> <p>Tests Performed <i>Toxoplasma</i> serology was positive, but patient had a brain biopsy that was inconclusive.</p> <p>Clinical Hypothesis Diagnosis was uncertain. A second brain biopsy was considered risky since the brain abscess was very close to the basal ganglia.</p> <p>Karius Test Result <i>Toxoplasma gondii</i></p> <p>Outcome Patient was placed on targeted therapy. A second brain biopsy was avoided as a result of the Karius test.</p>

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Neutropenic Fever	<i>Rhizopus oryzae</i>	<p>Patient History 6 year-old male with pre-B cell acute lymphoblastic leukemia admitted for neutropenic fever and treated with cefepime. He showed rapid defervescence and improvement, but had recurrence of fevers after 1 week.</p> <p>Tests Performed Extensive laboratory work-up for prolonged fevers came back negative. Chest imaging showed a right lower lobe nodular consolidation with cavitation and suggestion of a “halo sign.”</p> <p>Clinical Hypothesis Invasive fungal infection</p> <p>Karius Test Result <i>Rhizopus oryzae</i></p> <p>Outcome Patient was treated for presumed pulmonary zygomycosis with amphotericin and posaconazole for 6 weeks. He eventually had resection of affected lung, with tissue evaluation showing fungal elements but negative cultures.</p>
Right Upper Lobe Pneumonia	<i>Streptococcus pneumoniae</i>	<p>Patient History 4 year-old female with 5 days of dry cough and fevers up to 102F. After imaging below, she was sent home on oral amoxicillin but developed chest pain while coughing, difficulty breathing and worsening abdominal pain. Started on ceftriaxone and vancomycin in the ED.</p> <p>Tests Performed Chest imaging showed right upper lobe consolidation and clinical exam was consistent with otitis media.</p> <p>Clinical Hypothesis Refractory pneumonia / parapneumonic effusion</p> <p>Karius Test Result <i>Streptococcus pneumoniae</i></p> <p>Outcome Treatment was narrowed to ceftriaxone alone and eventually switched to oral amoxicillin. Karius testing revealed the organism causing the pneumonia, allowing for more narrow antibiotic use and avoidance of a pleurocentesis.</p>

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Culture-negative Endocarditis	<i>Kingella kingae</i> (HACEK group)	<p>Patient History 9 year-old female with history of rheumatic heart disease and severe mitral insufficiency for which she underwent a mitral valve replacement 3 years ago. Patient presented with prolonged fever, tachycardia and echocardiographic findings of a vegetation on her prosthetic mitral valve. She was started on intravenous vancomycin and rifampin.</p> <p>Tests Performed Initial blood cultures were negative, but antibiotics were continued. An echocardiogram showed destruction of the mitral valve with severe mitral insufficiency, mitral stenosis, and vegetation formation. The patient was started on linezolid and gentamicin. Repeat blood cultures were also negative, as were a series of serologic lab tests for fastidious organisms. The patient was empirically switched from linezolid/gentamicin to linezolid/doxycycline.</p> <p>Clinical Hypothesis Infective endocarditis</p> <p>Karius Test Result <i>Kingella kingae</i> (HACEK group)</p> <p>Outcome Antibiotics were narrowed to ceftriaxone. The patient ultimately underwent surgical valve replacement, with pathologic evaluation of the explanted mitral valve showing diffuse eosinophilic necrosis with dystrophic calcification. Bacterial PCR of explanted valve tissue revealed <i>Kingella</i> species.</p>

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