



## A Guide to Performing the Modified Hodge Test Using MicroBioLogics® QC Microorganisms

MicroBioLogics® recently added the CLSI recommended Quality Control Microorganisms for the Modified Hodge Test (MHT) to its product line. The MHT is an important tool for detecting *Klebsiella pneumoniae* carbapenemase (KPC) in *Enterobacteriaceae*.

KPCs are class A carbapenemases that reside on transferable plasmids and are capable of inactivating carbapenems, such as imipenem and meropenem. Since carbapenems are often used to treat infections caused by extended-spectrum beta lactamase (ESBL)-producing Gram-negative bacteria, carbapenemase production in *Enterobacteriaceae* can significantly limit treatment options for life-threatening diseases. KPCs occur most commonly in *Klebsiella pneumoniae* but have been seen in other species of *Enterobacteriaceae* as well.

CLSI (Clinical Laboratory Standards Institute) recommends the MHT be performed before reporting carbapenem susceptibility results if a clinical isolate has an elevated but susceptible carbapenem MIC. Susceptibility results may be reported out without performing the MHT if a clinical isolate is intermediate or resistant to carbapenems, but clinical laboratories may want to perform the MHT for infection control and epidemiological reasons.

To perform the MHT, a suspension of the carbapenem susceptible strain of *E. coli* ATCC® 25922™\* (MicroBioLogics® 0335) is prepared, diluted, and swabbed in lawn-like fashion across a Mueller Hinton plate. A 10 µg meropenem or ertapenem susceptibility disk is placed in the center of the test plate. The test microorganism is streaked in a straight line from the edge of the disk to the edge of the plate. The plate is incubated overnight. A positive test will show growth of the *E. coli* ATCC® 25922™\* on the microorganism streak line towards the carbapenem disk. A negative test will show no growth of the *E. coli* on the microorganism streak line.

A positive test indicates carbapenemase production by the test microorganism. By producing carbapenemase, the test microorganism is able to inactivate the carbapenem that diffuses from the disk after the disk has been placed on the Mueller Hinton Agar. This allows carbapenem susceptible *E. coli* ATCC® 25922™\* to grow toward the disk. A negative test indicates no carbapenemase production by the test microorganism.

The quality control microorganisms used in the MHT are as follows:

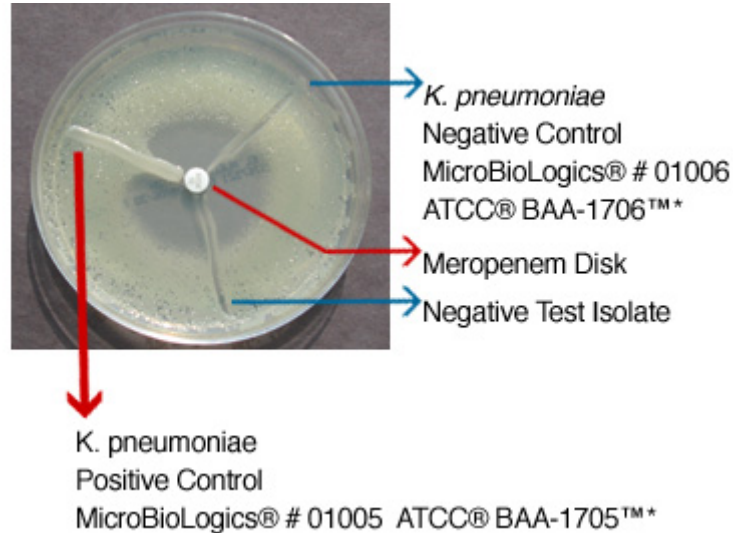
MHT positive *Klebsiella pneumoniae*, ATCC® BAA-1705™\*, MicroBioLogics® # 01005

MHT negative *Klebsiella pneumoniae*, ATCC® BAA-1706™\*, MicroBioLogics® # 01006

# MicroBioLogics®

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Below is a picture of the MHT test using MicroBioLogics Quality Control microorganisms.



Detailed instructions for the MHT can be found in the CLSI book, “Performance Standards for Antimicrobial Susceptibility Testing: Nineteenth Informational Supplement”. The procedure is also described by CDC in a pamphlet available online called, “Modified Hodge Test for Carbapenemase Detection in *Enterobacteriaceae*”. [Click here to download the pamphlet as a PDF](#)

### References

CLSI. 2009. *Performance Standards for Antimicrobial Susceptibility Testing: Nineteenth Informational Supplement*. CLSI document M100-S19, pages 136-139. Wayne, PA; Clinical Laboratory Standards Institute.

CDC. 2009. *Modified Hodge Test for Carbapenemase Detection in Enterobacteriaceae*. CDC Protocol. Centers for Disease Control and Prevention Antimicrobial Resistance Team. CDC, Atlanta GA.

CDC. Slide Presentation. 2009. Jean B. Patel. *Carbapenem-Resistant Enterobacteriaceae (CRE) Detection and Control*.

CDC. Slide Presentation. 2009. Jean B. Patel. *VISA, hVISA,  $\beta$ -lactamases in Enterobacteriaceae*



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