510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
DEVICE ONLY TEMPLATE

A. 510(k) Number:
k050075

B. Purpose of Submission:
To include Daptomycin on the VITEK®2 gram positive AST panel for testing appropriate gram positive isolates.

C. Analyte:
Daptomycin at ≤0.5 - ≥16µg/ml

D. Type of Test:
Quantitative and Qualitative growth based detection algorithm using optics light detection

E. Applicant:
bioMerieux, Inc.

F. Proprietary and Established Names:
VITEK® 2 Gram Positive Daptomycin

G. Regulatory Information:

1. Regulation section:
   866.1645 Short-Term Antimicrobial Susceptibility Test System
2. Classification:
   II
3. Product Code:
   LON System, Test, Automated, Antimicrobial Susceptibility, Short Incubation
4. Panel:
   83 Microbiology

H. Intended Use:

1. Intended use(s):
   The VITEK® 2 Antimicrobial Susceptibility Test (AST) is intended to be used with the VITEK® 2 System for the automated quantitative or qualitative susceptibility testing of isolated colonies for the most clinically significant aerobic gram-negative bacilli, *Staphylococcus spp*., *Enterococcus spp*., *Streptococcus agalactiae*, and *S. pneumoniae.*

   The VITEK®2 Gram Positive susceptibility Card is intended for use with the VITEK 2 System in clinical laboratories as an *in vitro* test to determine the susceptibility of *Staphylococcus spp*., *Enterococcus spp*., and *Streptococcus*

agalactiae to antimicrobial agents when used as instructed in the Online Product Information.

2. Indication(s) for use:
   This submission is for the addition of the antibiotic Daptomycin at concentrations at 8,16 and 32 ug/mL for a calling range of ≤0.5-≥16ug/mL to the VITEK®2 gram positive susceptibility CARD for the testing of appropriate gram positive isolates.

3. Special condition for use statement(s):
   Prescription Use only.
   The ability of the AST card to detect resistance among the appropriate gram positive isolates with daptomycin is unknown because resistant strains among the gram positive isolates tested were not available at the time of comparative testing.
4. Special instrument Requirements:
   Not applicable

I. Device Description:

Each VITEK® 2 test card contains 64 microwells. A control well, that contains only microbiological culture medium is resident on all cards, with the remaining wells containing premeasured amounts of a specific antibiotic combined with culture medium. A suspension of organism is made in 0.45 % sterile saline from a pure culture and standardized to a McFarland 0.5 standard using the DensiChek. The desired card (s) are placed in the cassette along with an empty tube for the susceptibility card. The cassette is placed into the VITEK® 2 instrument where a susceptibility test will be automatically diluted from the ID suspension by the VITEK® 2. The cards are then automatically vacuum filled; the tubes are cut and the cards sealed prior to proceeding to the incubator/reader for incubation (35.5^{o} C) and optical scanning during testing. Minimum Inhibitory Concentration (MIC) readings are performed every 15 minutes.

There is also an alternate manual dilution method of the organism that is recommended in the package insert.

J. Substantial Equivalence Information:

1. Predicate device name(s):
   VITEK®2 Gram Positive AST Panel for linezolid
2. Predicate K number(s):
   K032766
3. Comparison with predicate:

Similarities		
Item	**Device**	**Predicate**
Intended Use	AST testing of gram positive isolates	Same
Test organism	Colonies of *Staphylococcus spp.*, *Enterococcus spp.*, *Streptococcus agalactiae*	Same
Test Card	VITEK® 2 card format with base broth	Same
Instrument	VITEK® 2 System	Same
Performance	MIC and categorical interpretation	MIC and categorical
Differences		
Item	**Device**	**Predicate**
Antibiotic	Daptomycin	Linezolid
Reading algorithm	Unique for Daptomycin	Unique for Linezolid

K. Standard/Guidance Document Referenced (if applicable):

Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA"; CLSI M7 (M100-S15) "Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standard".

L. Test Principle:

Optics systems use visible light to directly measure organism growth. These transmittance optics are based on an initial light reading of a well before significant growth has begun. Periodic light transmittance samplings of the same well measure organism growth by how much light is prevented from going through the well. An interpretive call is made between 4 and 16 hours for an early reading of results with an option to incubate up to 18 hours if necessary. The VITEK®2 Susceptibility Card test is based on the microdilution minimum inhibitory concentration technique with concentrations equivalent to standard method concentrations. Several parameters based on the growth characteristics observed are used to provide appropriate input for the MIC calculations. Discriminate analysis is used to develop the algorithm that determines the susceptibility result for all antimicrobials on the VITEK® 2 system. The MIC result must be linked to an organism identification in order to determine a category interpretation. An MIC along with a category interpretation will be reported.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:
   a. ***Precision/Reproducibility:***

      Ten on-scale gram positive organisms were tested in triplicate at each of three sites for three days for an overall inter reproducibility of >95%. Ten on-scale organisms were also tested at each site three times each to determine intra reproducibility of >95%. This testing

was performed using both the manual dilution of the inoculum and also the automatic dilution method.

b. Linearity/assay reportable range:
Not applicable

c. Traceability (controls, calibrators, or method):
Quality Control was performed during the studies using both the auto-dilution and the manual method of diluting the organisms. This included the two recommended QC organisms with the following results.

Inoculum density control: Internal verification of the DensiChek was performed using 2 ATCC organisms and five instruments with 50 results available for each organism. The clinical sites also performed weekly standardization of the DensiChek used at that site. All recorded calibrated values were within acceptable parameters.

d. Detection limit:
Not applicable

e. Analytical specificity:
Not applicable

f. Assay cut-off:
Not applicable

2. Comparison studies:

a. ***Method comparison with predicate device****:*
A comparison of the clinical data was performed to the broth microdilution reference method as described in the NCCLS M7. *Staphylococcus spp*., *Enterococcus spp*., and *Streptococcus agalactiae* were tested at three sites that included both clinical and challenge isolates. All of the test organisms that provided results did so in <16 hours. Testing was performed using the auto dilution feature. Since the Staphylococcus and Beta Streptococcus have a different break-point (BP) from the Enterococcus, they are presented separately in the table below:

	total	**EA**	**% EA**	**Total evaluable**	**EA of evaluable**	**% EA**	**CA**	**% CA**	**NS**
Staphylococcus /Beta Strep	444	444	100	4	3	75.0	604	100	1
Enterococcus	273	261	95.6	209	202	96.7	113	100	2
Combined	717	705	98.3	213	205	96.2	717	100	3

EA- essential agreement **NS**-non-susceptible
CA-Category Agreement

Major, very major, and minor errors were not calculated because there is only a susceptible category. The very good EA would demonstrate acceptability. CA is when the interpretation of the reference method agrees exactly with the interpretation of the

VITEK ® 2 results. EA is when there is agreement between the reference method and the Vitek ® 2 results are within plus or minus one serial two-fold dilution of antibiotic. The %EA and CA are acceptable when compared to the reference method as described in the FDA guidance document, "Class II Special Controls Guidance Document: Antimicrobial Susceptibility Test (AST) Systems; Guidance for Industry and FDA".

The challenge set of organisms was also tested at one site using the manual method of inoculation with the following performance that demonstrated that there was little or no difference between the two inoculation methods. There is no evidence of trending.

Manual testing:

	total	**EA**	**%EA**	**Total evaluable**	**EA of evaluable**	**%EA of evaluable**	**CA**	**%CA**	**NS**
Staph	84	84	100	0	0	0	84	100	2
Strep	29	28	96.5	24	24	100	29	100	2
Combined	113	112	99.1	24	24	100	113	100	4

Autodilution testing:

	total	**EA**	**%EA**	**Total evaluable**	**EA of evaluable**	**%EA of evaluable**	**CA**	**%CA**	**NS**
Staph	84	84	100	0	0	0	84	100	1
Strep	29	28	96.5	25	25	100	29	100	2
Combined	113	112	99.1	25	25	100	113	100	3

The test device had a growth rate of >95%.

b. Matrix comparison:
Not applicable

3. Clinical studies:
   a. Clinical sensitivity:
   Not applicable
   b. Clinical specificity:
   Not applicable
   c. Other clinical supportive data (when a and b are not applicable):
   Not applicable
4. Clinical cut-off:
   Not applicable
5. Expected values/Reference range:
   Staphylococcus spp. ≤1 (S)
   Streptococcus agalactiae ≤ 1 (S)
   Enterococcus spp. ≤ 4 (S)

   The expected value range, interpretive criteria and QC are the same as recommended in CLSI and FDA.

   The current absence of data on resistant strains precludes defining any results other than "Susceptible". Strains yielding MIC results suggestive of a "non-

susceptible" category should be submitted to a reference laboratory for further testing.

N. Proposed Labeling

The labeling is sufficient and it satisfies the requirement of 21 CFR Part 809.10

O. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.