

# Mycobacterium tuberculosis, Strain 98-2581

## Catalog No. NR-30870

This reagent is the tangible property of the U.S. Government.

## Product Description:

*Mycobacterium tuberculosis* (*M. tuberculosis*), strain 98-2581 was isolated between 1995 and 2000 from human sputum from an HIV-negative patient infected with pulmonary tuberculosis in North America.

Lot: 70003457<sup>1</sup>

Manufacturing Date: 07JUL2017

| TEST                                                                                                                                                                                                                                                                                                                                                                                            | SPECIFICATIONS                                                                                                                                                                                                                         | RESULTS                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Phenotypic Analysis<sup>2</sup></b><br>Cellular morphology<br>Colony morphology <sup>3</sup><br><br>Growth rate<br>Growth at 26°C<br>Growth at 37°C<br>Acid-fast stain<br>Pigmentation in the dark (Scotochromogen)<br>Photoinduction for 1 hour (Photochromogen)<br>Nonchromogen (no pigment)<br>Biochemical tests<br>Niacin production <sup>4</sup><br>Nitrate reduction<br>Pyrazinamidase | Gram-positive rods<br>Report results<br><br>≥ 7 days<br>Negative<br>Positive<br>Positive (red colonies)<br>Negative (no pigment)<br>Negative (no pigment)<br>Positive (no pigment)<br><br>Positive<br>Positive<br>Positive             | Gram-positive rods<br>Irregular, slightly peaked, undulate, rough and cream (Figure 1)<br>22 days<br>Negative<br>Positive<br>Positive (red colonies)<br>Negative (no pigment)<br>Negative (no pigment)<br>Positive (no pigment)<br><br>Positive<br>Positive<br>Positive |
| <b>Antibiotic Susceptibility Profile</b><br>Sensititre™ System <sup>5,6</sup><br>Amikacin<br>Cycloserine<br>Ethambutol<br>Ethionamide<br>Isoniazid<br>Kanamycin<br>Moxifloxacin<br>Ofloxacin<br>Para-aminosalicylic acid<br>Rifabutin<br>Rifampin<br>Streptomycin                                                                                                                               | Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results<br>Report results | 0.25 µg/mL<br>4 µg/mL<br>1 µg/mL <sup>7-9</sup><br>1.2 µg/mL <sup>7</sup><br>≤ 0.03 µg/mL<br>1.2 µg/mL<br>0.25 µg/mL<br>0.5 µg/mL <sup>9,10</sup><br>≤ 0.5 µg/mL <sup>7</sup><br>≤ 0.12 µg/mL <sup>7</sup><br>0.25 µg/mL <sup>9,11</sup><br>≤ 0.25 µg/mL <sup>7</sup>   |
| <b>Genotypic Analysis</b><br>Sequencing of Heat Shock Protein 65 gene (~ 420 base pairs)                                                                                                                                                                                                                                                                                                        | ≥ 99% sequence identity to <i>M. tuberculosis</i> type strain (GenBank: AL123456)                                                                                                                                                      | 100% sequence identity to <i>M. tuberculosis</i> type strain (GenBank: AL123456) <sup>12</sup>                                                                                                                                                                          |
| <b>Purity (post-freeze)</b><br>Middlebrook 7H10 agar with OADC enrichment <sup>13</sup><br><br>Tryptic Soy agar <sup>14</sup>                                                                                                                                                                                                                                                                   | Growth consistent with expected colony morphology<br>Report results                                                                                                                                                                    | Growth consistent with expected colony morphology<br>Growth consistent with expected colony morphology                                                                                                                                                                  |
| <b>Viability (post-freeze)<sup>3</sup></b>                                                                                                                                                                                                                                                                                                                                                      | Growth                                                                                                                                                                                                                                 | Growth                                                                                                                                                                                                                                                                  |

<sup>1</sup>NR-30870 was produced by inoculation of the deposited material into Middlebrook 7H9 broth with ADC enrichment. Broth inoculum was added to Middlebrook 7H10 agar with OADC enrichment kolles, which were grown for 46 days at 37°C in an aerobic atmosphere with 5% CO<sub>2</sub>. The resulting growth was harvested in Middlebrook 7H9 broth with ADC enrichment supplemented with 10% glycerol and frozen. The frozen material was later thawed and aliquoted into cryovials and frozen to produce this lot.

<sup>2</sup>Information on *Mycobacterium* testing is available from Ribón, W. "Biochemical Isolation and Identification of Mycobacteria." *Biochemical Testing*. (2012) Jose C. Jimenez-Lopez (Ed.), InTech, <http://www.intechopen.com/books/biochemical-testing/biochemical-isolation-and-identification-of-mycobacteria> and Lévy-Frébault, V. V. and F. Portaels. "Proposed Minimal Standards for the Genus *Mycobacterium* and for Description of New Slowly Growing *Mycobacterium* Species." *Int. J. Syst. Bacteriol.* 42 (1992): 315-323. PubMed: 1581193.

<sup>3</sup>22 days at 37°C in an aerobic atmosphere with 5% CO<sub>2</sub> on Middlebrook 7H10 agar with OADC enrichment

<sup>4</sup>All mycobacteria produce niacin but only *M. tuberculosis* accumulates it, resulting in a positive test for *M. tuberculosis*.

<sup>5</sup>Sensititre™ System *Mycobacterium tuberculosis* MIC Plate, Thermo Scientific™, catalog number MYCOTB

<sup>6</sup>Minimum Inhibitory Concentration (MIC); No Clinical & Laboratory Standards Institute (CLSI) interpretations of the Sensititre™ System data for *M. tuberculosis* are currently available.

<sup>7</sup>For ethambutol, ethionamide, para-aminosalicylic acid, rifabutin and streptomycin, the endpoint for these drugs is determined by the well with approximately 80% inhibition of growth compared to the positive control well with no drug.

<sup>8</sup>Two MICs were observed for ethambutol ( $\leq 0.5 \mu\text{g/mL}$  and  $1 \mu\text{g/mL}$ ) under identical test conditions. The highest MIC is being reported as the test result.

<sup>9</sup>Variability in the MIC result by the Sensititre™ method has been demonstrated (Lee, J., et al. "Sensititre MYCOTB MIC Plate for Testing *Mycobacterium tuberculosis* Susceptibility to First- and Second-Line Drugs." *Antimicrob. Agents Chemother.* 58 (2014): 11-18. PubMed: 24100497.), with the results for a single antibiotic typically within one doubling dilution.

<sup>10</sup>Two MICs were observed for ofloxacin ( $\leq 0.25 \mu\text{g/mL}$  and  $0.5 \mu\text{g/mL}$ ) under identical test conditions. The highest MIC is being reported as the test result.

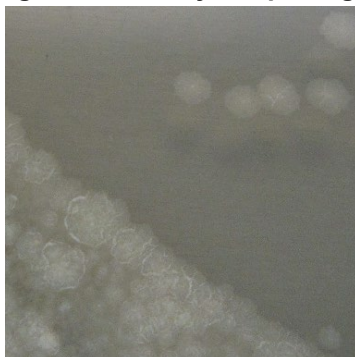
<sup>11</sup>Two MICs were observed for rifampin ( $\leq 0.12 \mu\text{g/mL}$  and  $0.25 \mu\text{g/mL}$ ) under identical test conditions. The highest MIC is being reported as the test result.

<sup>12</sup>Also consistent with *M. africanum*, *M. canettii*, *M. caprae*, *M. bovis* and *M. microti*

<sup>13</sup>Purity of this lot was assessed for 53 days at 37°C in an aerobic atmosphere with 5% CO<sub>2</sub>.

<sup>14</sup>Purity of this lot was assessed for 22 days at 37°C in an aerobic atmosphere with 5% CO<sub>2</sub>.

Figure 1: Colony Morphology



/Heather Couch/  
Heather Couch

29 OCT 2019

Program Manager or designee, ATCC Federal Solutions

ATCC®, on behalf of BEI Resources, hereby represents and warrants that the material provided under this certificate has been subjected to the tests and procedures specified and that the results described, along with any other data provided in this certificate, are true and accurate to the best of ATCC®'s knowledge.

ATCC® is a trademark of the American Type Culture Collection.

You are authorized to use this product for research use only. It is not intended for human use.

