Single bacterial cells under various antimicrobial conditions in microfluidic channel

Bacteria immobilization in a thin agarose channel suitable for:
- Microscopic imaging for cellular analysis
- Diffusion of media for bacteria growth and antibiotics for susceptibility testing

Microfluidic agarose channel technology is implemented in multiwell plate formats with dried antibiotics as ready-to-use kits for susceptibility testing.

Imaging each well every hour

We can determine MIC and SR for antimicrobials by observing bacterial growth in real-time using a patented microfluidic chip.
- Time-lapse tracking of bacterial growth in a MAC chip
- Expertise cellular image analysis and algorithms for determining minimum inhibitory concentration
- S/RA interpretation based on breakpoint and expert rules

You just work on the table 1 minute

- Scan sample barcode
- Load cartridge
- Load Panel
- No sub-culture
- No turbidimetry

dRAST™ Kit
- GRYGR Panels / Gel / Broth

Panels
- GRYGR panel for positive blood culture
- Patented micro-patterned 96 wells with dried 17 GP / 15 SR antibiotics

Gel
- Agarose for immobilizing bacteria

Broth
- Growth media & pipette tip

Fully automated dispensing, incubating, imaging, analysis
- Panel capability up to 12 (additional 8 panels)
- Continuous reading
- Ready to use consumables, reagents
- Automated dispenser for sample, agarose and growth media
- Microscopic optics to check cell growth via thin AgAR Imaging
- Temperature control system for incubation
- Reporting susceptibility results by proprietary algorithm and database

Image processing and analysis software
- Automated image processing for growth measurement
- MIC determination and SR interpretation based on database and expert rules
- Robust and efficient integration of LIB

susceptibility information

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>MIC</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>≤8</td>
<td>S</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>≥32</td>
<td>R</td>
</tr>
<tr>
<td>Colistin</td>
<td>≥4</td>
<td>R</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>≤2</td>
<td>S</td>
</tr>
</tbody>
</table>

Result report:
Automatic MIC determination and SR interpretation
24 well containing one or two concentrations of 13 drugs.

QDSTM™ in an innovative product designed to take full advantage of solid and liquid media based drug susceptibility testing and to identify susceptibility to 13 different drugs in a week using our patented microfluidic chip.

- DST diagnosis systems that produce DST data on 4 first-line drug and 9 second-line drugs in 7 days using microfluidic and imaging technologies.
- Critical concentration for S/R determination
- Multiple concentration for primary antibiotics to detect low/high-level resistance
- Customizable: New drugs can be easily added

QDSTM™ chip to enable time laps single cell imaging of MTB

- QDSTM™ fully automated image processing for and sizing to calculate the growth of the microorganism.
- QDSTM™ can determine the susceptibility of Mycobacterium tuberculosis to various concentrations of antibiotics against control in 7 days.

<table>
<thead>
<tr>
<th>Susceptible</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Line Drugs:</td>
<td></td>
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<tr>
<td>Isoniazide</td>
<td>Streptomycin</td>
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<tr>
<td>Second Line Drugs:</td>
<td></td>
</tr>
<tr>
<td>Capreomycin</td>
<td>Pyrazinamide</td>
</tr>
</tbody>
</table>

Observation of MTB growth and resistant to the drug within 7 days.

3 minutes per one sample to 3 steps of preparation

Step 1: Mixing agarose and loading
Step 2: MTB is immobilized by pulled agarose
Step 3: Loading liquid media

3-level safety

Immunostained MTB in agarose, sealing film, cover with safety lock

Fully automated incubating imaging analysis with 120 random access

- Handle up to 120 samples
- Auto preparation and dispensing to plates
- 37°C incubation
- Time-lapse imaging for checking cell growth
- Susceptible/resistant based on critical concentration

Image processing and analysis software

- Reporting susceptible results by proprietary algorithm and database
- Reliable and efficient integration of LJS
- S/R (Susceptible/Resistant) determination based on data bias and expert system

QDSTM Report

Acknowledgement Information

<table>
<thead>
<tr>
<th>Antibiotic Information</th>
<th>CC</th>
<th>Temperature</th>
<th>Antibiotic</th>
<th>CC</th>
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</thead>
<tbody>
<tr>
<td>Susceptible (S)</td>
<td>1</td>
<td></td>
<td>Sensitive</td>
<td>1</td>
</tr>
<tr>
<td>Resistant (R)</td>
<td>2</td>
<td></td>
<td>Resistant</td>
<td>2</td>
</tr>
<tr>
<td>(MIC)</td>
<td>3</td>
<td></td>
<td>(MIC)</td>
<td>3</td>
</tr>
<tr>
<td>(MIC)</td>
<td>4</td>
<td></td>
<td>(MIC)</td>
<td>4</td>
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</tbody>
</table>

Result report

Result of the QDSTM™ can be provided automatic S/R interpretation