

## SUPPLEMENTARY DATA

### (A) Reference isolates

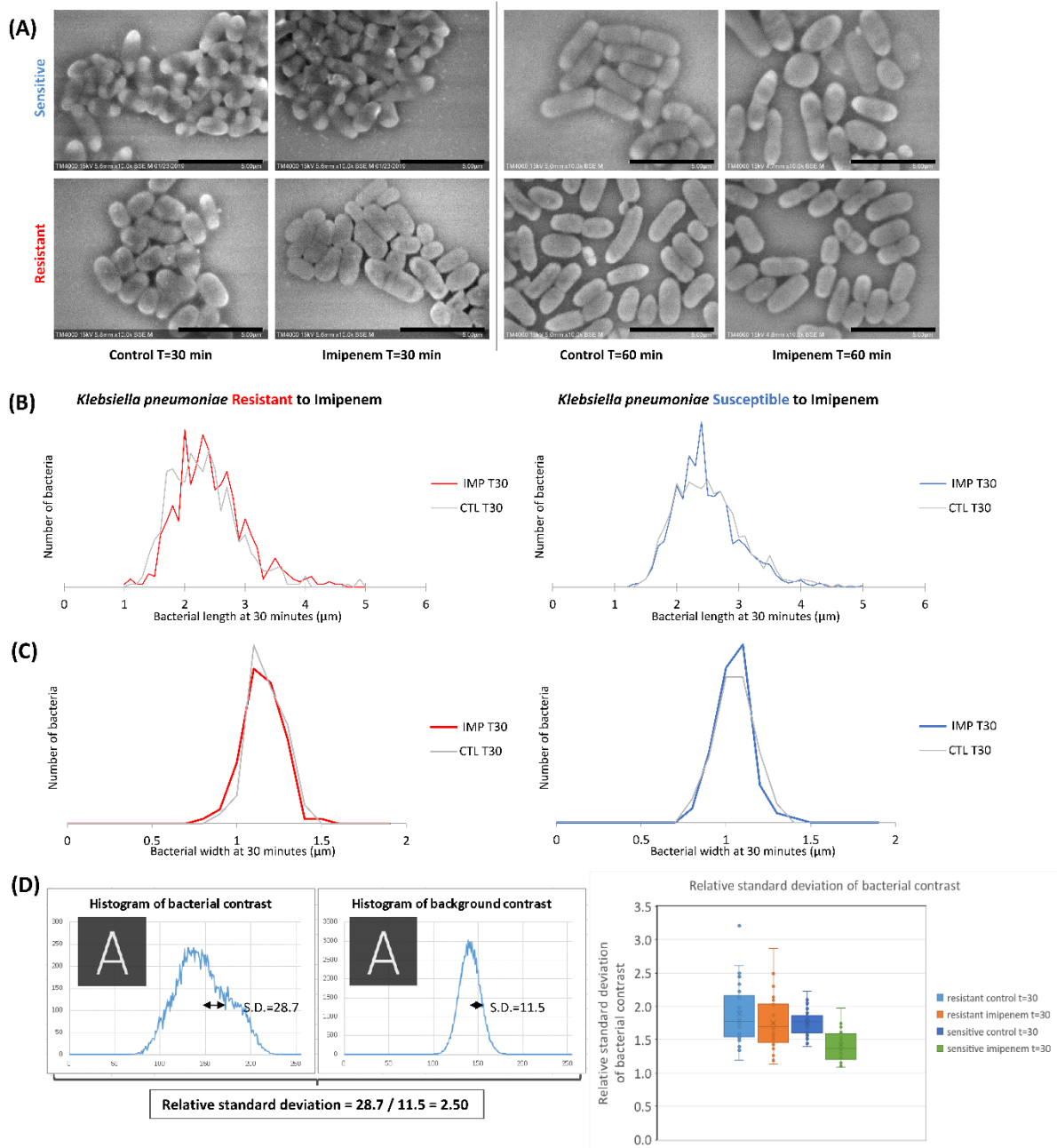
| Species                             | CSUR reference number | Imipenem resistance profile | EUCAST interpretation | E-test    | Resistance gene     |
|-------------------------------------|-----------------------|-----------------------------|-----------------------|-----------|---------------------|
| <i>Pseudomonas aeruginosa</i>       | CSURP9558             | Susceptible                 | 4mg/L                 | 1mg/L     | N/A                 |
|                                     | CSURP9559             | Resistant                   |                       | >32mg/L   | OprD truncated      |
| <i>Klebsiella pneumoniae</i>        | CSURP9552             | Susceptible                 | 2mg/L                 | 0.19mg/L  | N/A                 |
|                                     | CSURP9553             | Resistant                   |                       | 8mg/L     | blaVIM-1            |
| <i>Escherichia coli</i>             | CSURP9547             | Susceptible                 | 0.5mg/L               | 0.25mg/L  | N/A                 |
|                                     | CSURP9546             | Resistant                   |                       | 1.5mg/L   | blaNDM-1            |
| <i>Enterobacter cloacae</i>         | CSURP9549             | Susceptible                 | 1mg/L                 | 0.25mg/L  | N/A                 |
|                                     | CSURP9548             | Resistant                   |                       | 2mg/L     | blaNDM-1            |
| <i>Proteus vulgaris</i>             | CSURP9556             | Susceptible                 | 4mg/L                 | 2mg/L     | N/A                 |
|                                     | CSURP9557             | Resistant                   |                       | >32mg/L   | unknown             |
| <i>Acinetobacter baumannii</i>      | CSURP9541             | Susceptible                 | 1mg/L                 | 0.125mg/L | N/A                 |
|                                     | CSURP9540             | Resistant                   |                       | >32mg/L   | blaOxa-24           |
| <i>Stenotrophomonas maltophilia</i> | CSURP5256             | Resistant                   | N/A                   | >32mg/L   | Naturally resistant |

### (B) Clinical isolates

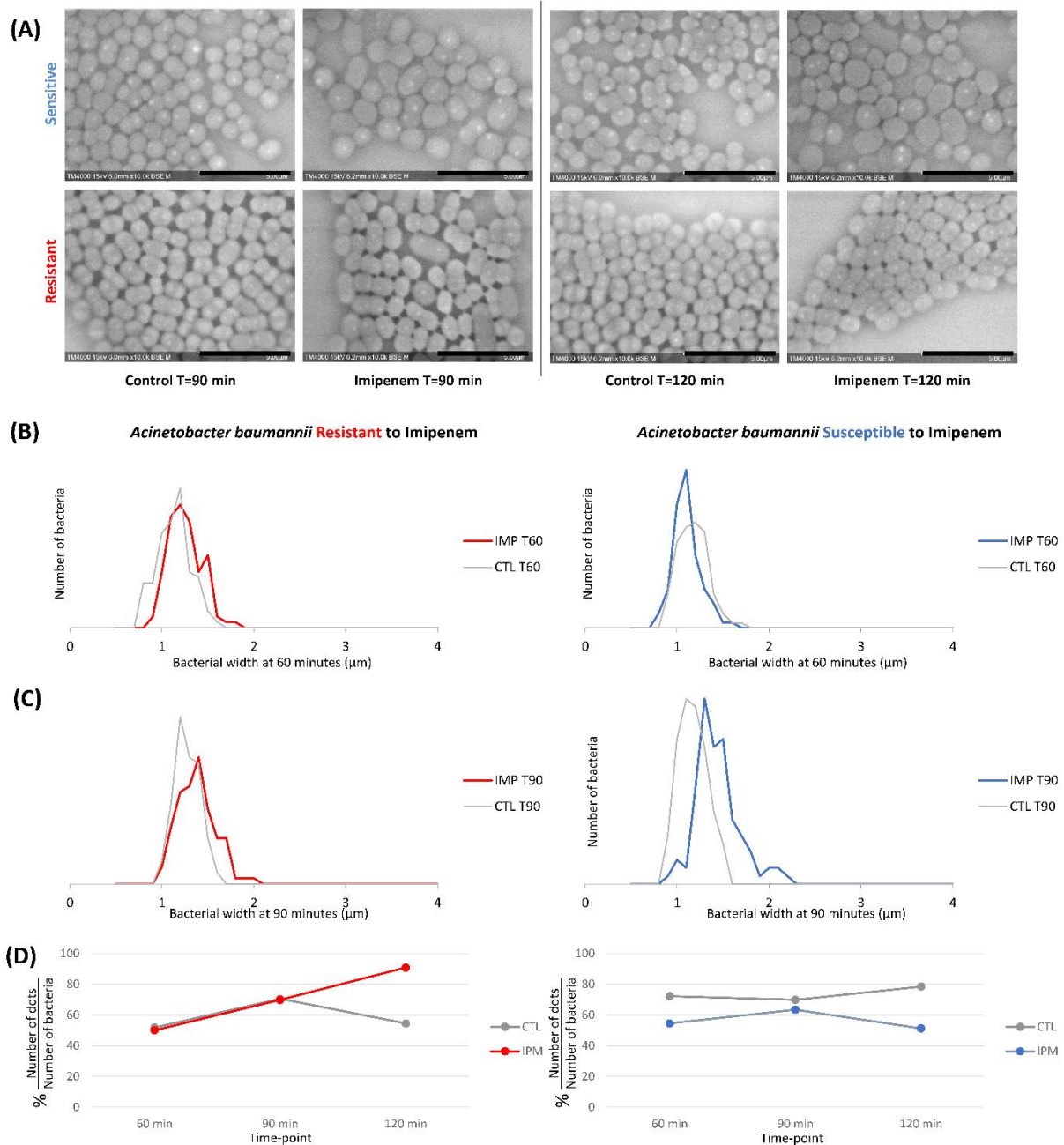
| Species                       | Isolate nature | Imipenem resistance profile | EUCAST interpretation | E-test    | Resistance gene |
|-------------------------------|----------------|-----------------------------|-----------------------|-----------|-----------------|
| <i>Pseudomonas aeruginosa</i> | CSURQ5591      | Susceptible                 | 4mg/L                 | 1.5mg/L   | N/A             |
|                               | CSURQ5592      | Susceptible                 |                       | 1.5mg/L   | N/A             |
|                               | CSURQ5593      | Susceptible                 |                       | 0.38 mg/L | N/A             |
|                               | CSURQ5594      | Susceptible                 |                       | 1.5mg/L   | N/A             |
|                               | CSURQ5330      | Susceptible                 |                       | 1.5 mg/L  | N/A             |
|                               | CSURQ5595      | Resistant                   |                       | >32mg/L   | Unknown         |
|                               | CSURQ5596      | Resistant                   |                       | >32mg/L   | blaVIM-1        |
| <i>Klebsiella pneumoniae</i>  | CSURQ5561      | Susceptible                 | 2mg/L                 | 0.75mg/L  | N/A             |
|                               | CSURQ5565      | Susceptible                 |                       | 0.25mg/L  | N/A             |
|                               | CSURQ5566      | Susceptible                 |                       | 0.5mg/L   | N/A             |
|                               | CSURP9554      | Susceptible                 |                       | 0.25 mg/L | N/A             |
|                               | CSURQ5568      | Susceptible                 |                       | 0.19mg/L  | N/A             |
|                               | CSURQ5569      | Susceptible                 |                       | 0.125mg/L | N/A             |
|                               | CSURQ5562      | Resistant                   |                       | 2 mg/L    | blaOxa-48       |
|                               | CSURQ5563      | Resistant                   |                       | 4mg/L     | blaNDM-1        |
|                               | CSURQ5564      | Resistant                   |                       | 1.5 mg/L  | blaVIM-1        |
|                               | CSURQ5567      | Resistant                   |                       | >32mg/L   | blaNDM-1        |
|                               | CSURQ5570      | Resistant                   |                       | 1.5 mg/L  | blaOxa-48       |
| <i>Escherichia coli</i>       | CSURP1767      | Susceptible                 | 0.5mg/L               | 0.19 mg/L | N/A             |
|                               | CSURQ5583      | Susceptible                 |                       | 0.064mg/L | N/A             |

|                                |           |             |         |            |           |
|--------------------------------|-----------|-------------|---------|------------|-----------|
| <i>Escherichia coli</i>        | CSURQ5584 | Susceptible | 0.5mg/L | 0.125mg/L  | N/A       |
|                                | CSURQ5585 | Susceptible |         | 0.125mg/L  | N/A       |
|                                | CSURQ5586 | Susceptible |         | 0.19 mg/L  | N/A       |
|                                | CSURQ5587 | Susceptible |         | 0.125 mg/L | N/A       |
|                                | CSURQ5588 | Susceptible |         | 0.19 mg/L  | N/A       |
|                                | CSURQ5589 | Susceptible |         | 0.125mg/L  | N/A       |
|                                | CSURQ5590 | Susceptible |         | 0.19mg/L   | N/A       |
|                                | CSURQ5581 | Resistant   |         | 0.75mg/L   | blaOxa-48 |
|                                | CSURQ5582 | Resistant   |         | >32mg/L    | blaNDM-1  |
|                                | CSURP5238 | Resistant   |         | 0.75mg/L   | blaOxa-48 |
|                                | CSURP1872 | Resistant   |         | 32mg/L     | blaNDM-1  |
|                                | CSURP1954 | Resistant   |         | 32mg/L     | blaNDM-1  |
| <i>Enterobacter cloacae</i>    | CSURQ5598 | Susceptible | 1mg/L   | 0.25 mg/L  | N/A       |
|                                | CSURQ5599 | Susceptible |         | 0.25 mg/L  | N/A       |
|                                | CSURQ5601 | Susceptible |         | 0.25 mg/L  | N/A       |
|                                | CSURQ5602 | Susceptible |         | 0.38 mg/L  | N/A       |
|                                | CSURQ5603 | Susceptible |         | 0.25mg/L   | N/A       |
|                                | CSURQ5604 | Susceptible |         | 0.25 mg/L  | N/A       |
|                                | CSURQ5606 | Susceptible |         | 0.25 mg/L  | N/A       |
|                                | CSURQ1030 | Resistant   |         | 1.5 mg/L   | blaOxa-48 |
|                                | CSURQ5600 | Resistant   |         | 12 mg/L    | unknown   |
|                                | CSURQ5605 | Resistant   |         | 1.5 mg/L   | blaOxa-48 |
|                                | CSURP1944 | Resistant   |         | 1 mg/L     | blaOxa-48 |
| <i>Proteus vulgaris</i>        | CSURQ5597 | Susceptible | 4mg/L   | 0.25 mg/L  | N/A       |
| <i>Proteus mirabilis</i>       | CSURP2049 | Susceptible | 4mg/L   | 0.38 mg/L  | N/A       |
|                                | CSURP5544 | Susceptible |         | 0.5 mg/L   | N/A       |
|                                | CSURP8539 | Resistant   |         | >32mg/L    | blaNDM-1  |
|                                | CSURP8541 | Resistant   |         | >32mg/L    | blaNDM-1  |
| <i>Acinetobacter baumannii</i> | CSURQ5572 | Susceptible | 1mg/L   | 0.25mg/L   | N/A       |
|                                | CSURQ5577 | Susceptible |         | 0.25mg/L   | N/A       |
|                                | CSURQ5578 | Susceptible |         | 0.125mg/L  | N/A       |
|                                | CSURQ5579 | Susceptible |         | 0.094mg/L  | N/A       |
|                                | CSURQ5580 | Susceptible |         | 0.25 mg/L  | N/A       |
|                                | CSURQ5571 | Resistant   |         | 1.5mg/L    | blaOxa-23 |
|                                | CSURQ5573 | Resistant   |         | >32mg/L    | blaOxa-23 |
|                                | CSURQ5574 | Resistant   |         | 6mg/L      | blaNDM-1  |
|                                | CSURQ5575 | Resistant   |         | >32mg/L    | blaOxa-23 |
|                                | CSURQ5576 | Resistant   |         | >32mg/L    | blaOxa-23 |

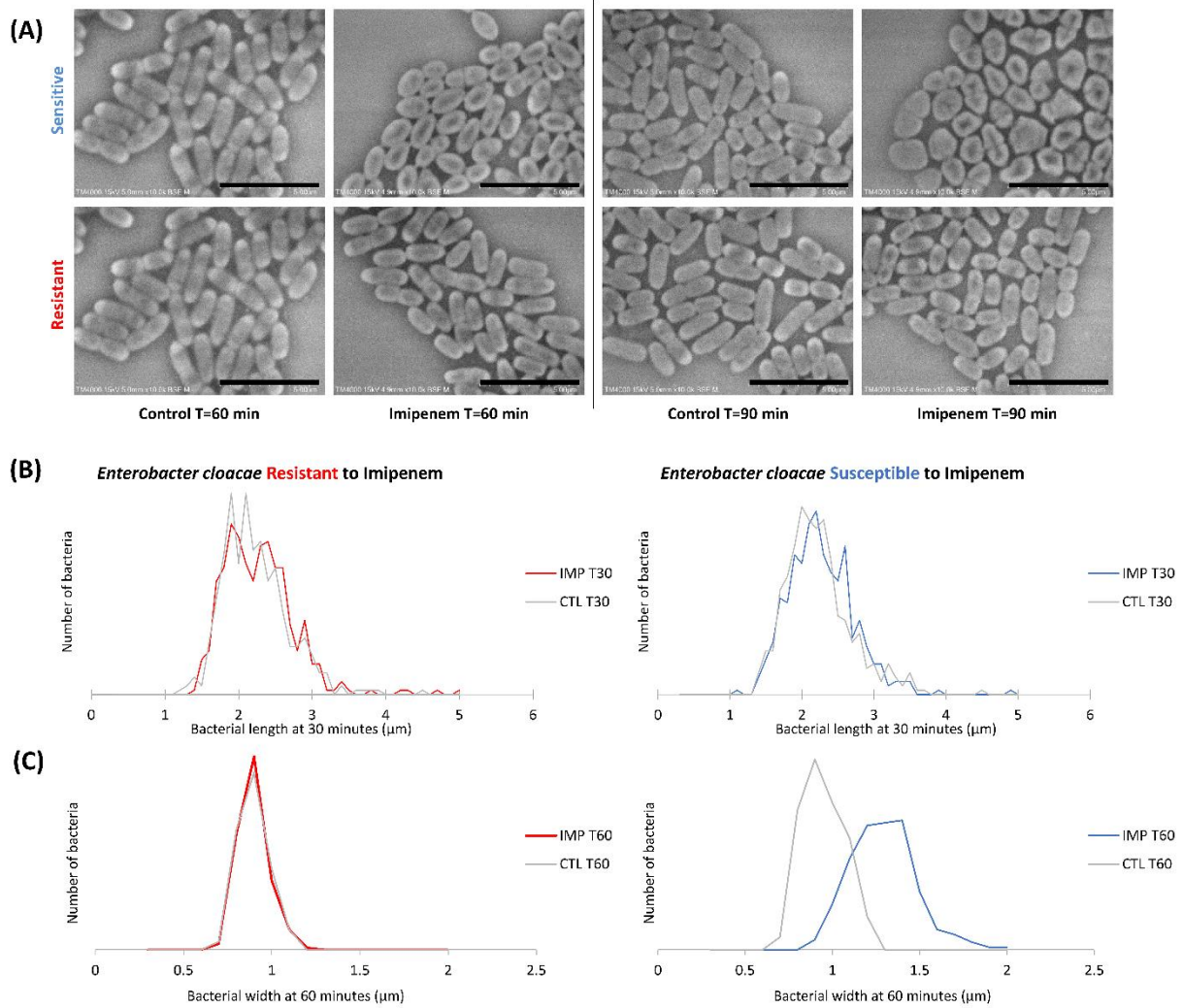
**Table S1. Tested isolates and their resistance profile to imipenem.** The liquid Minimal Inhibitory Concentrations (MIC) recovered from EUCAST. The E-test results and the resistance gene present in each isolate were validated by RT-PCR. **(A)**. Reference isolates; **(B)**. Clinical isolates.



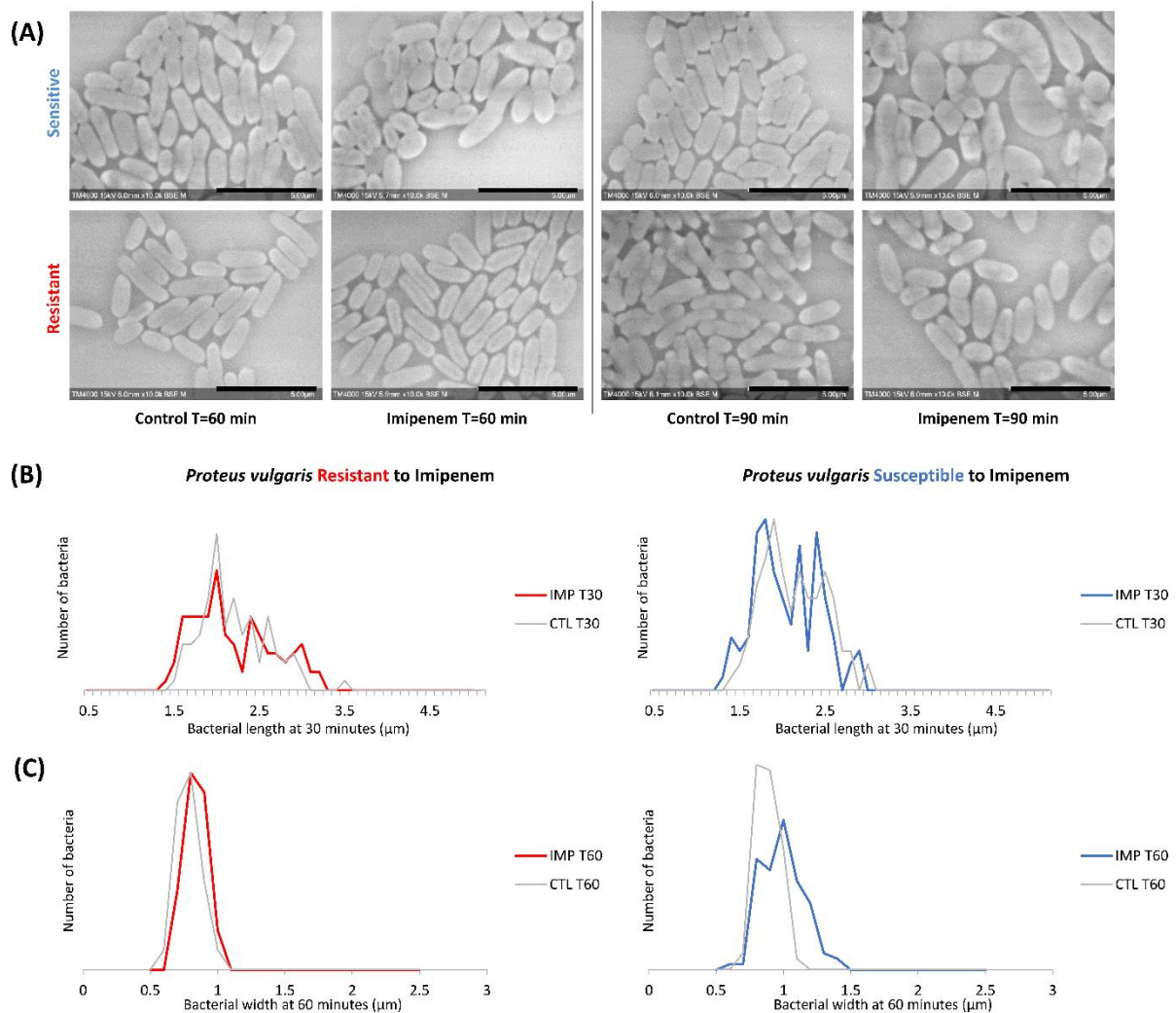
**Figure S1. Modifications observed on *K. pneumoniae* incubated with and without IPM for 30 and 60 minutes. (A).** TM4000Plus micrographs. Bacterial damage: engulfment formation observed at 60 minutes in the susceptible isolates confirms the susceptibility of that isolate towards IPM. **(B).** Histograms showing length measurements at 30 minutes of *K. pneumoniae* for both susceptible and resistant isolates. **(C).** Histograms showing width measurements at 30 minutes of *K. pneumoniae* for both susceptible and resistant isolates. **(D).** Histograms showing brightness measurements for a single bacterium and for the background at 30 minutes of *K. pneumoniae* and the relative SD of the bacterial contrast when compared to the background for both susceptible and resistant isolates. Scale bars: 5µm.



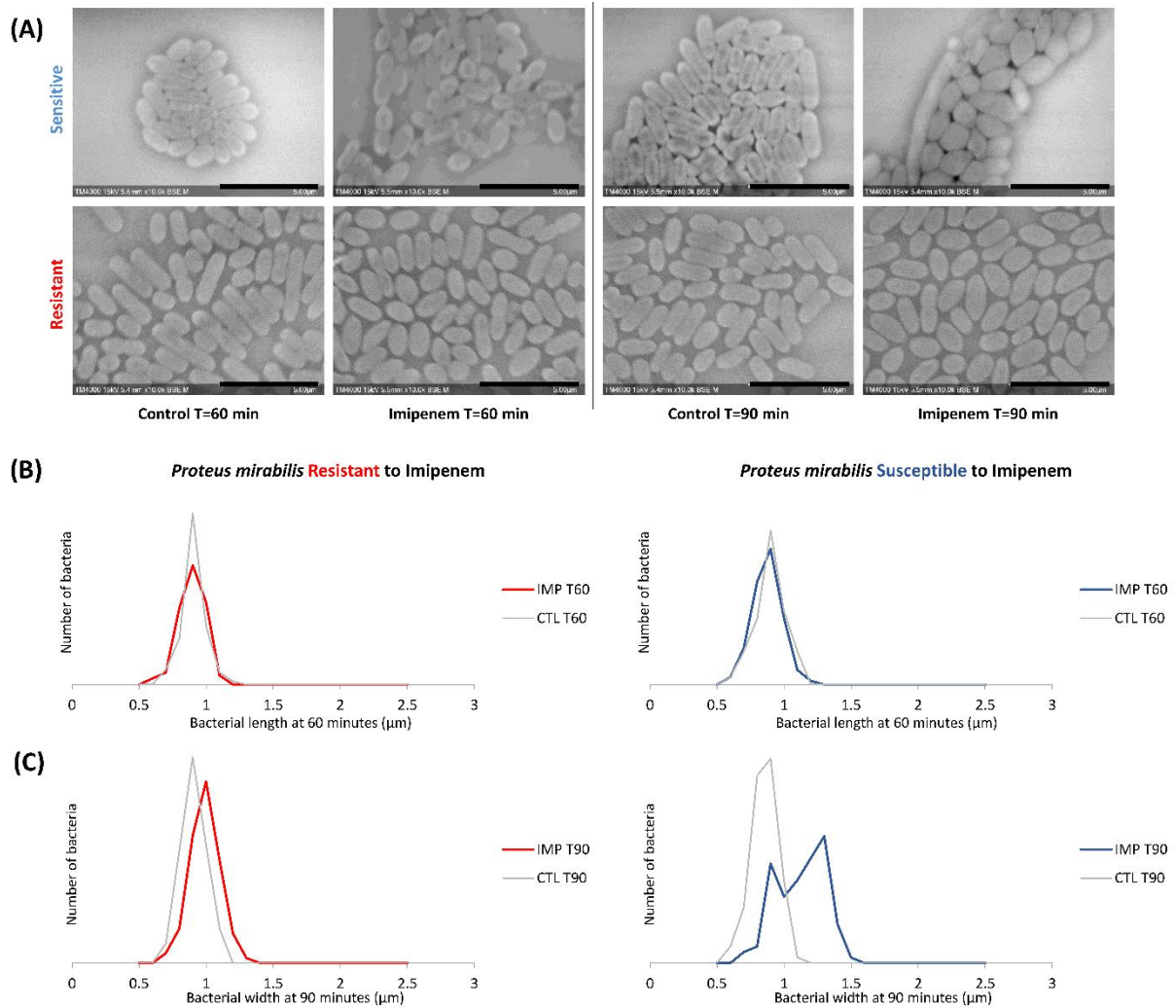
**Figure S2. Modifications observed on *Acinetobacter baumannii* incubated with and without Imipenem for 90 and 120 minutes. (A).** TM4000Plus micrographs. Inflated bacteria outnumber greatly the regular sized ones in the susceptible isolates confirming the susceptibility of that isolate towards Imipenem. **(B).** **(C).** Histograms showing the width measurements at 60 and 90 minutes of *A. baumannii* for both susceptible and resistant isolates. **(D).** Total bacteria and hyperdense dots count at 60, 90 and 120 minutes for both susceptible and resistant isolates. Scale bars: 5 $\mu$ m.



**Figure S3. Modifications observed on *Enterobacter cloacae* incubated with and without imipenem for 60 and 90 minutes. (A).** TM4000Plus micrographs. Amorphous shapes observed at 60 minutes in the susceptible isolates confirm the susceptibility of that isolate towards imipenem. **(B).** Histograms showing length measurements at 30 minutes of *E. cloacae* for both susceptible and resistant isolates. **(C).** Histograms showing width measurements at 60 minutes of *E. cloacae* for both susceptible and resistant isolates. Scale bars: 5 $\mu\text{m}$ .



**Figure S4. Modifications observed on *Proteus vulgaris* incubated with and without imipenem for 60 and 90 minutes. (A).** TM4000Plus micrographs. Bacterial inflation and damage observed at 60 minutes in the susceptible isolates confirms the susceptibility of that isolate towards imipenem. **(B).** Histograms showing length measurements at 30 minutes of *P. vulgaris* for both susceptible and resistant isolates. **(C).** Histograms showing width measurements at 60 minutes of *P. vulgaris* for both susceptible and resistant isolates. Scale bars: 5μm.



**Figure S5. Modifications observed on *Proteus mirabilis* incubated with and without imipenem for 60 and 90 minutes. (A).** TM4000Plus micrographs. Bacterial inflation and damage observed at 60 minutes in the susceptible isolates confirms the susceptibility of that isolate towards imipenem. **(B).** Histograms showing length measurements at 60 minutes of *P. mirabilis* for both susceptible and resistant isolates. **(C).** Histograms showing width measurements at 90 minutes of *P. mirabilis* for both susceptible and resistant isolates. Scale bars: 5 $\mu$ m.