

## Author Contributions

\*Nathan G. Schoepp, \*Eugenia M. Khorosheva, Travis S. Schlappi, Matthew S. Curtis, Romney M. Humphries, Janet A. Hindler and Rustem F. Ismagilov. **2016**. "Digital Quantification of DNA Replication and Chromosome Segregation Enables Determination of Antimicrobial Susceptibility After Only 15 Minutes of Antibiotic Exposure." *Angewandte Chemie*. 55(33):9557–9561.

### SI

#### Contributions of non-corresponding authors

Nathan G. Schoepp

1. Major contributor to selecting DNA replication as AST marker, contributed knowledge on AST state of the art and effects of antibiotics on replication, contributed to digital resolution hypothesis, contributor to chromosome segregation hypothesis
2. Optimized antibiotic exposure protocols
3. Performed all antibiotic exposures
4. Maintained bacterial isolates
5. Performed all bulk and digital quantification experiments
6. Contributed all data to figures 1, 2, 3, S1, S2, S3, and table S2, contributed all non-sheared data to figure 4
7. Drew figures 1, 2, 3, 4, S1, S2, S3, and constructed table S2
8. Contributed to writing abstract, introduction, results/discussion, and conclusion sections of manuscript
9. Contributed to writing of supplemental information

Eugenia Khorosheva

1. Major contributor to selecting DNA replication as AST marker, major contributor of knowledge on AST state of the art and effects of antibiotics on replication, contributed to selecting 23S gene as a target of choice, contributed to digital resolution hypothesis, contributed to chromosome segregation hypothesis
2. Selected experimental protocols for maintenance and growth of isolates
3. Established initial AST protocols and experimental workflow from exposure to extraction
4. Selected and optimized protocols for amplification with Enterobacteriaceae specific 23S primers.
5. Contributed to optimizing DNA shearing experiments.
6. Contributed to writing introduction, results/discussion, and conclusion sections of manuscript

Travis S. Schlappi

1. Contributed knowledge on AST statistics, contributed to digital resolution hypothesis
2. Connected FDA guidelines for establishing new antimicrobial susceptibility determination methods to statistical hypothesis testing for both qPCR and dPCR.
3. Performed statistical analysis (p-values and error bars) for all data presented in the manuscript and supplemental information.
4. Performed preliminary digital PCR experiments showing that dPCR can resolve differences in concentration after 15min exposure that qPCR cannot.
5. Contributed to writing of supplemental information.

Matthew S. Curtis

1. Contributed to selecting DNA replication as AST marker, contributed knowledge on AST state of the art and effects of antibiotics on replication, contributed to digital resolution hypothesis, major contributor to chromosome segregation hypothesis
2. Selected and optimized shearing protocols on extracted DNA for the analysis of chromosome structure.
3. Performed shearing experiments to generate data for figure 4.
4. Contributed to statistical analysis
5. Contributed to writing of the introduction, results/discussion, and conclusion of the manuscript.

Romney M. Humphries and Janet A. Hindler contributed microbiological and AST expertise.