**Supplement Information**

**Title: Growth response and recovery of *Corynebacterium glutamicum* colonies on single-cell level upon defined pH stress pulses**

**Sarah Täuber1,3, Luisa Blöbaum1,3, Volker F. Wendisch2,3 and Alexander Grünberger1,3\***

*1Multiscale Bioengineering, Technical Faculty, Bielefeld University, Bielefeld, Germany*

*2Genetics of Prokaryotes, Faculty of Biology*

*3CeBiTec, Bielefeld University, Bielefeld, Germany*

\*Correspondence:

Email: alexander.gruenberger@uni-bielefeld.de

Video S1: *C. glutamicum* growth before, during and after 2 h stress pulse of pH 5.

Video S2: *C. glutamicum* growth before, during and after 6 h stress pulse of pH 5.

Video S3: *C. glutamicum* growth before, during and after 2 h stress pulse of pH 10.

Video S4: *C. glutamicum* growth before, during and after 6 h stress pulse of pH 10.

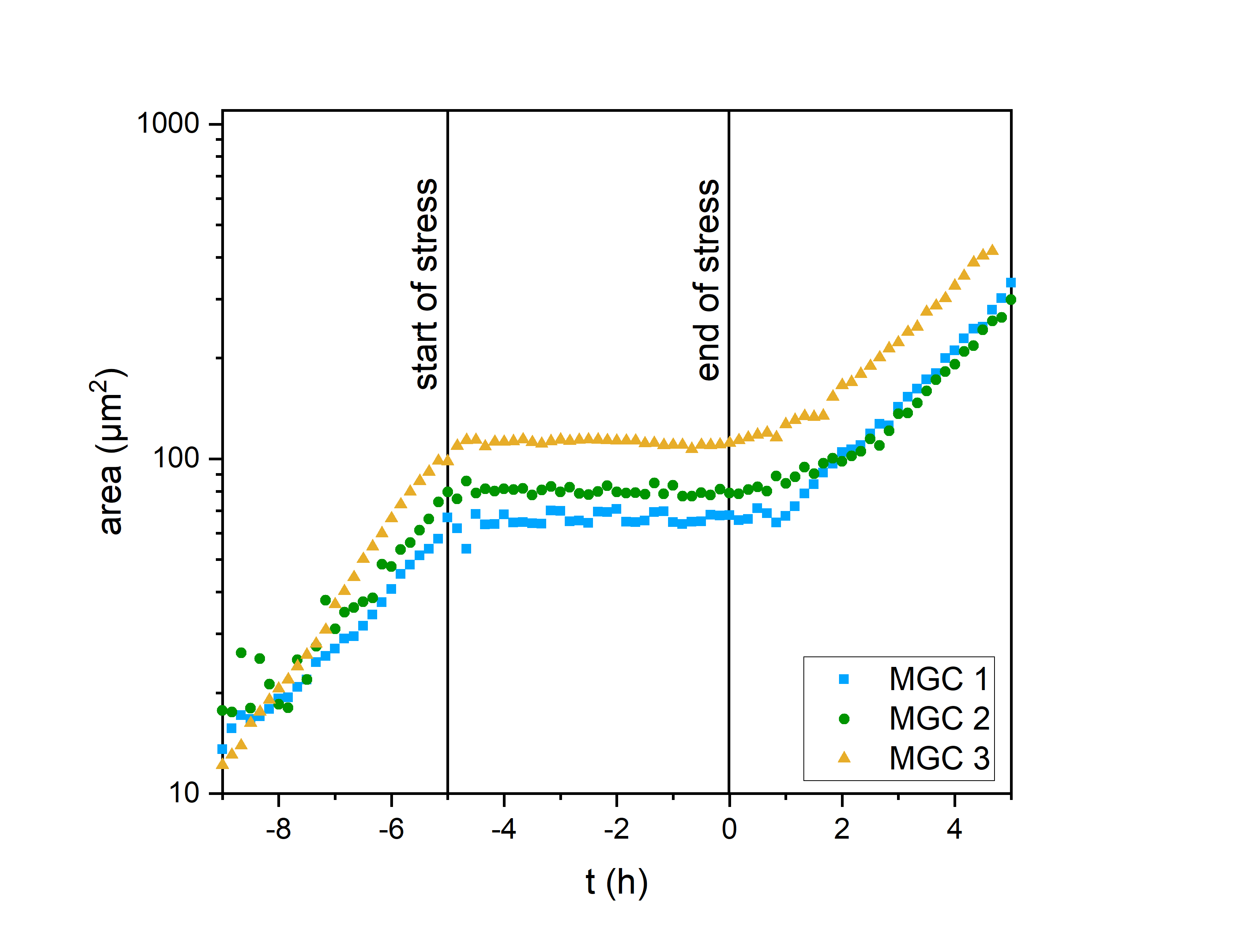
**Table S1:** Single-cell sample size for each single stress pulse.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Stress pulse** | **Single cell sample size** | **Growing cells** | **No growth** |
| pH 4 | 30 min | 100 | 0 | 100 |
| 25 min | 119 | 5 | 114 |
| 20 min | 61 | 3 | 58 |
| 15 min | 50 | 6 | 44 |
| 10 min | 61 | 13 | 48 |
| 5 min | 45 | 41 | 4 |
| pH 5 | 2 h | 117 | 109 | 8 |
| 3 h | 94 | 54 | 35 |
| 4 h | 59 | 53 | 9 |
| 5 h | 117 | 37 | 80 |
| 6 h | 113 | 31 | 82 |
| 7 h | 128 | 11 | 117 |
| 8 h | 164 | 22 | 142 |
| 9 h | 152 | 9 | 143 |
| pH 10 | 2 h | 77 | 76 | 1 |
| 3 h | 82 | 67 | 15 |
| 4 h | 70 | 30 | 40 |
| 5 h | 108 | 32 | 76 |
| 6 h | 106 | 16 | 90 |
| 7 h | 72 | 12 | 52 |
| pH 11 | 5 min | 38 | 38 | 0 |
| 10 min | 53 | 44 | 9 |
| 15 min | 127 | 82 | 45 |
| 20 min | 181 | 146 | 35 |
| 25 min | 134 | 36 | 96 |
| 30 min | 95 | 0 | 95 |

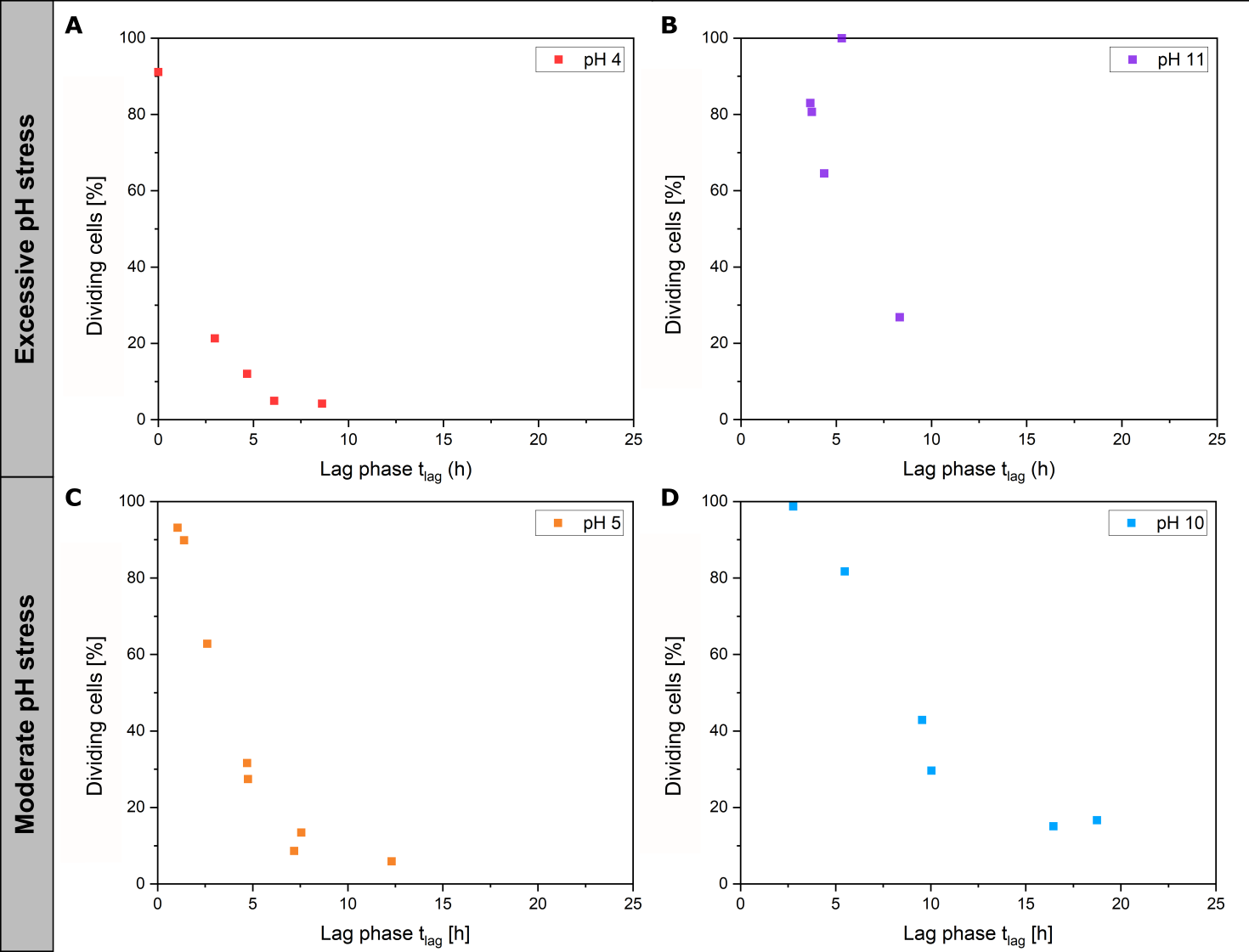
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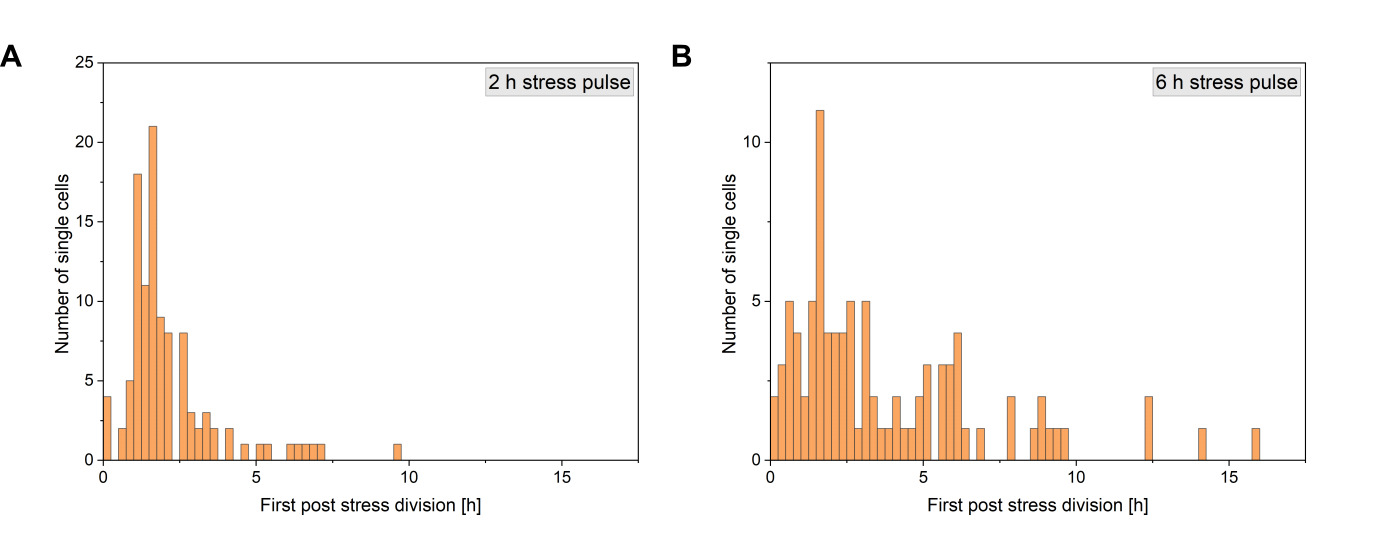
**Figure S1**: dMSCC with seven array pairs, the distance between these pairs being 400 µm. Six flow profiles were conducted with one control zone of each side.



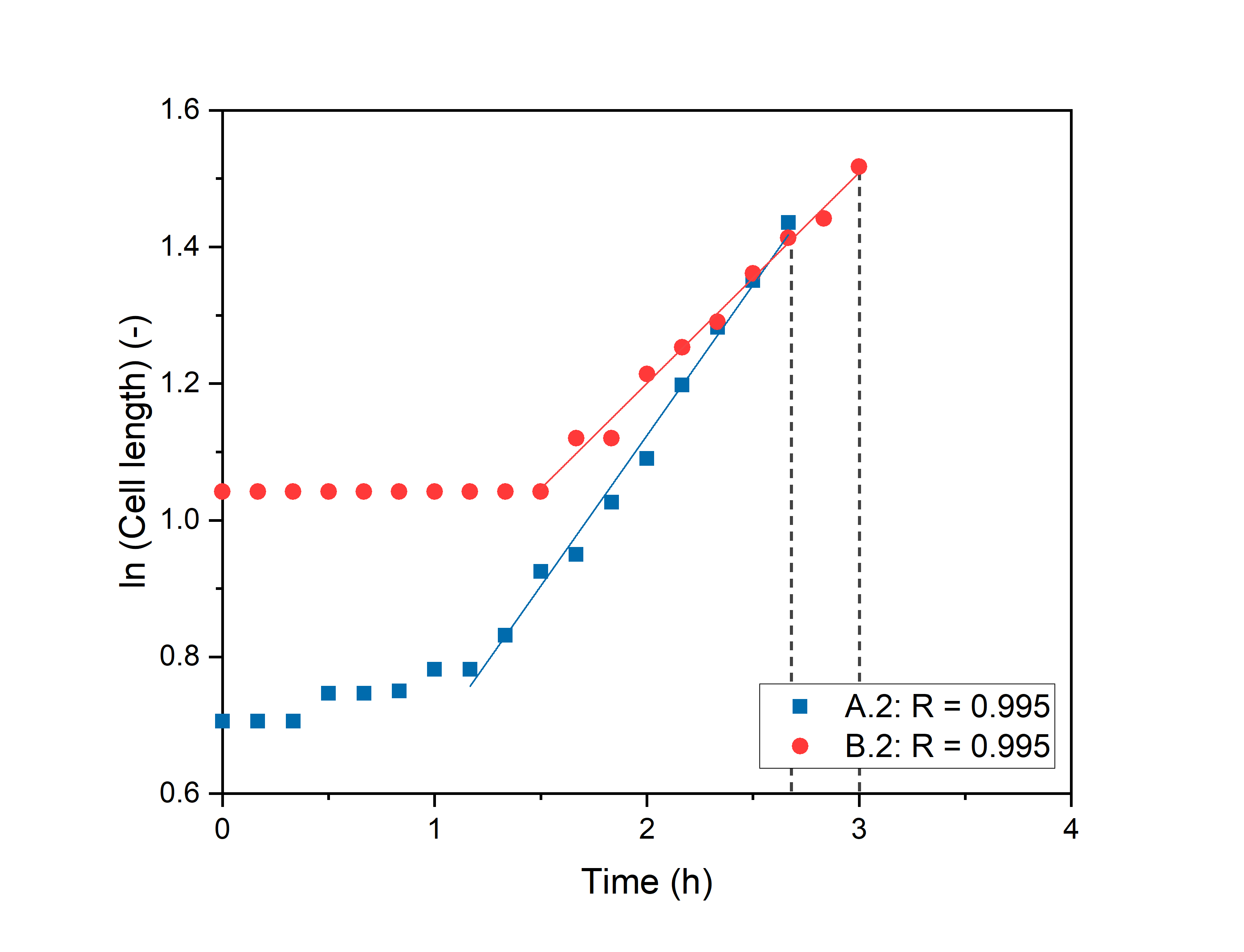
**Figure S2**: Growth curve at a single stress pulse of pH 5 for 5h. At t = 0h, the stress ends. Three colonies (yellow, green, blue) are shown.



**Figure S3:** Correlation between dividing cells and lag phase for colony growth of *C. glutamicum*. With decreasing viability, the lag phase increase for all pH values. A) pH 4. B) pH 11. C) pH 5. D) pH 10.



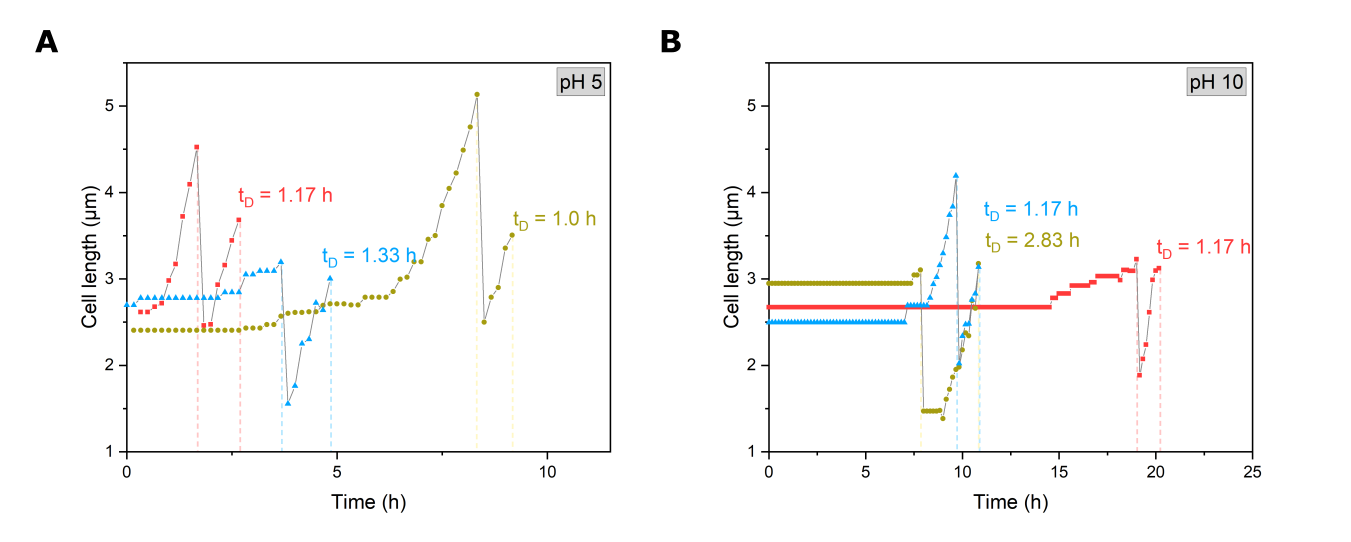
**Figure S4:** Cell distribution of the first post stress division time after a A) 2 h and B) 6 h pH 5 stress pulse.



**Figure S5:** Correlation analysis for the exponential length growth of cell A.2 (2 h stress pulse at pH 5) and cell B.2 (2 h stress pulse of pH 10).



**Figure S6:** Distribution of regrowth physiological states of *C. glutamicum* after A) 2 h stress pulse of pH 5. B) 2 h stress pulse of pH 10. C) 6 h stress pulse of pH 5. D) 6 h stress pulse of pH 10. E) 9 h stress pulse of pH 5. Sample sizes are shown in Table 1.



**Figure S7:** Cell length growth of single *C. glutamicum* cells after 6 h stress pulses of A) pH 5 and B) 10 stress until the first and second post-stress division. The dashed line marks the division of the cells.

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**Figure S8**: Microscope images of live-dead staining of *C. glutamicum* at the end of a pH stress pulse. After a pH 5 stress pulse of a duration of A) 2h, B) 6h and C) 8h and after a pH 10 stress pulse of a duration of D) 2h and E) 6h. Scale bar 10 µm.