**Source Data Charts for**

**A ‘rich-get-richer’ mechanism drives patchy dynamics and resistance evolution in antibiotic-treated bacteria**

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**Figure 1B, final cell densities:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | | | | |
| **Initial cell density** | **0** | **1** | **10** | **100** | **1000** |
| 7.629E-06 | 1000.000 | 999.994 | 0.000 | 0.000 | 0.000 |
| 1.221E-04 | 1000.000 | 999.994 | 0.000 | 0.000 | 0.000 |
| 1.221E-04 | 1000.000 | 999.994 | 0.000 | 0.000 | 0.000 |
| 1.953E-03 | 1000.000 | 999.995 | 0.000 | 0.000 | 0.000 |
| 3.125E-02 | 1000.000 | 1000.000 | 999.958 | 0.000 | 0.000 |
| 1.250E-01 | 1000.000 | 1000.000 | 1000.000 | 999.006 | 0.000 |
| 5.000E-01 | 1000.000 | 1000.000 | 1000.000 | 1000.000 | 1000.000 |
| 2.000E+00 | 1000.000 | 1000.000 | 1000.000 | 1000.000 | 1000.000 |

**Figure 1C, final patch cell densities:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CS+** |  | | | | | | | | |
| **Patch ID** | **0** | **10** | **20** | **30** | **40** | **50** | **60** | **70** | **80** |
| Patch1 | 1055.838 | 1303.739 | 0.138 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch2 | 669.025 | 7.818 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch3 | 711.824 | 114.843 | 0.484 | 0.154 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch4 | 725.750 | 284.361 | 9.110 | 4.754 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch5 | 978.196 | 1657.180 | 1960.425 | 1091.178 | 725.107 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch6 | 1072.072 | 1434.366 | 38.508 | 0.904 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch7 | 1035.098 | 2194.573 | 1576.043 | 450.816 | 146.260 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch8 | 701.303 | 565.362 | 509.854 | 568.485 | 483.470 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch9 | 633.044 | 401.294 | 579.121 | 995.949 | 1171.375 | 1660.224 | 0.000 | 0.000 | 0.000 |
| Patch10 | 842.987 | 1906.980 | 4970.474 | 6343.173 | 7042.297 | 7883.078 | 10242.178 | 0.000 | 0.000 |
| Patch11 | 808.321 | 1295.111 | 3128.478 | 3908.642 | 4064.996 | 4723.892 | 5618.702 | 0.000 | 0.000 |
| Patch12 | 776.086 | 329.406 | 8.116 | 2.113 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch13 | 761.717 | 218.202 | 0.401 | 0.092 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch14 | 536.498 | 45.867 | 34.970 | 110.366 | 163.717 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch15 | 657.276 | 671.052 | 1160.120 | 2295.633 | 3012.721 | 4025.305 | 0.000 | 0.000 | 0.000 |
| Patch16 | 599.007 | 240.217 | 313.878 | 973.959 | 1553.931 | 2497.236 | 0.000 | 0.000 | 0.000 |
| Patch17 | 405.153 | 1.117 | 0.913 | 5.484 | 17.396 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch18 | 980.449 | 1888.013 | 1442.543 | 923.774 | 682.603 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch19 | 641.475 | 1.007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch20 | 828.505 | 1679.994 | 2475.141 | 2804.556 | 2562.585 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch21 | 711.198 | 900.305 | 1024.091 | 2045.210 | 2605.095 | 3619.628 | 0.000 | 0.000 | 0.000 |
| Patch22 | 238.331 | 0.020 | 0.009 | 0.087 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch23 | 783.476 | 1201.296 | 1107.150 | 1532.655 | 1631.795 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch24 | 807.019 | 487.757 | 0.856 | 0.084 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch25 | 475.299 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch26 | 816.094 | 1148.966 | 533.141 | 380.649 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch27 | 448.621 | 1.247 | 0.073 | 0.151 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch28 | 698.168 | 482.029 | 65.819 | 79.430 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch29 | 965.574 | 2565.156 | 2686.638 | 1404.780 | 650.657 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch30 | 543.842 | 0.029 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch31 | 1021.829 | 470.847 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch32 | 1195.664 | 3083.714 | 2970.059 | 673.136 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch33 | 568.972 | 0.158 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch34 | 761.352 | 59.273 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch35 | 665.143 | 0.629 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Patch36 | 970.658 | 18.203 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

|  |  |  |
| --- | --- | --- |
| **CS–** |  | |
| **Patch ID** | **0** | **20** |
| Patch1 | 1055.838 | 0.000 |
| Patch2 | 669.025 | 0.000 |
| Patch3 | 711.824 | 0.000 |
| Patch4 | 725.750 | 0.000 |
| Patch5 | 978.196 | 0.000 |
| Patch6 | 1072.072 | 0.000 |
| Patch7 | 1035.098 | 0.000 |
| Patch8 | 701.303 | 0.000 |
| Patch9 | 633.044 | 0.000 |
| Patch10 | 842.987 | 0.000 |
| Patch11 | 808.321 | 0.000 |
| Patch12 | 776.086 | 0.000 |
| Patch13 | 761.717 | 0.000 |
| Patch14 | 536.498 | 0.000 |
| Patch15 | 657.276 | 0.000 |
| Patch16 | 599.007 | 0.000 |
| Patch17 | 405.153 | 0.000 |
| Patch18 | 980.449 | 0.000 |
| Patch19 | 641.475 | 0.000 |
| Patch20 | 828.505 | 0.000 |
| Patch21 | 711.198 | 0.000 |
| Patch22 | 238.331 | 0.000 |
| Patch23 | 783.476 | 0.000 |
| Patch24 | 807.019 | 0.000 |
| Patch25 | 475.299 | 0.000 |
| Patch26 | 816.094 | 0.000 |
| Patch27 | 448.621 | 0.000 |
| Patch28 | 698.168 | 0.000 |
| Patch29 | 965.574 | 0.000 |
| Patch30 | 543.842 | 0.000 |
| Patch31 | 1021.829 | 0.000 |
| Patch32 | 1195.664 | 0.000 |
| Patch33 | 568.972 | 0.000 |
| Patch34 | 761.352 | 0.000 |
| Patch35 | 665.143 | 0.000 |
| Patch36 | 970.658 | 0.000 |

**Figure 1D, maximum final patch cell densities:**

|  |  |  |  |
| --- | --- | --- | --- |
| **CS+** | | **CS–** | |
|  | **max. patch cell density** |  | **max. patch cell density** |
| 0 | 1195.664 | 0 | 1195.664 |
| 10 | 3083.714 | 0.5 | 1195.664 |
| 20 | 4970.474 | 1 | 1195.664 |
| 30 | 6343.173 | 2.5 | 1195.664 |
| 40 | 7042.297 | 5 | 1195.663 |
| 50 | 7883.078 | 7.5 | 0.000 |
| 60 | 10242.178 | 10 | 0.000 |
| 70 | 0.000 | 20 | 0.000 |
| 80 | 0.000 | 30 | 0.000 |
|  |  | 40 | 0.000 |
|  |  | 50 | 0.000 |
|  |  | 60 | 0.000 |
|  |  | 70 | 0.000 |
|  |  | 80 | 0.000 |

**Figure 2B, final cell densities (OD600):**

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**Figure 2C, patch size histograms:**

1. Note that the raw image data were arranged and presented in Supplementary Figures 8-9. The raw images have also been uploaded to <https://github.com/youlab/Patchy_Dynamics.git> .
2. The Matlab script used to measure the patch areas have been uploaded to <https://github.com/youlab/Patchy_Dynamics.git> .
3. For each dataset, total count for a given [Carb] value was subtracted from the total counts for [Carb] = 0 and recorded for the first bin. The patches located near the edge of the well and the ones that clearly appeared as merged early on were excluded.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **CS+** | | | | | | **CS–** | | | | |
|  | **[Carb] (μg/ml)** | | | | | | **[Carb] (μg/ml)** | | | | |
| **Bin (mm2)** | **0** | **2.5** | **3** | **4** | **5** | **9** | **0** | **2.5** | **3** | **4** | **5** |
| 0.5 | 0 | 99 | 122 | 128 | 132 | 141 | 1 | 132 | 141 | 144 | 144 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 1 | 0 | 0 |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 4 | 2 | 0 | 0 |
| 2 | 87 | 1 | 0 | 0 | 0 | 0 | 74 | 0 | 0 | 0 | 0 |
| 2.5 | 54 | 5 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 |
| 3 | 0 | 15 | 4 | 0 | 1 | 0 | 5 | 0 | 0 | 0 | 0 |
| 3.5 | 0 | 10 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 7 | 7 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.5 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 3 | 1 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.5 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |

**Figure 2D, maximum patch sizes (mm2):**



**Figure 3A, final cell densities (OD600):**

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**Figure 3B, final cell densities (OD600):**

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**Figure 3C, patch size histograms:**

1. Note that the raw image data were arranged and presented in Supplementary Figures 12-13. The raw images have also been uploaded to <https://github.com/youlab/Patchy_Dynamics.git> .
2. For each dataset, total count for a given antibiotic concentration value was subtracted from the total counts for the no antibiotic treatment case and recorded for the first bin. The patches located near the edge of the well and the ones that clearly appeared as merged early on were excluded.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Tic** | | | | | | **Pip** | | | | | |
|  | **[Tic] (μg/ml)** | | | | | | **[Pip] (μg/ml)** | | | | | |
| **Bin (mm2)** | **0** | **7.5** | **10** | **15** | **20** | **30** | **0** | **1.5** | **1.7** | **2.5** | **3.4** | **5** |
| 0.5 | 0 | 89 | 86 | 101 | 103 | 103 | 0 | 103 | 152 | 154 | 161 | 164 |
| 1 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 36 | 1 | 0 | 1 | 0 |
| 1.5 | 0 | 1 | 8 | 1 | 0 | 0 | 0 | 3 | 0 | 9 | 2 | 0 |
| 2 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 4 | 7 | 1 | 0 | 0 |
| 2.5 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 0 | 0 | 0 |
| 3 | 18 | 1 | 1 | 0 | 0 | 0 | 22 | 3 | 0 | 0 | 0 | 0 |
| 3.5 | 49 | 2 | 1 | 0 | 0 | 0 | 90 | 1 | 0 | 0 | 0 | 0 |
| 4 | 31 | 0 | 1 | 0 | 0 | 0 | 48 | 4 | 1 | 0 | 0 | 0 |
| 4.5 | 2 | 0 | 1 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 5.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 9.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10.5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Figure 3D, maximum patch sizes (mm2):**

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**Figure 4, final cell densities (OD600):**

For each dataset, 3-4 independent clones of the ancestor strain (Ancestor #) was included as a control.

\* Some samples, as specified below each following table, never grew despite multiple attempts. Those were all very small patches. They could be surface imperfections misleadingly appeared as bacterial colonies.

‡ We could not conclusively categorize five samples, as specified below, for Sampling Day 3 of the dataset denoted by squares. Those samples were excluded from the statistics.

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\* T2-7 did not grow.

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\* 11, 17, 19, 20, 30, 41, 43 - 45, 60, 62, 64, 76, 81, 89, and 93 did not grow.

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‡ 37 - 39, and 48 – 49 were excluded as we could not conclusively categorize them.

**Supplementary Figure 14, final cell densities (OD600):**



\*Note that Sampling Day 2, Patch 4 showed significant elevated resistance to Tic. However, it was not subjected to the inheritability testing by escaping from our attention. Thus, it was excluded from the statistics.

