**Data structure for experimental data**

1. **Frame data (Table name ‘resultTable3’ in dataset)**

Each row contains features of one droplet at a time point.

Each column contains a specific feature. A detailed description is shown below:

|  |  |
| --- | --- |
| **Variable name** | **Property**  |
| t | Time of each frame |
| xcoord | x coordinate of droplet |
| ycoord | y coordinate of droplet |
| area | Droplet area  |
| perimeter  | Droplet perimeter estimated from area |
| CFPstdInt | Standard deviation of CFP intensity |
| CFPmeanInt | Averaged CFP intensity |
| mCherry | Averaged mCherry intensity (dye) |
| Custom | Averaged FRET intensity |
| track | Track index assignment after lineage tracing |
| CFPdivInt | Averaged CFP intensity after background subtraction of CFP channel |
| mCherrydivInt | Averaged mCherry intensity after background subtraction of mCherry channel |
| FRETdivInt | Averaged FRET intensity after background subtraction of FRET channel |
| FRETratio | Custom/CFPmeanInt; calculate FRET/CFP ratio |
| firstTenmCh | Averaged mCherry intensity from the droplet’s first ten mCherry frames  |

1. **Osci data (Table name ‘osci3’ in dataset)**

Each row contains features of one oscillation in a droplet.

Each column contains a specific feature. A detailed description is shown below:

|  |  |
| --- | --- |
| **Variable name** | **Property** |
| ampLeft | FRET ratio (FRET intensity/CFP intensity) difference from pervious trough to peak |
| ampRight | FRET ratio (FRET intensity/CFP intensity) difference from peak to next trough |
| timeLeft | Frame difference from pervious trough to peak |
| timeRight | Frame difference from peak to next trough |
| periodPeak | Frame difference from previous peak to current peak  |
| periodTrough | Frame difference from previous trough to current trough |
| cycleID | Index of oscillation in one specific droplet |
| dropID | Index of droplet |
| mCherry | Averaged mCherry intensity  |
| area | Droplet area |
| xcoord | x coordinate of droplet |
| Ycoord | y coordinate of droplet |
| frameStep | Time interval between two consecutive frames |
| firstTenmCh | Averaged mCherry intensity from the droplet’s first ten mCherry frames |
| PeakTime | Frame index of the peak |
| dilutionPer | Dilution percentage of a droplet calculated from firstTenmCh |

1. **Droplet data (Table name ‘drop3’ in dataset)**

Each row contains features of one droplet.

Each column contains a specific feature. A detailed description is shown below:

|  |  |
| --- | --- |
| **Variable name** | **Property**  |
| meanPerPeak | Averaged period for a droplet measured by peaks |
| meanPerTrough | Averaged period for a droplet measured by troughs |
| madPerPeak | Median absolute deviation of period for a droplet measured by peaks |
| madPerTrough | Median absolute deviation of period for a droplet measured by troughs |
| meanAmpLeft | Averaged rising amplitude for a droplet |
| meanAmpRight | Averaged falling amplitude for a droplet |
| madAmpLeft | Median absolute deviation of rising amplitude for a droplet  |
| madAmpRight | Median absolute deviation of falling amplitude for a droplet |
| dropID | Index of droplet |
| mCherry | Averaged mCherry intensity  |
| area | Droplet area |
| meanMove | Averaged movement for a droplet |
| frameStep | Time interval between two consecutive frames |
| firstTenmCh | Averaged mCherry intensity from the droplet’s first ten mCherry frames |

1. **Oscillation percentage data (Table name ‘Osci\_percentage’ in dataset)**

Each row represents a droplet.

Each column contains a specific feature as shown below:

|  |  |
| --- | --- |
| **Variable name** | **Property** |
| mCherry | mCherry intensity of a droplet (same as firstTenmCh in osci and droplet data) |
| Dilution Percentage | Dilution percentage of a droplet calculated from mCherry |
| Osci\_or\_not | If the droplet has oscillations, we assign 1 to this droplet; If the droplet has no oscillation, we assign 0 to this droplet |

1. **Oscillation percentage histogram data (Table name ‘osci\_per\_hist’ in dataset)**

Each column represents one inhibitor concentration.

Each row represents a dilution range with the width of 5%. From top to bottom, dilution percentage gradually increases. For example, the first data row is 0-5%, the second row is 5-10%, and the last row is 95%-100% dilution.

Each value means the percentage of oscillating droplets among all tracked droplets within each dilution range.

1. **Inhibitor\_fit\_results.npz**

Results of least\_squares fitting and error estimation via bootstrapping. Scipy's least squares was performed using soft\_l1 as loss and bootstrapping was performed with 1e4 repetitions. The results for all the boostrapping repetitions are stored in a nested dictionary indexed by exp, day, and conc.

**Essential data and codes to generate corresponding figures**

|  |  |  |
| --- | --- | --- |
| **Figure** | **Data source** | **Code** |
| Figure 1C | 01062021\_Figure1\_data/resultTable3 | plot\_individual\_droplets\_tuning\_01062021.m |
| Figure 1D | 01062021\_Figure1\_data/osci3 | raster\_plot\_01062021\_Figure1D.m |
| Figure 1E-F | Osci\_percentage\_datexxx\_Figure1F.txt (9 different days)01062021 \_osci\_per\_hist.txt | Figures\_Dilution.ipynb |
| Figure 1G-J | 01062021\_Figure1\_data/osci3 | cycleNumber\_period\_amplitude\_01062021.m |
| Figure 2A | 10282020\_Figure2A\_data | plot\_tracks\_figure\_2A\_01062021.m |
| Figure 2C | 10282020\_Figure2C-I\_data | plot\_individual\_droplets\_tuning\_10282020.m |
| Figure 2D | Osci\_percentage\_10282020\_Figure2D | Figures\_Dilution.ipynb |
| Figure 2E-2I | 10282020\_Figure2C-I\_data | cycle\_number\_period\_raster\_10282020.m |
| Figure 4A,C | 08102020\_Figure4\_wee1\_dataOsci\_percentage\_08102020\_xuM (5 files)08\_10\_20\_xuM-Wee1.txt (5 files)08102020\_osci\_per\_hist.txt | Figures\_Dilution.ipynbraster\_plot\_08102020\_Figure4A.m |
| Figure 4B,D | 010620201\_Figure4\_cdc25\_dataOsci\_percentage\_01062021\_xuM (5files)01\_06\_21\_xuM-Cdc25.txt (5 files)01062021\_osci\_per\_hist.txt | Figures\_Dilution.ipynbraster\_plot\_01062021\_Figure4B.m |
| Figure 4E | oscil\_thresh\_cdc25\_01062021.txtoscil\_thresh\_wee1\_08102020.txtper\_thresh\_cdc25\_01062021.txtper\_thresh\_wee1\_08102020.txt | Figures\_Dilution.ipynb |
| Figure 4F,G | 01062021\_cycle\_num\_with\_cdc25.txt08102020\_cycle\_num\_with\_wee1.txt |  |