

Plotting data for:

a) Displacement vs time plot of A-type cells with different A:B.

Important: How do you define cell position?

b) Displacement vs time plot of B-type cells with different A:B.

c) Displacement vs time plot of cell front (A and B type together) with different A:B. Important: How do you define cell front position?

# About the Simulation

- The simulation contains 2 types of cells- Cell Type A (pink) and Cell Type B (green).
- The whole matrix is filled with a chemical which is restricting cell type B to grow. The rate of dividing for cell type B is negligible (0.00001)
- Cell Type A is motile and has the property to eat up the chemical. It attracts towards the chemical.
- The region where the concentration of the chemical reduces below a certain threshold (here 0.8), cell type A grows and divides at a rate of 0.1.
- It is a rectangular matrix, dimensions: (200,70).
- All the cells are on the left side of the matrix, closely packed in the region (0,70) to (40, 70)
- The simulation runs for 1500 mcs.

- Other specifications-
- Adhesion energy: A-Medium: 10

B-Medium: 10

A-A: 50

B-B: 50

A-B: 100

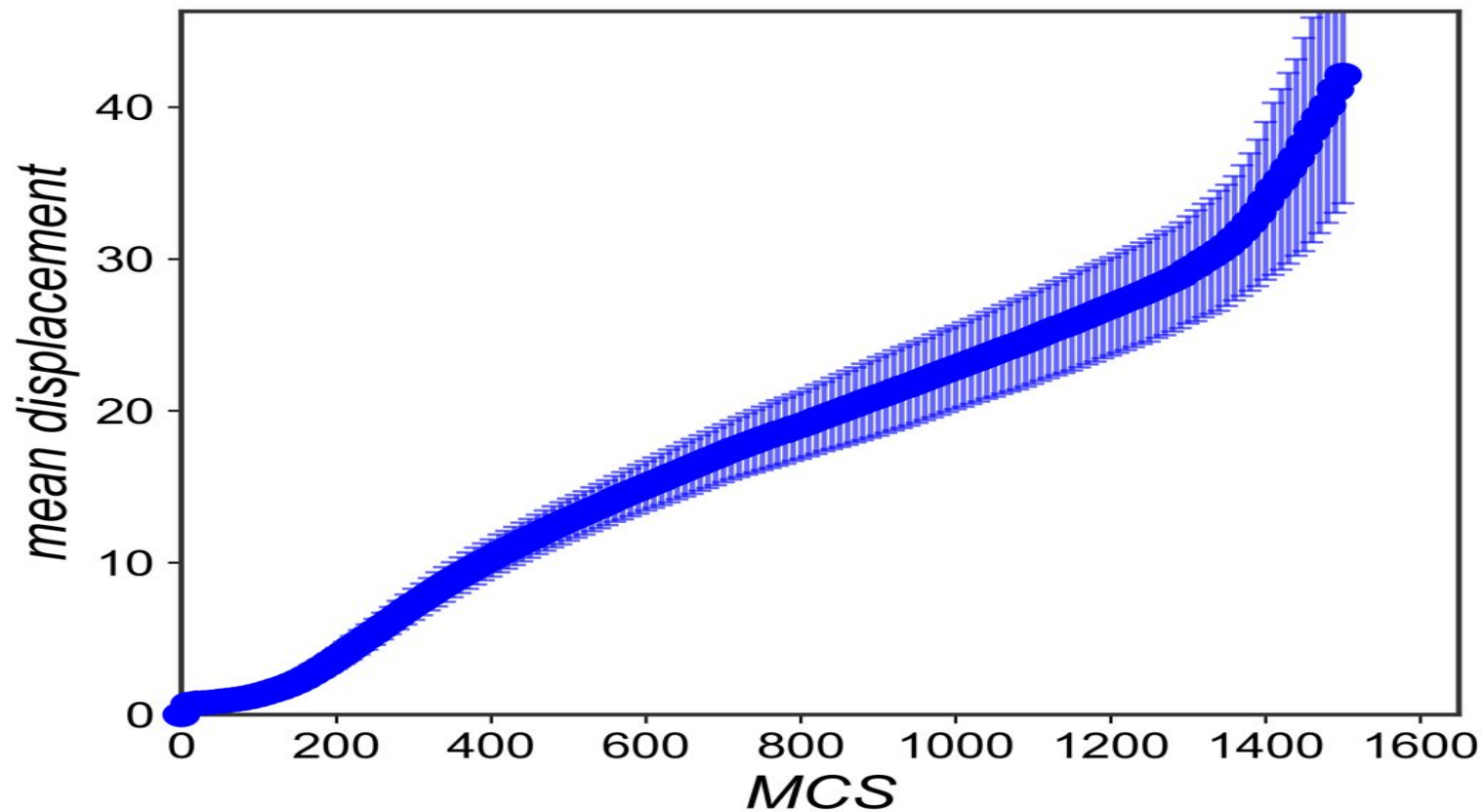
Cells of different types repel each other more.

- Target Volume for both Cell Type A and Cell Type B: 36
- Volume Parameter: Cell Type A: 10, Cell type B:20

Now, we analyse the displacement by Cell Type A and Cell Type B for different ratios of number of cells of Cell Type A and cell Type B

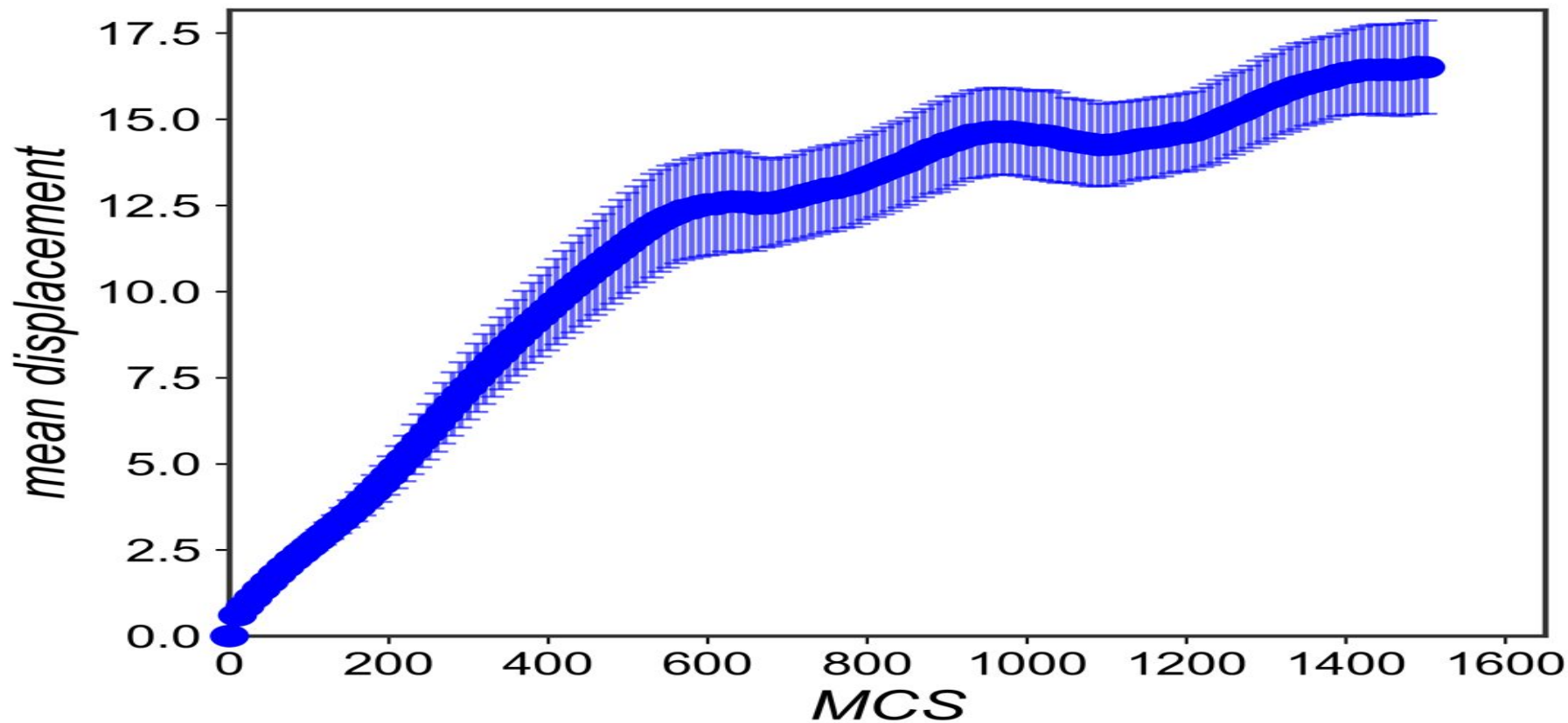
The Position of a cell is defined by the coordinates of its COM. the displacement of a particular cell is taken by the euclidean distance between the cell's initial position and position at the current MCS. We have then taken the mean of displacement of all the Cells of Cell type A and cell type B. We ran the simulation for 100 times, since running for 1000 repeats was consuming a lot of time.

Number of cell type A cells: Number of cell type B cells= 1:1



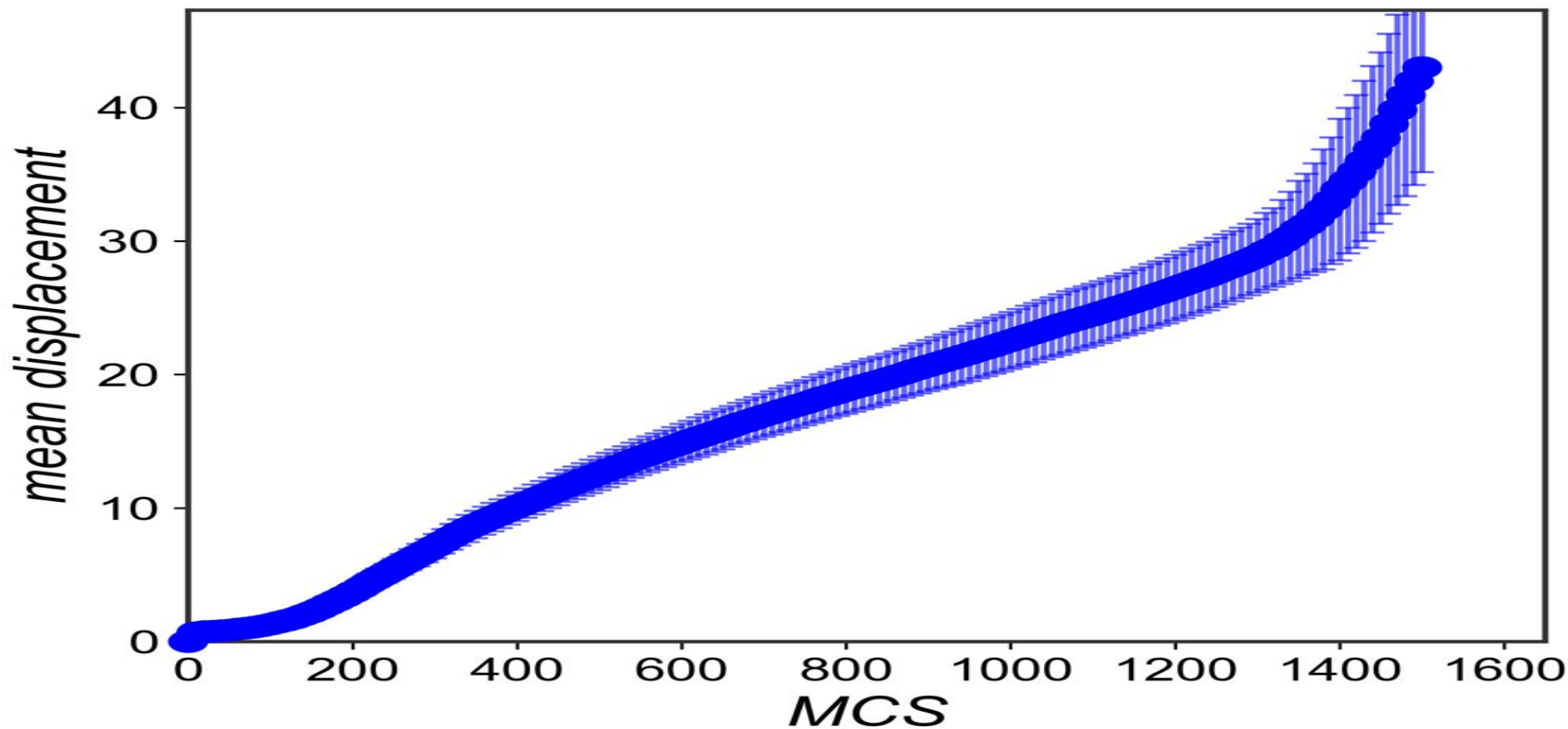
Mean Displacement of **Cell Type A** vs Time for **1:1 ratio**

Number of cell type A cells: Number of cell type B cells= 1:1



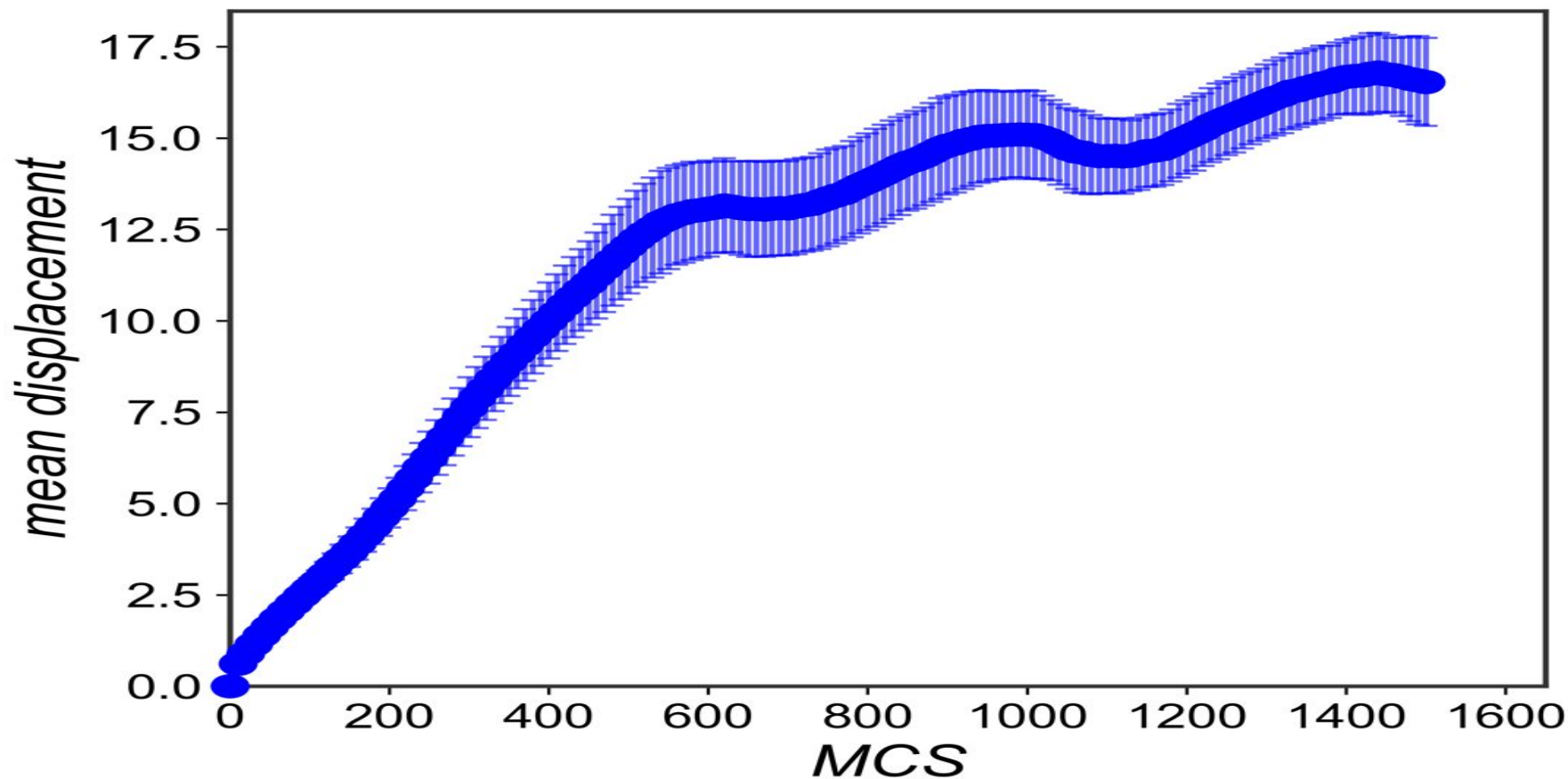
Mean Displacement of **Cell Type B** vs Time for **1:1 ratio**

Number of cell type A cells: Number of cell type B cells= 1:2



Mean Displacement of **Cell Type A** vs Time for **1:2** ratio

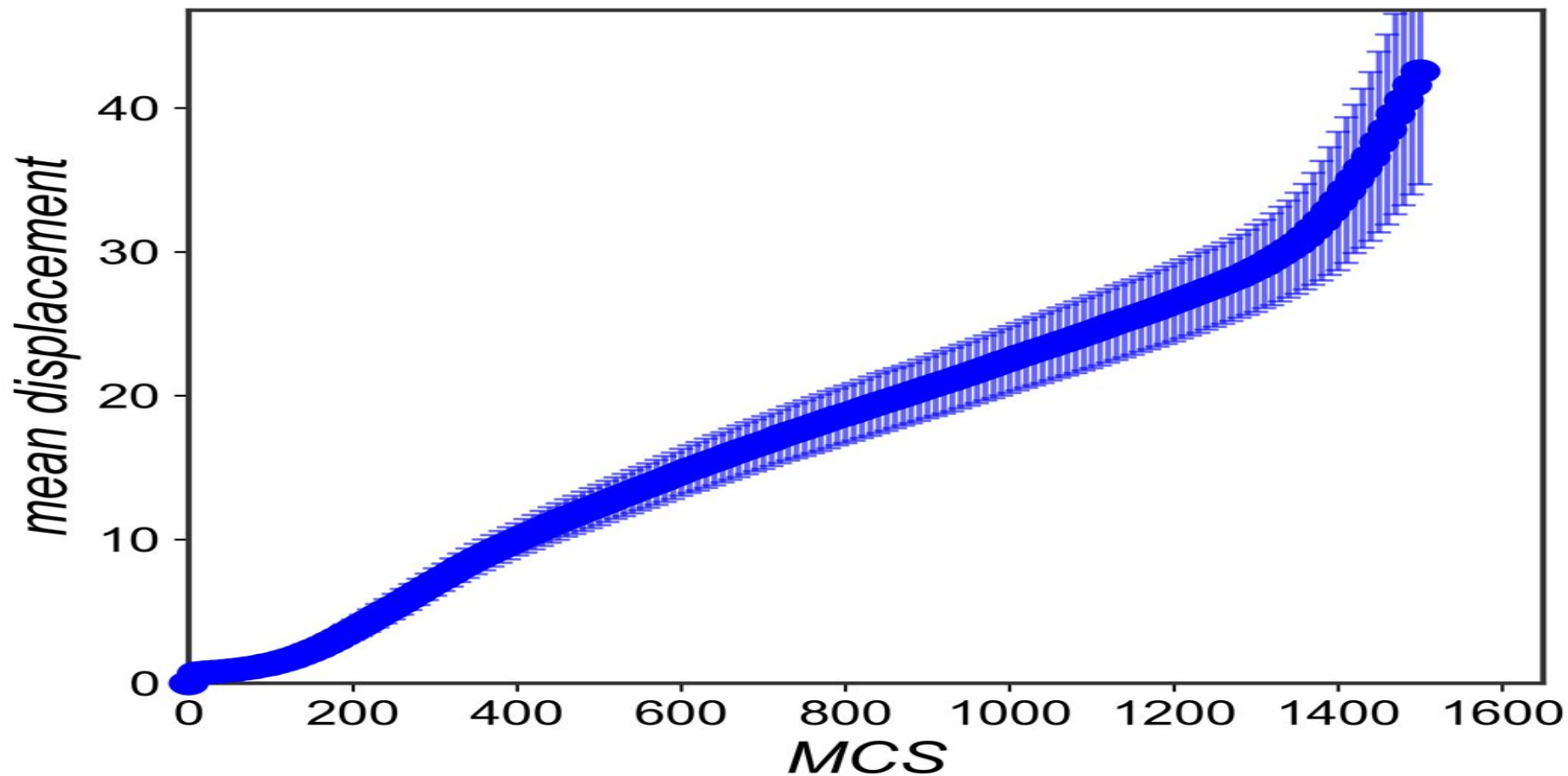
Number of cell type A cells: Number of cell type B cells= 1:2



Mean Displacement of **Cell Type B** vs Time for **1:2** ratio

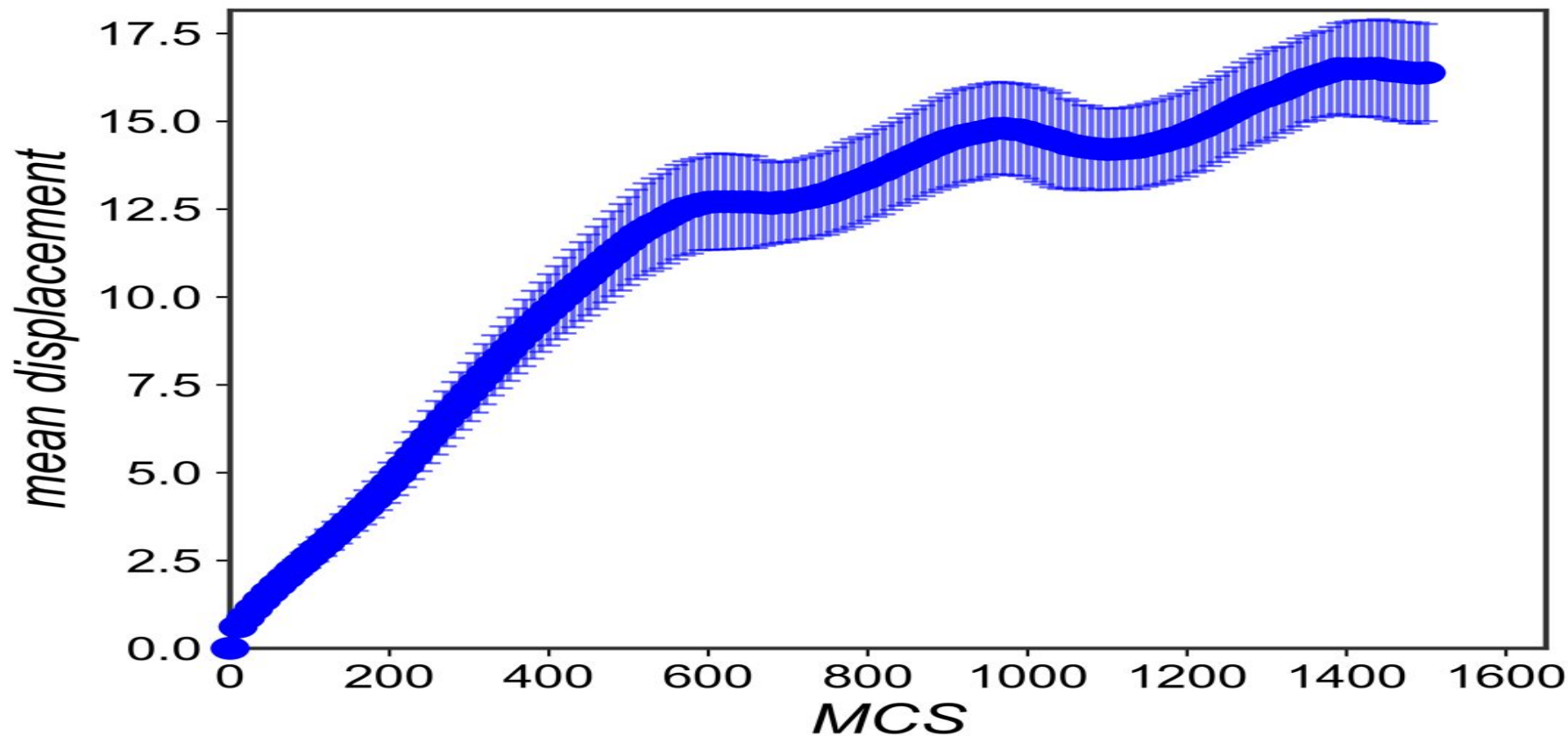


Number of cell type A cells: Number of cell type B cells= 2:1



Mean Displacement of **Cell Type A** vs Time for **2:1 ratio**

Number of cell type A cells: Number of cell type B cells= 2:1



Mean Displacement of **Cell Type B** vs Time for **2:1** ratio