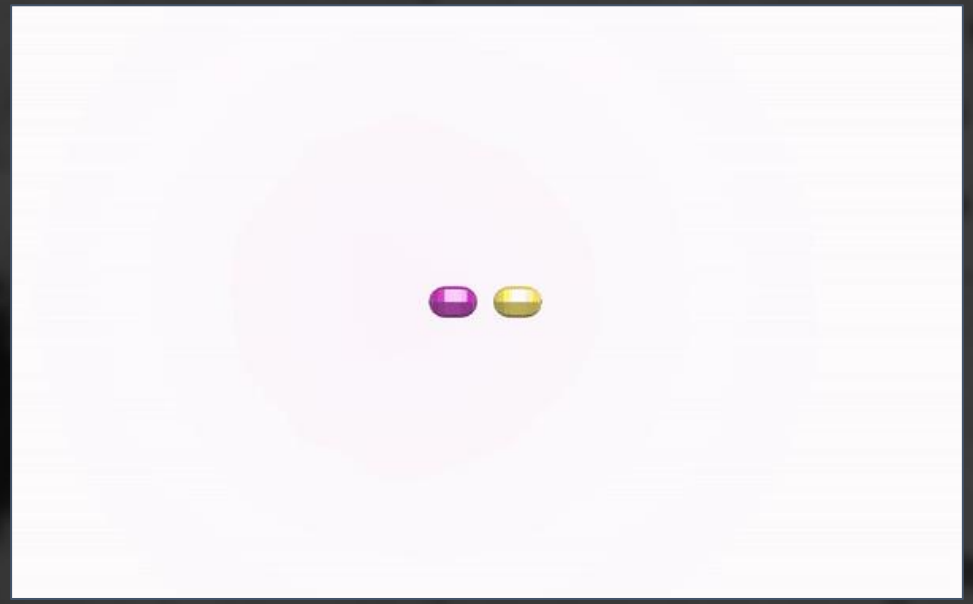
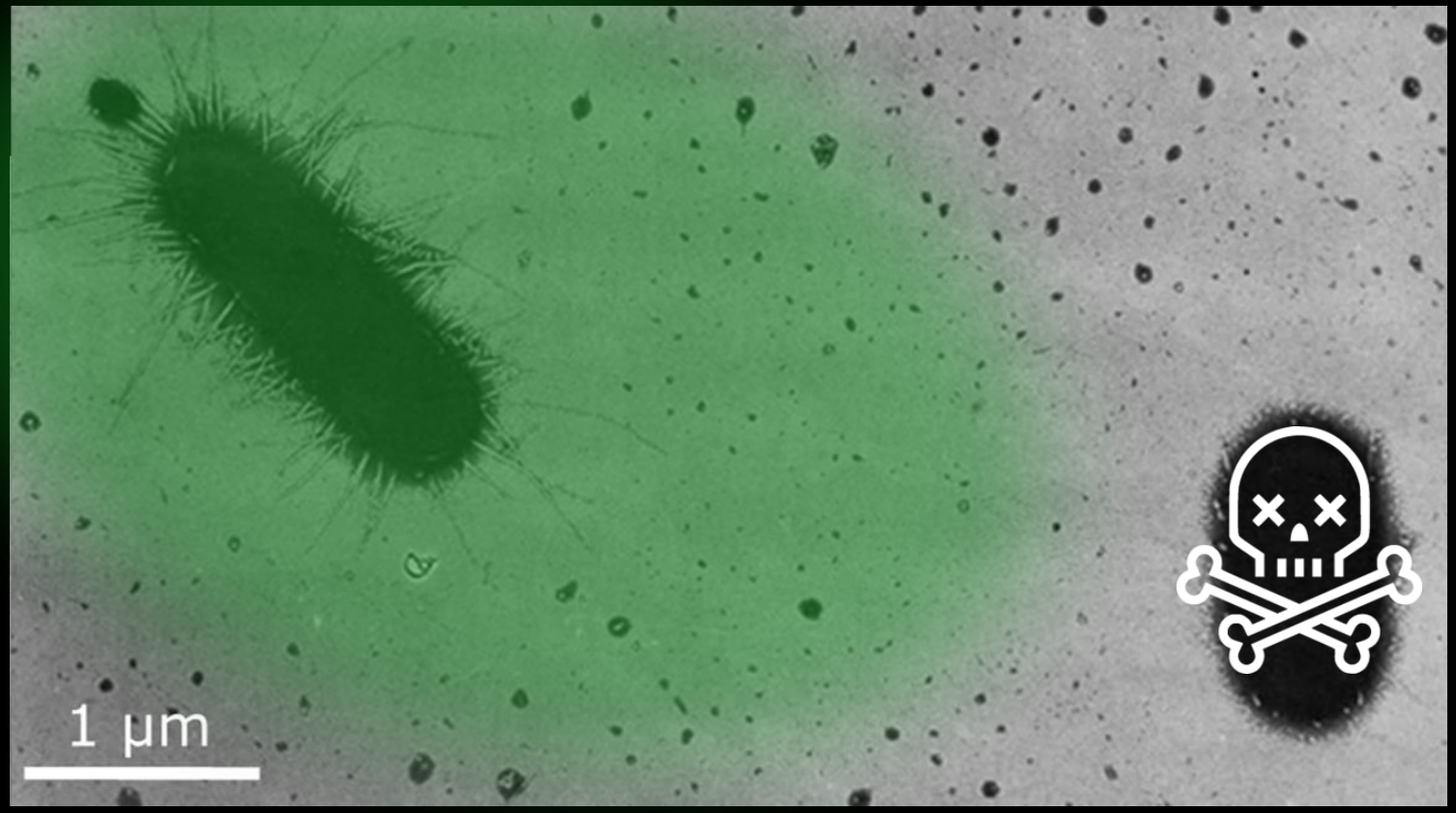
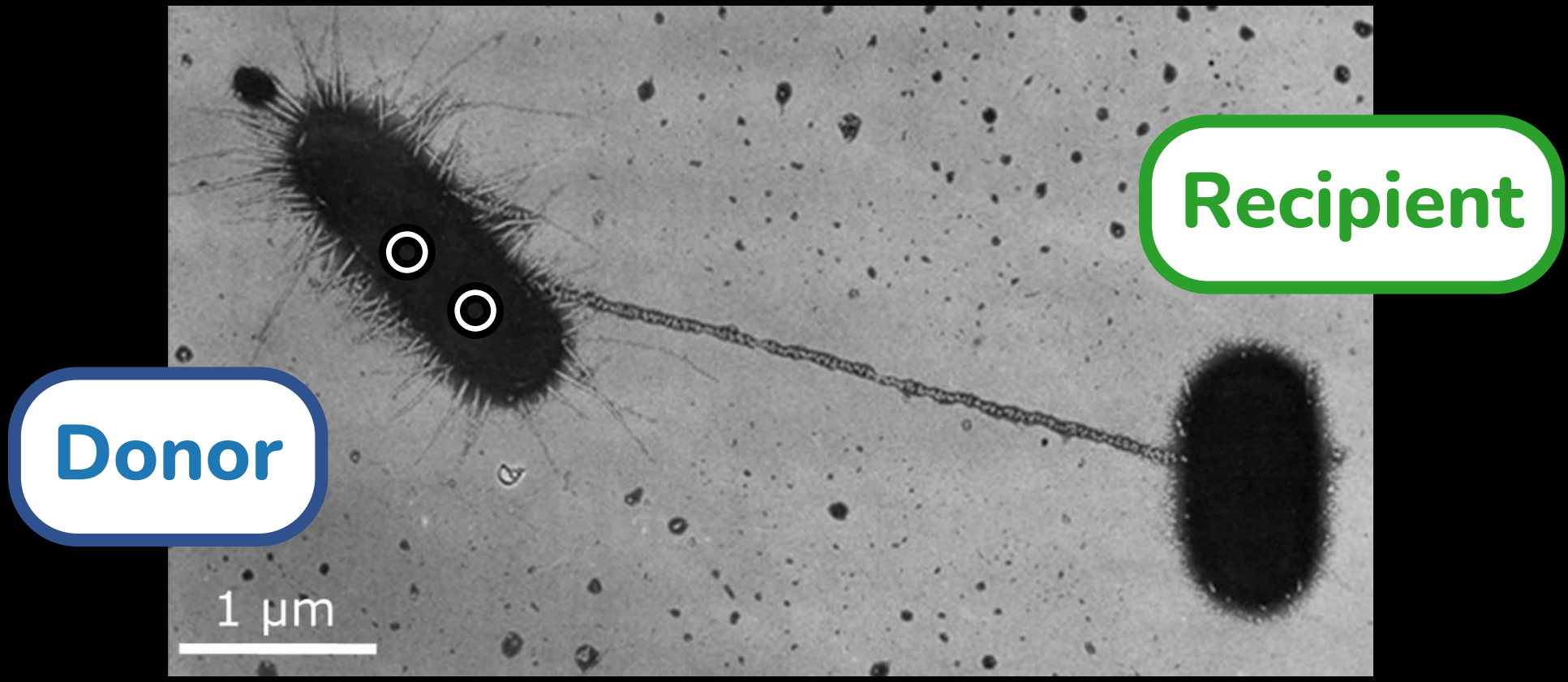
Toxins on Plasmids



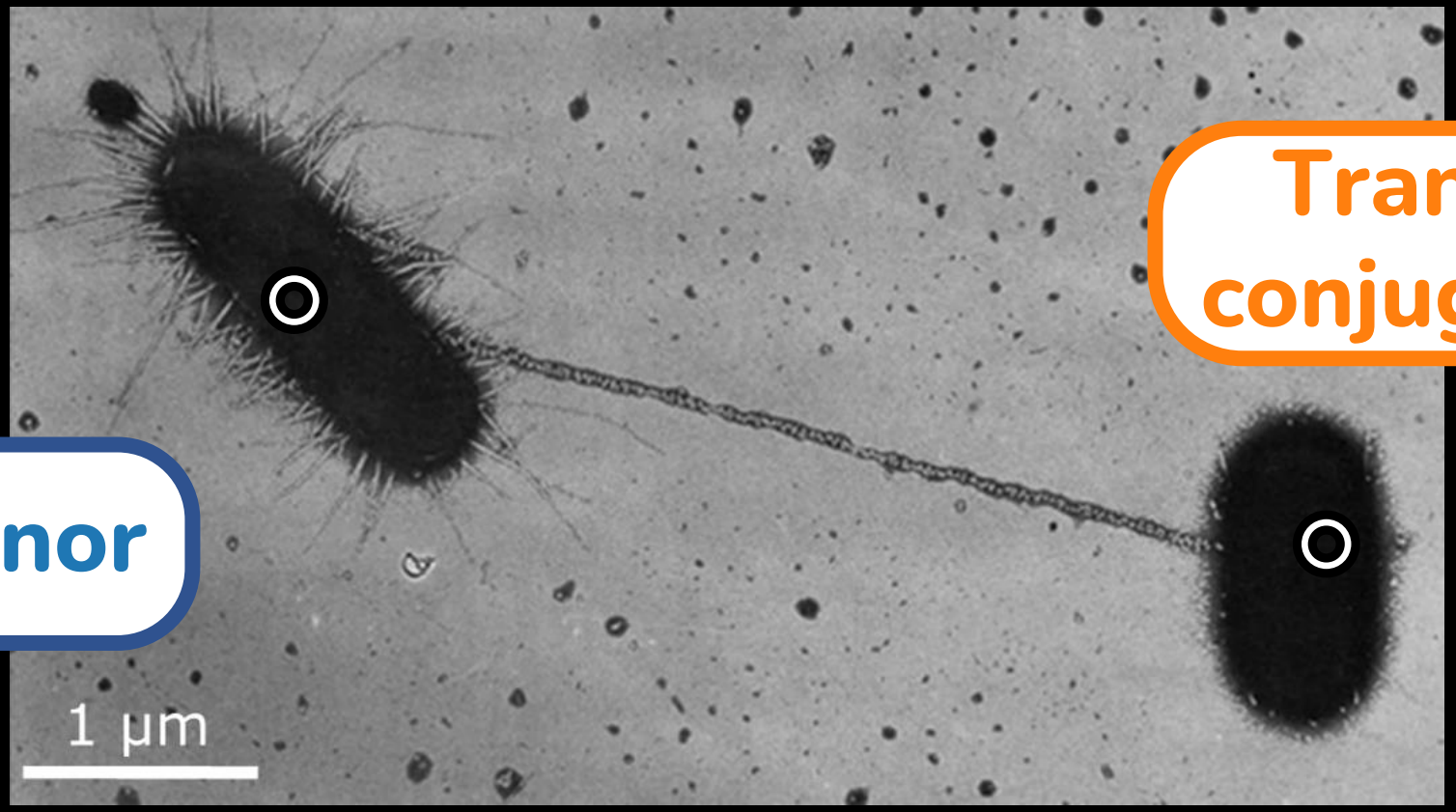
George Shillcock
+
The Foster Lab



Bacteria compete for nutrients,
and use toxins to kill each other.

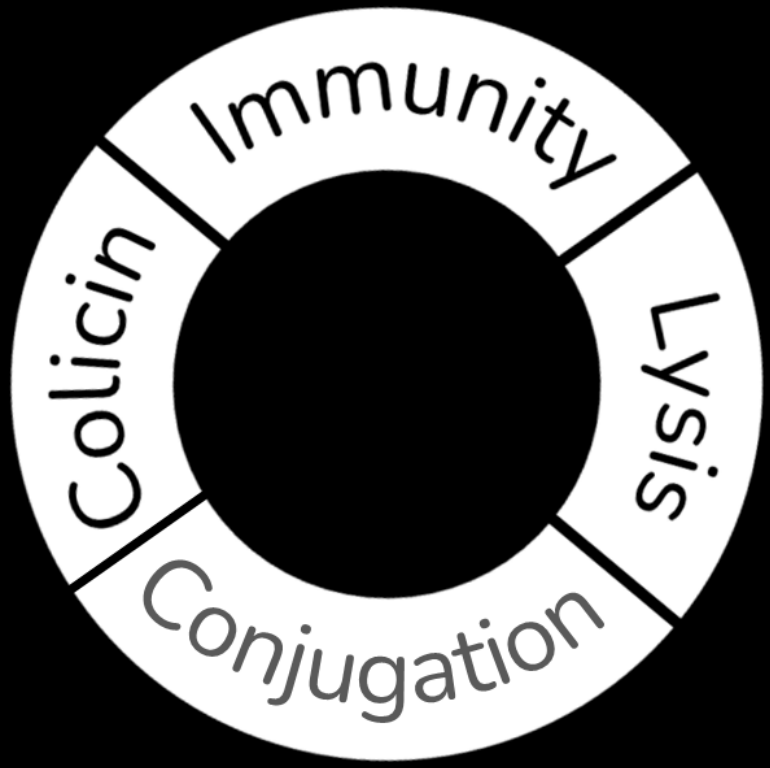


However, toxin genes are on plasmids, which move between cells.



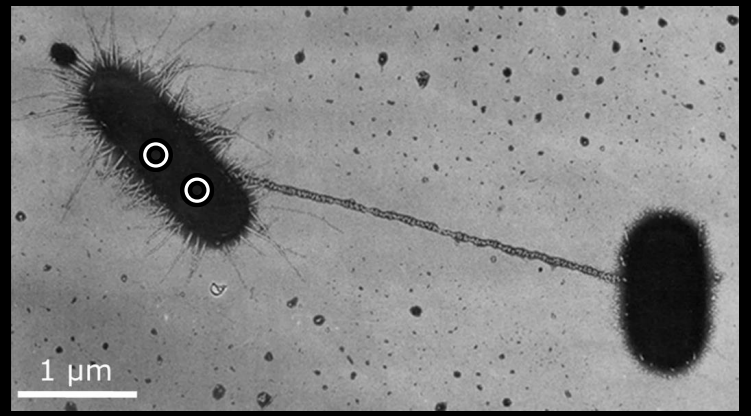
However, toxin genes are on plasmids,
which move between cells.

Plasmids also contain **immunity** genes.



Why are toxin genes transferred to competitors, making toxins **ineffective**?

Conjugation lets plasmids move between *E. Coli*.



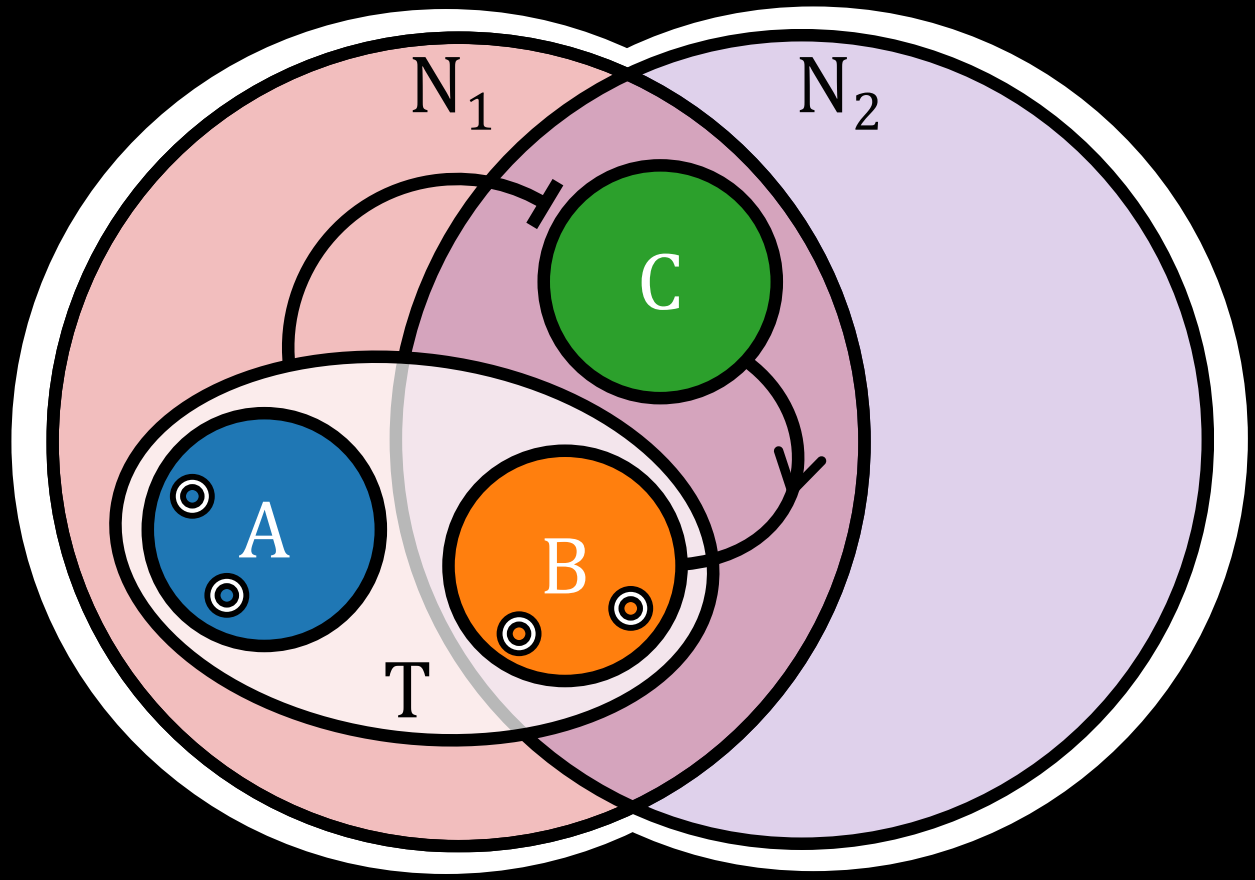
Mobile plasmids commonly contain toxin genes.

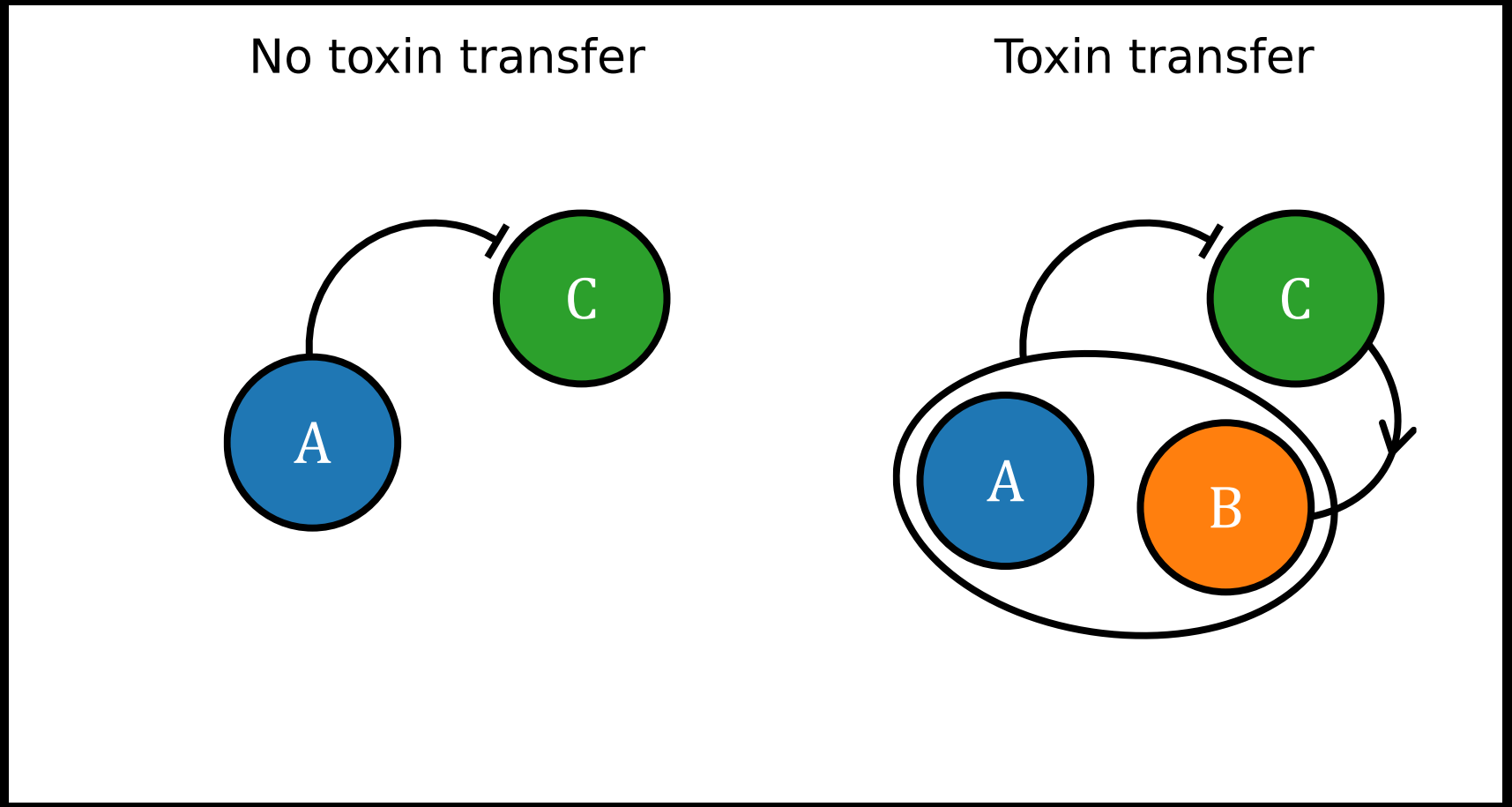
Modelling

A Donors

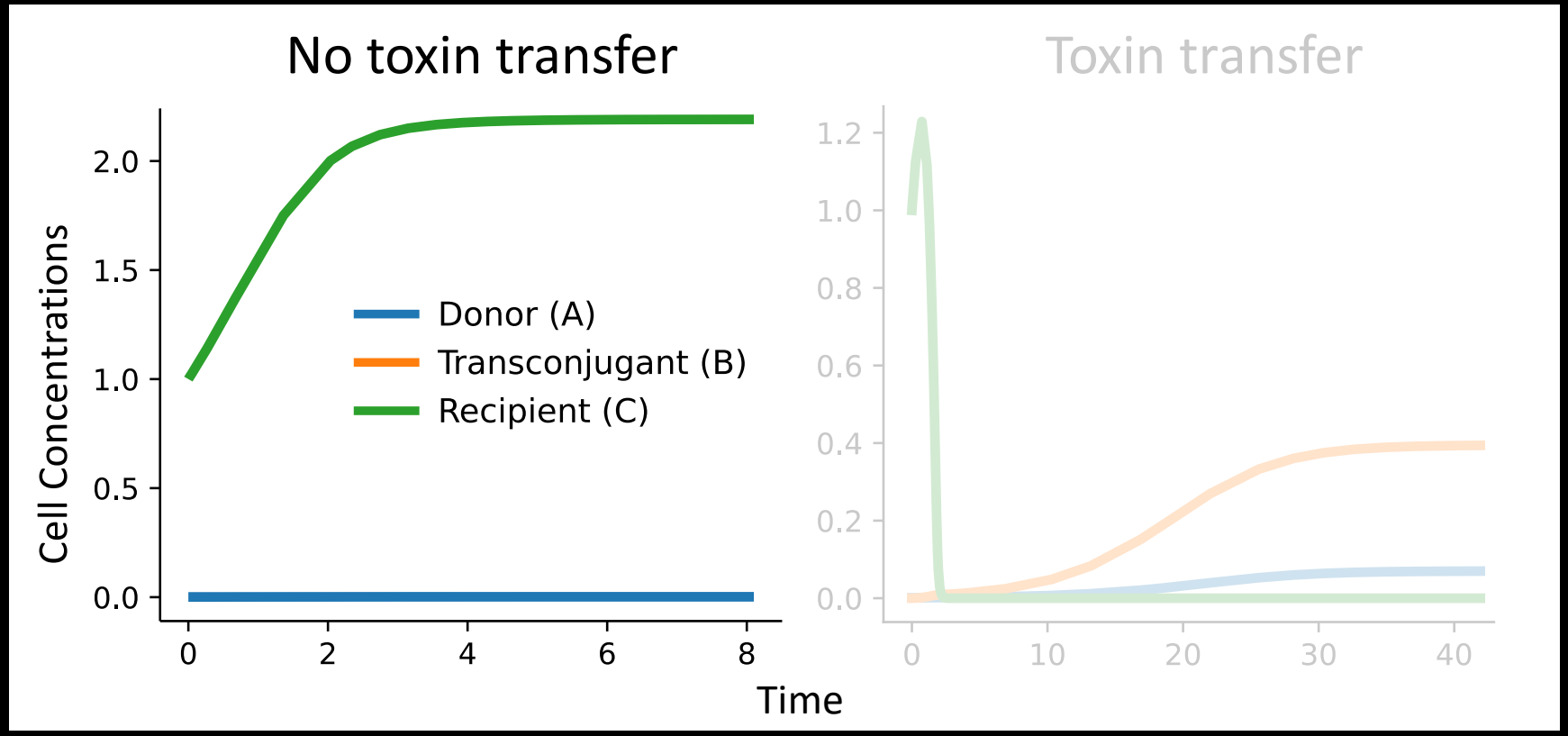
B Trans-conjugants

C Recipients



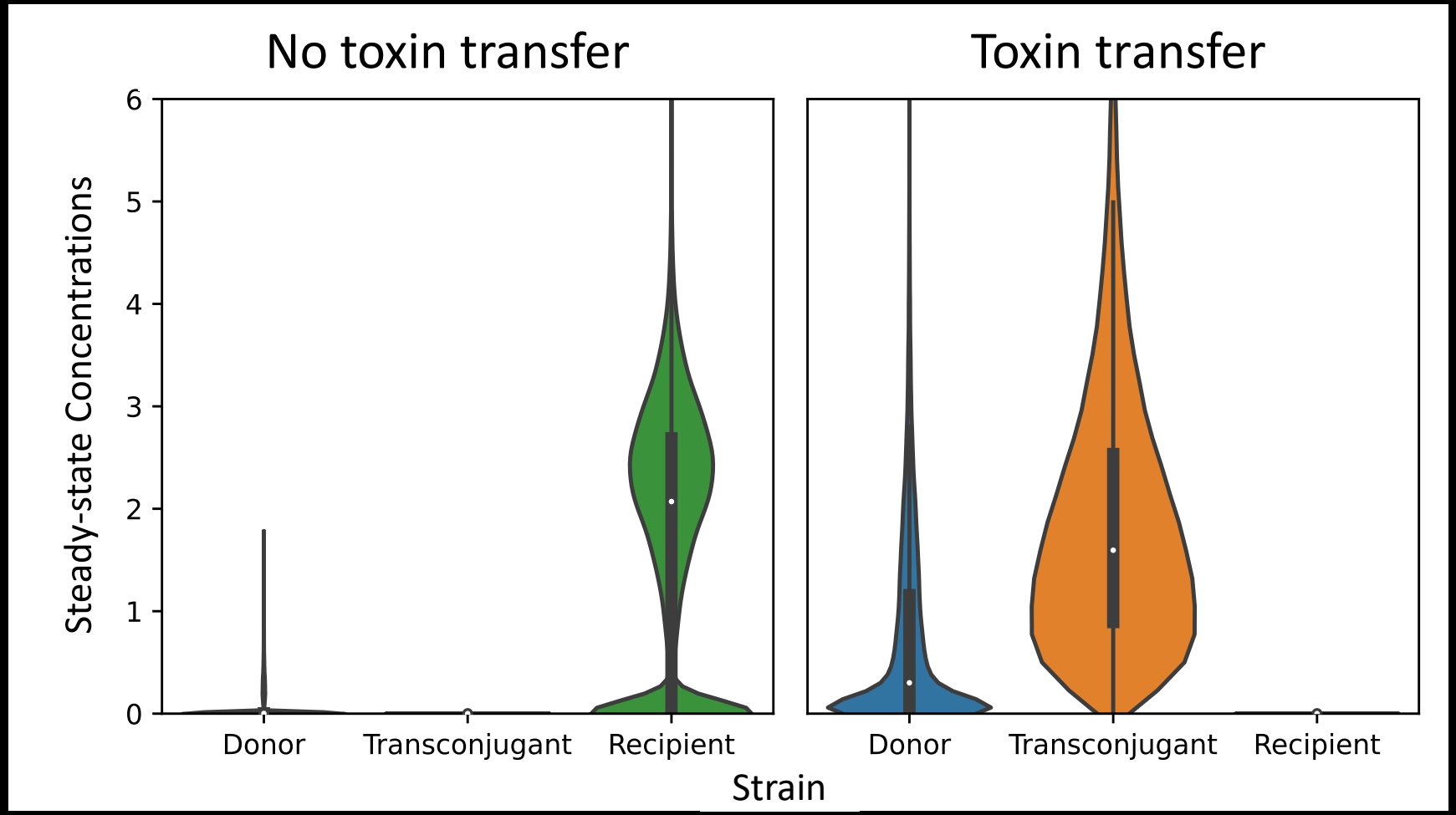

No toxin transfer
C
A
Toxin transfer
C
A
B

Dynamics



Toxin transfer lets donors invade.

Many repeats:



The result isn’t a fluke.

Conclusion

Transferring toxins may be beneficial to donors.

Future work

Wider ecological effects of conjugation.

Fit model to experiments and inform design.

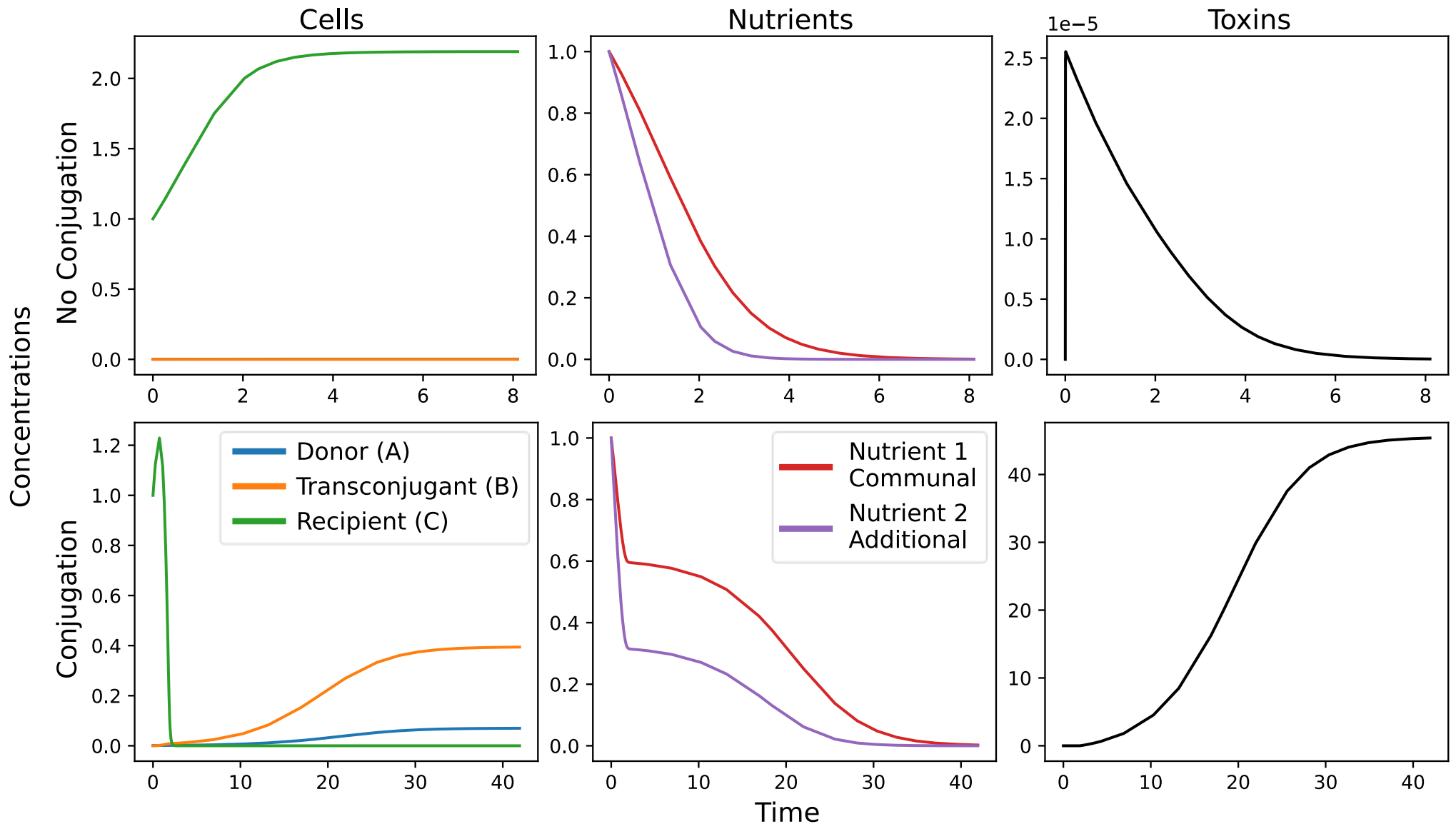
With thanks to

Jake Palmer

Kevin Foster

Elisa Granato

and the rest of the lab!


Cells
Nutrients
Toxins
1e−5
Concentrations
No Conjugation
Conjugation
Donor (A)
Transconjugant (B)
Recipient (C)
Nutrient 1
Communal
Nutrient 2
Additional
Time

Sensitivity