

1 S1 List of parameters

2 Table A lists the parameters used in the model and their interpretation, and indicates the default values
3 used for producing all figures (unless otherwise indicated in the text). Fig A (next page) shows the func-
4 tional forms of all rate functions used in the main text.

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Table A: List of parameters and default values that were using for producing figures.

Parameter		Default value
<i>Parameters affecting community complexity</i>		
m	Initial (maximum) number of species	1
<i>Parameters affecting mutation and migration</i>		
μ	Rate of mutation	0.001
ν	Rate of migration	0
<i>Parameters affecting cell-level rates</i>		
γ	Cost of cooperation	0.01
K_{cells}	Within-group carrying capacity	100
<i>Parameters affecting group-level rates</i>		
B_0	Minimum fission rate	0.05
σ	Slope of group size-dependence for fission rate	0
K_{total}	Scales the total number of cells in the community	10^5
<i>Parameters affecting mode of fragmentation</i>		
n	Fractional offspring number	(0, 1]
s	Fractional offspring size	(0, 0.5]

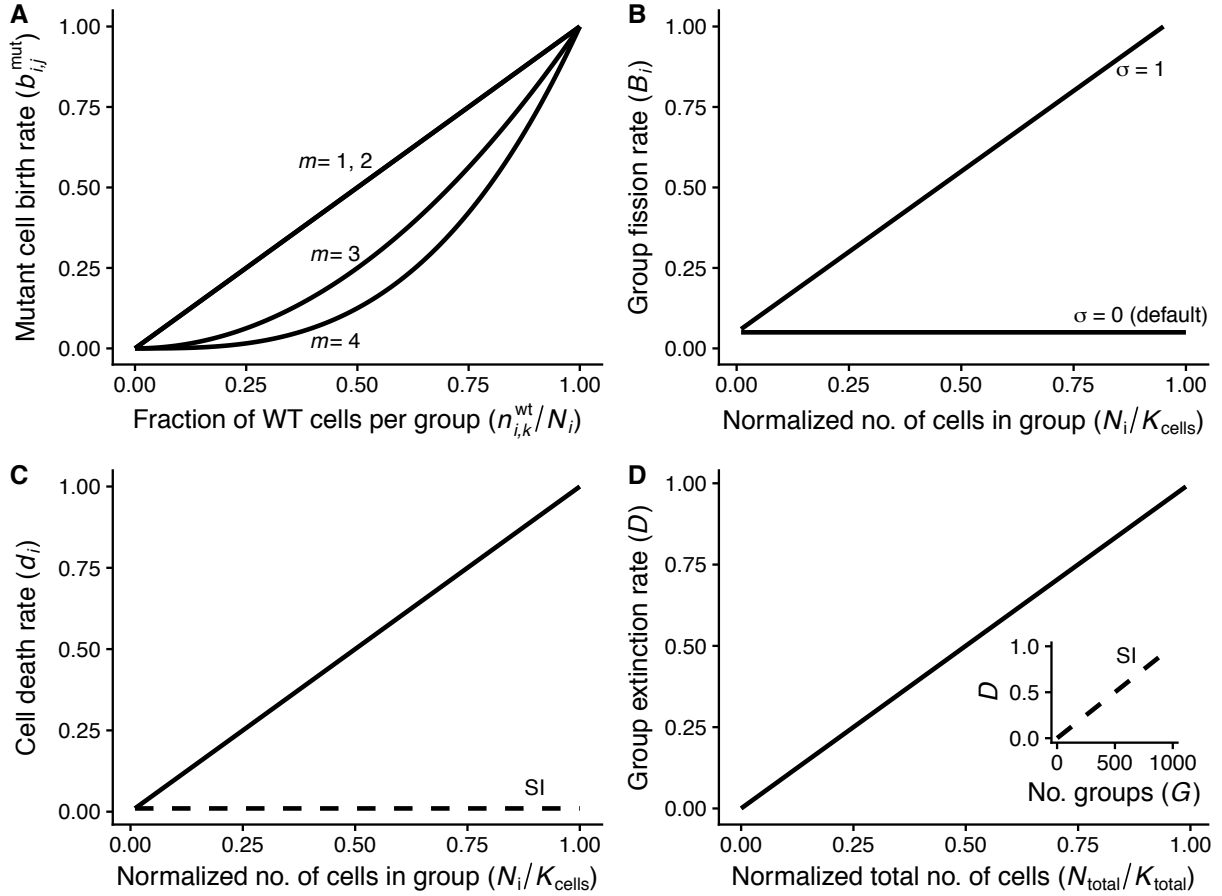


Fig A: Functional forms for cell- and group-level birth rates (top row) and death rates (bottom row). **Panel A:** cell birth rate (Eq 1, main text); **Panel B:** group fission rate (Eq 3, main text); **Panel C:** cell death rate (solid line from Eq 2, main text; dashed line from Eq S3.3 in S3 Text); **Panel D:** group extinction rate (solid line from Eq 2, main text; dashed line in inset from Eq S3.1 in S3 Text). Dashed lines indicate some of the alternative functional forms explored in this Supplemental Information. Parameters: $K_{\text{groups}} = 10^3$; all other parameters are set to the default values (table A), unless otherwise specified. For panel A, all groups, regardless of species, were assumed to have the same fraction of wild-type cells.