Figure 1. A

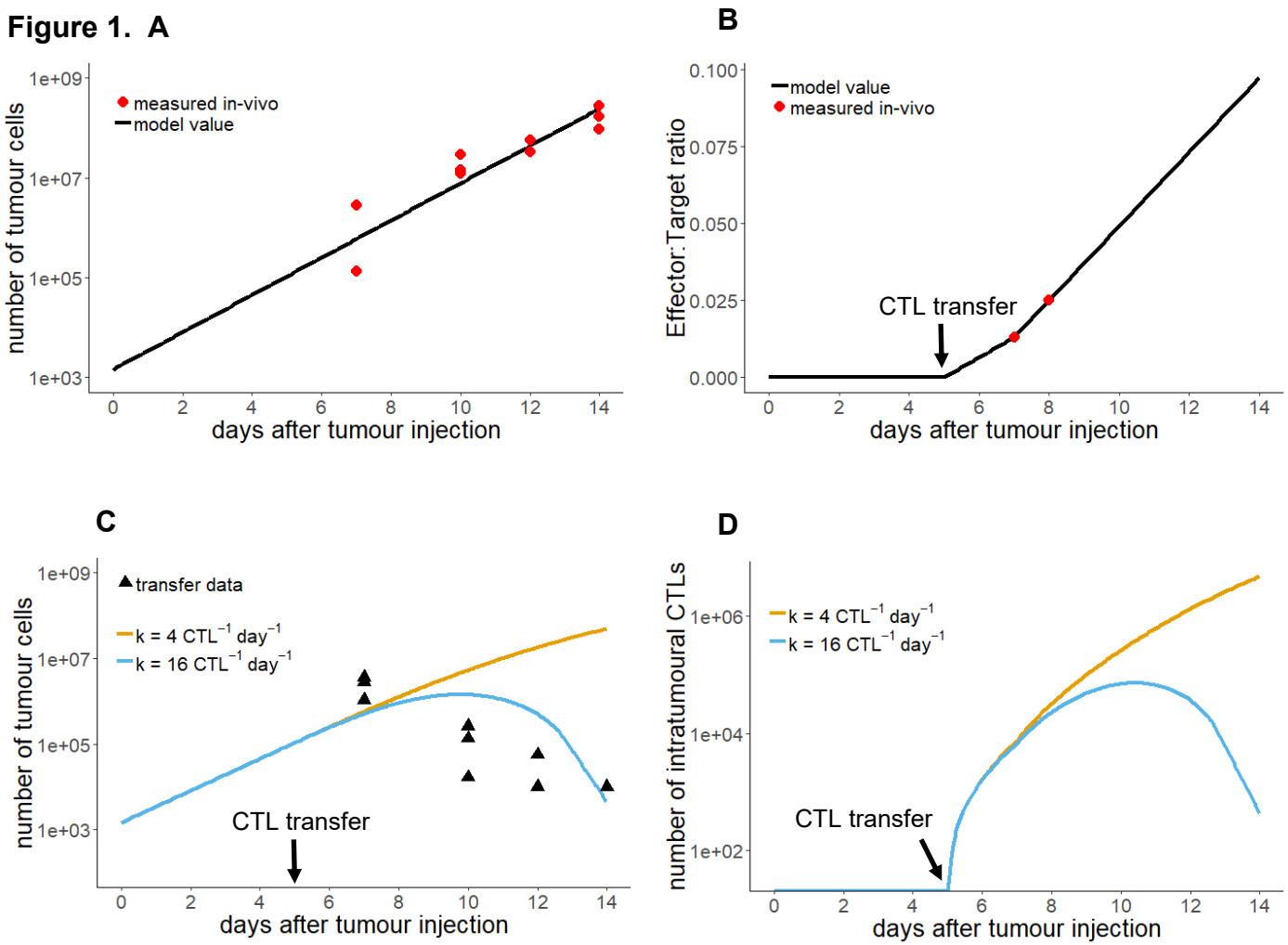
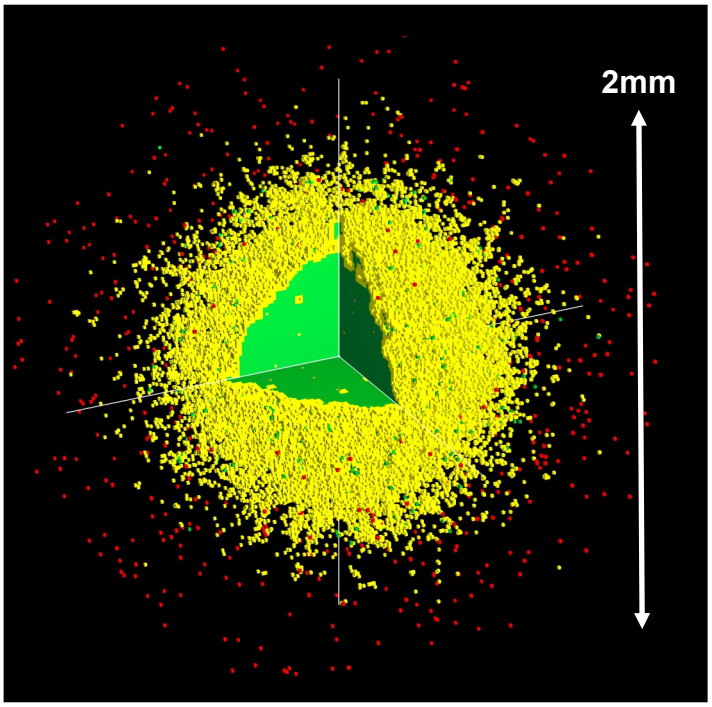


Figure 1. ODE model suggests direct T cell cytotoxicity is insufficient for control of EG7 tumours. **A)** Tumour growth is described as exponential growth (g=0.86 day^{-1}). **B)** E:T ratio in the ODE model is estimated by linear interpolation of measured data points. After day 8, we assume a linear increase in CTL density. **C)** ODE simulation of tumour dynamics in the presence of actively killing CTLs, with two different killing rates. Solid lines represent model fits and dots represent experimental data. **D)** Total number of CTLs in simulations with killing.

Figure 2. A



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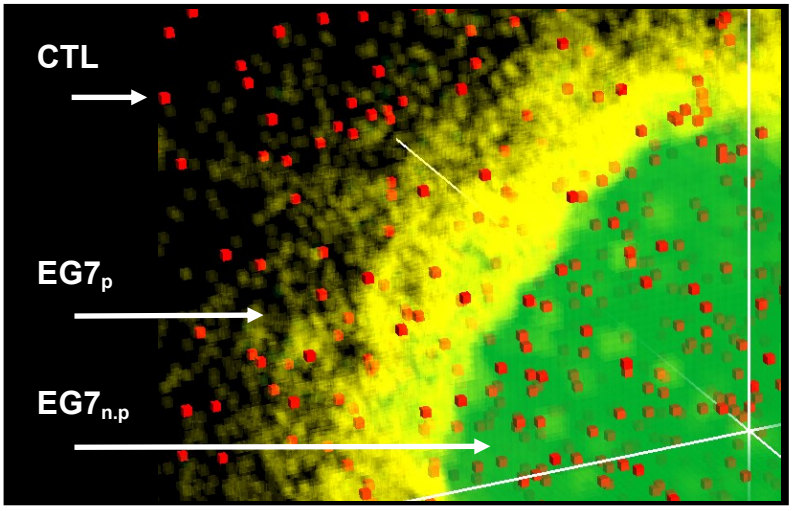

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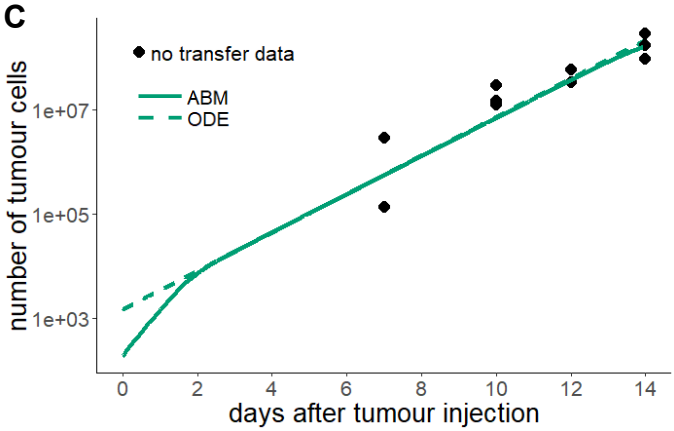
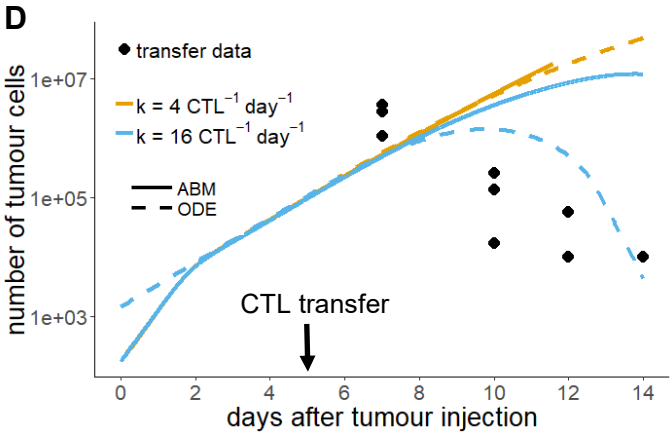


D



E

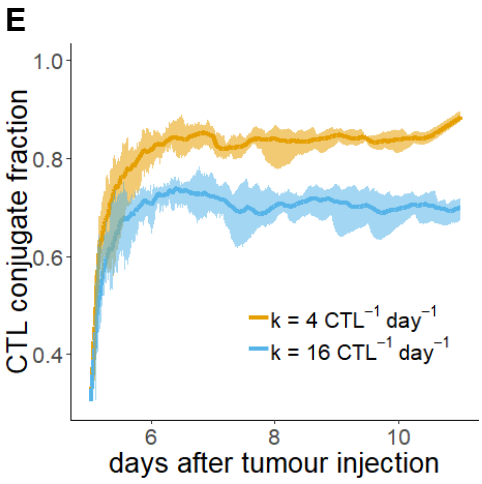


Figure 2. ABM confirms that direct T cell cytotoxicity is insufficient for control of EG7 tumours. **A-B)** ABM tumour infiltrated by CTLs on day 7. EG7 with free adjacent lattice sites can proliferate ($EG7_p$). EG7 with no free adjacent lattice sites are non-proliferating ($EG7_{n.p}$), although they may still disperse (see Methods). **C-D)** Comparison of tumour evolution in ABM (solid lines) and ODE model (dashed lines) without **(C)** and with **(D)** transferred CTLs. **E)** Fraction of CTLs in a conjugate with a tumour cell throughout ABM simulations.

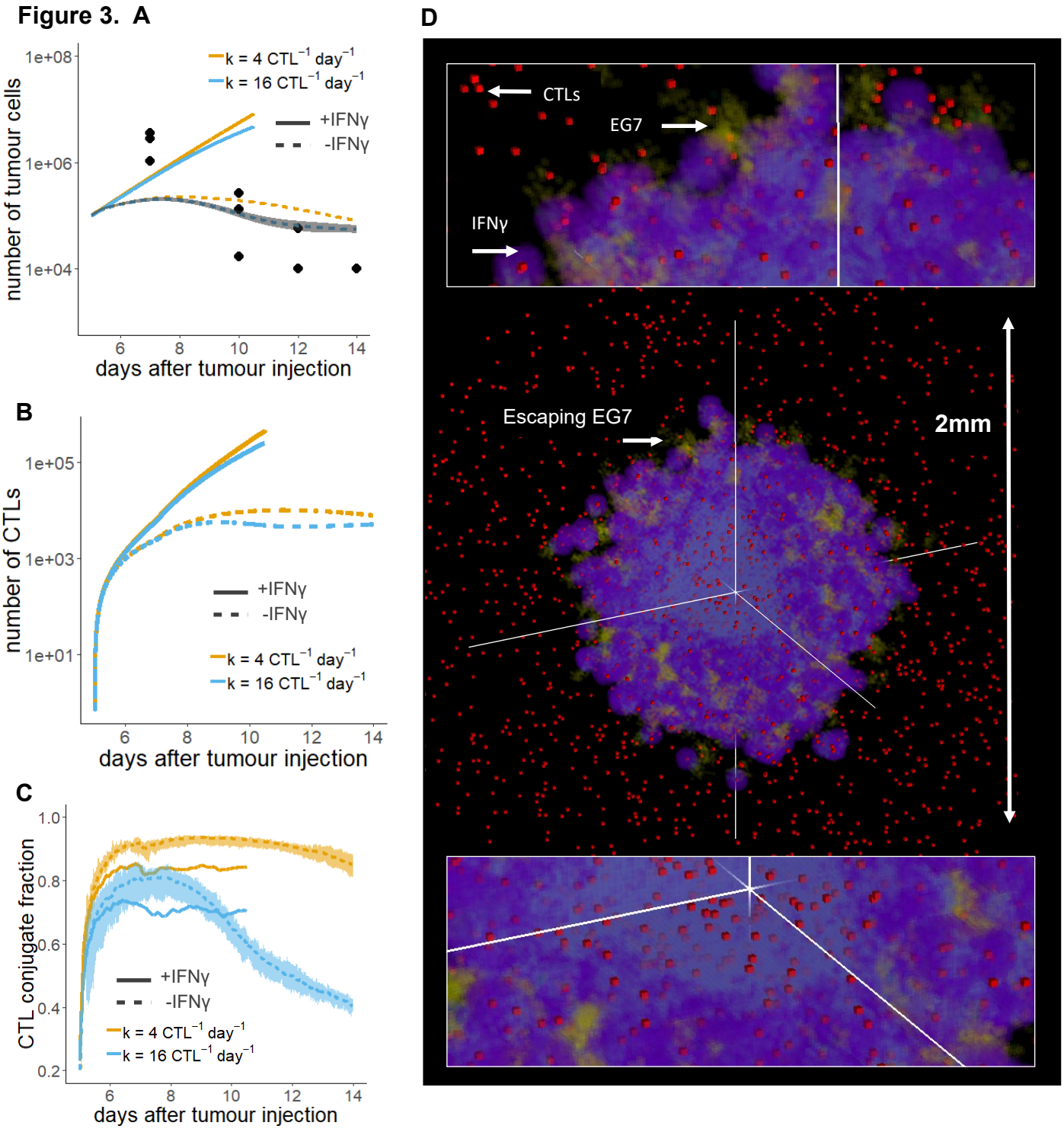
Figure 3. 

Figure 3. Antiproliferative IFNγ leads to tumour control. **A)** Simulated tumour volume compared with and without IFNγ producing CTLs. **B)** Total CTL numbers in simulations with or without IFNγ. **C)** Fraction of CTLs in conjugates in simulations with and without IFNγ. **D)** Tumour on day 8, in the presence of IFNγ.

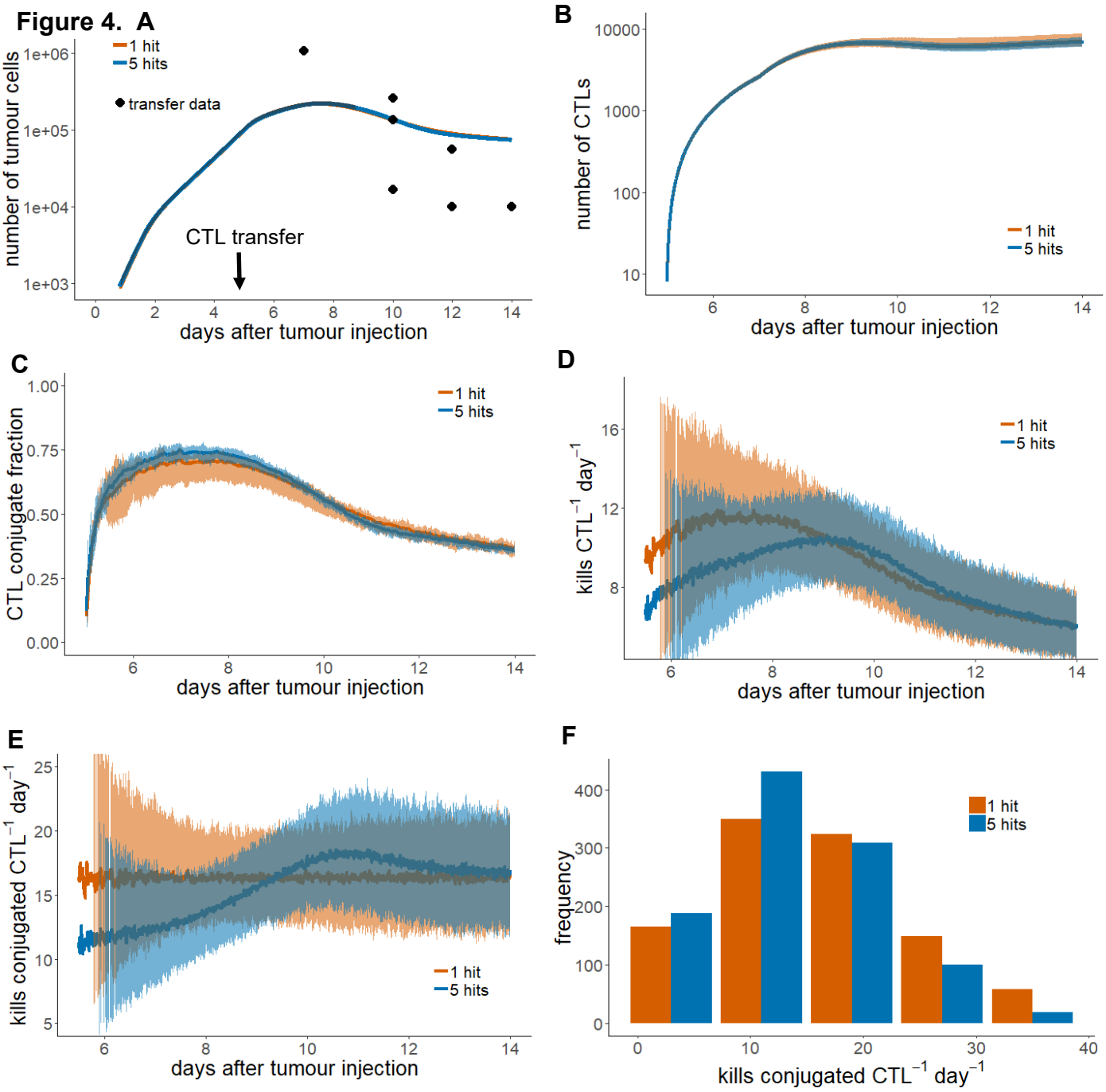
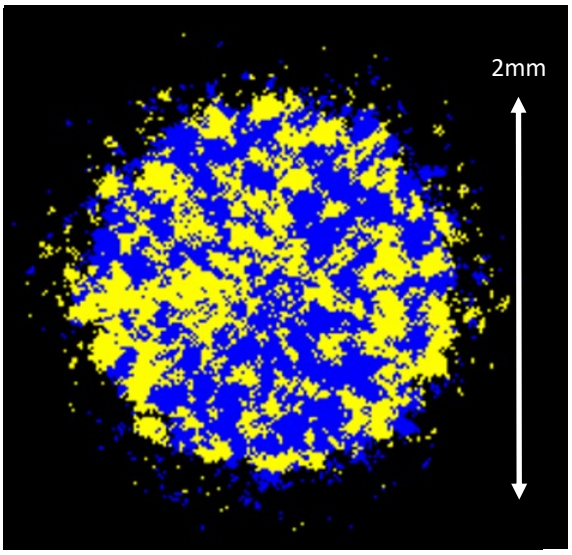


Figure 4. T cell cooperativity causes heterogeneity in killing rate. **A-E)** Comparison of **(A)** simulated tumour volume**, (B)** total number of CTLs, **(C)** fraction of conjugated CTLs, **(D)** killing rate per simulated CTL and **(E)** killing rate per conjugated CTL between simulations where CTLs required 1 or 5 hits to kill targets, in the presence of IFNγ. **F)** Killing rate measured from 2-hour windows beginning on day 8. **G)** Distribution of dead (EG7$_d$), damaged ('hit', EG7$_h$), or healthy ('unhit',EG7$_u$) tumour cells.

Figure 5. A



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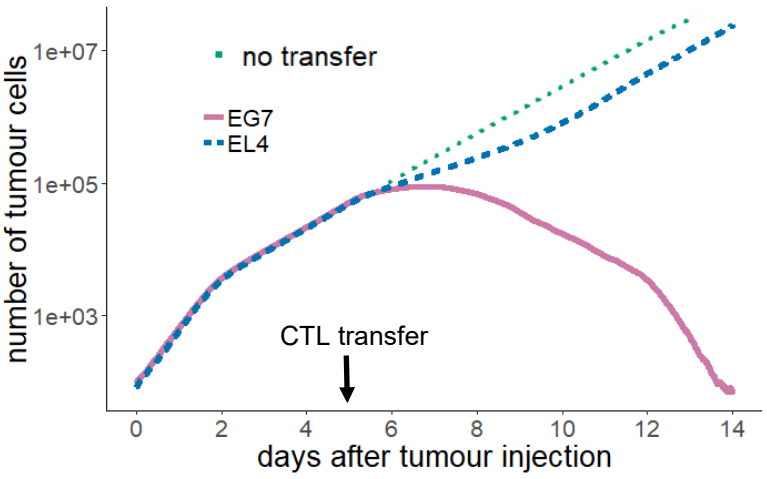

B

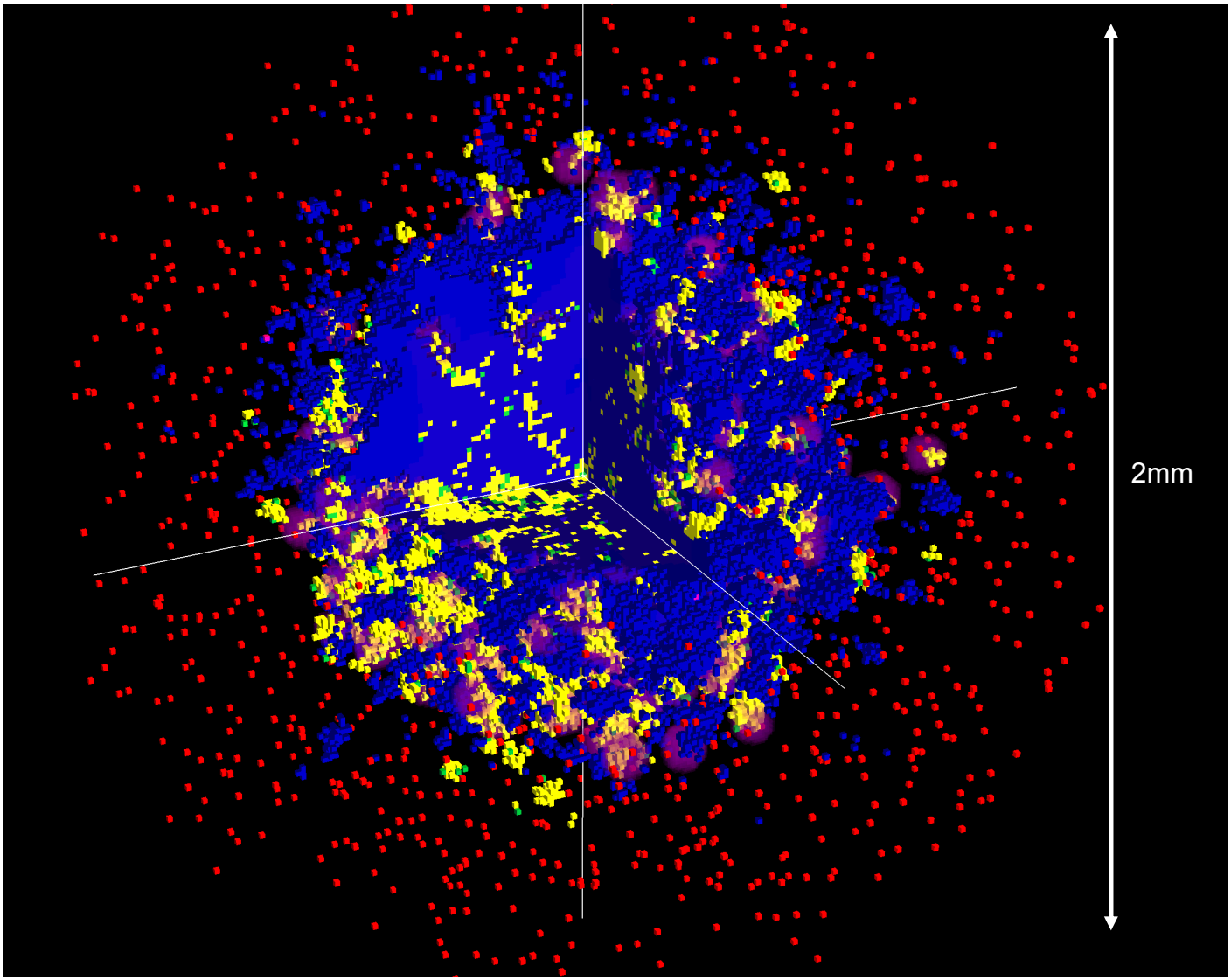

Figure 5. Antiproliferative IFNγ explains selective destruction of EG7 cells within EG7/EL4 mixed tumours. **A)** Example 2D slice from the centre of a simulated mixed tumour 8 days after tumour inception. **B)** Images showing examples of tumour composition (T cells in red, EG7 cells in yellow, EL4 cells in blue and IFNγ concentrations in purple) on day 8 during the course of EG7 regression. **C)** Evolution of the total volume of EG7 and EL4 cells in mixed tumour simulations, with transfer of CTLs.