

Dear Dr. Magalhaes

We appreciate the opportunity to resubmit a revised version of our manuscript entitled **“Coevolution of virulence and immunosuppression through in infections”**.

We have upload the revised version on bioRxiv:  
<https://www.biorxiv.org/content/early/2017/12/07/149211.full.pdf+html>

Please find below detailed responses to reviewer comments.

Thank you,

Tsukushi Kamiya, Nicole Mideo and Samuel Alizon

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- Title: wouldn't it be 'in' rather than 'through'?

**Changed.**

- An article on the classical host-parasite interaction of rabbits and myxoma virus came out (Kerr PNAS 29 aug 2017) describing a novel strain that immunosuppresses the host, maybe worth mentioning?

**The suggested paper is now referenced. (L. 256).**

- Abstract line 7: I would put “host-parasite interactions”.

**Done**

- Abstract line 17: “the shape of the trade-off determining the cost and benefit of immunosuppression” is not clear. What is being traded off with what? Maybe rephrase here.

**We assumed that recovery and susceptibility to further infection that are traded-off against one another and that this is mediated via immunosuppression. We have rephrased the sentence as: “ ...the precise trade-off shape determining the effect of immunosuppression on host recovery and susceptibility to further infection.”**

- Line 36: help maintain -> helps maintaining.

**Rephrased**

- You state that immunosuppression translates into a longer infection period (eg line 43). Can't we imagine that, instead, it leads to a higher parasite load for the same time period?

**As pointed out, we could indeed have assumed that the benefit of immunosuppression would be a higher parasite load (and therefore a greater transmission rate). One of the reasons why we preferred to go for an effect on recovery rate is that increased parasite load would then raise the question of the effect on virulence and in the end we would be varying two variables at the same time (transmission and virulence) making the results much more difficult to interpret.**

**Our model assumed that the increased risk of coinfection (i.e. higher parasite load) as a cost of immunosuppression. We explain this cost in the paragraph starting in Line 47.**

- Line 68: again, trade-off between what and what?

**Rephrased as: “ ...trade-off concavity determining the effect of immunosuppression on host recovery and susceptibility to further infection.”**

- Line 83: replace “the single species model” by “it”.

**Done**

- Line 84: replace “than” with “which is not the case for”.

**Done**

- Line 101: remove extra space before “doubly”.

**Done**

- Legend of Table 1: put a comma after “evolve”.

**Done**

- Line 168: replace “evolutionarily” by “evolutionary”.

**Done**

- Line 188: replace “in which” by “therefore”.

**Done**

- Line 201: again, trade-off between which variables?

**Rephrased.**

- Line 242: I also found Koella and Boete 2003 Am Nat, I let you decide whether it is sufficiently relevant within this context.

**Thank you for pointing out this relevant work. The suggested paper is now cited.**

- I still find figure 4 a bit cryptic but have no obvious suggestion for improvement...