

This is an interesting study using the drosophila model system to study the effects of social interactions on cancer progression; a study which would be extremely difficult if not impossible to conduct in the human population. The experiments are well-thought-out, however, I do have doubts regarding some statistical analyses.

Major comments:

Statistical analysis:

- I am confused with the statistical analysis in the choice experiments. The authors show the results of a logistic regression in the text, where they ask the questions whether age, cancerous state/stimulus, or the interaction between them affects choice. They are thus comparing different groups in their choice, but they do not directly test for one group whether they are more attracted to a certain cage over the other (just differences between groups). This is more or less tested in individual tests for deviation of random choice (0.5) with asterisks in figures 3-4, however, the method of this testing is not described but seems to be performed for each individual point separately and p-values should thus be adjusted for multiple testing. Was this done? I suggest the authors to have the principle analysis be done on whether cancerous flies are attracted to a certain social group, a secondary analysis would be whether there are differences between cancerous vs control and age of the fly.
- P7, paragr3: "This was especially pronounced when flies were young i.e. at the very beginning of the tumor development". However, the interaction between age and target fly is not significant so this is not a significant effect
- P7, paragr3: "However, at later ... $P < 10^{-3}$)." I believe this p-value must be based on the individual datapoint analysis that is not described. This becomes confusing because you first report a non-significant interaction (see point above), but here you don't talk about a difference between groups, but a difference from random choice. Please rewrite the results so these distinctions become clearer.
- P7, paragr4: "Cancerous flies showed ... $P = 0.44$ ", same point as above, you report the non-significant result but mention a significant effect. Report statistical analysis.
- P6, paragr1: "More surprisingly, we ... together (Fig. 1).": report statistical results backing up this result.

In the concluding paragraph of the discussion there is a referral to the contribution of this study to the evolutionary ecology of cancer, it would be great if the authors could expand a few sentences on this. What are the evolutionary benefits? Could such behavior be adaptive for cancer or is it an unintended consequence of a non-specific infection avoiding behavior? The tumor cells in this study do not impact fitness, could this bias any conclusions drawn from this study?

Minor comments:

P4, paragr1: remove comma behind "it is therefore,"

P4, paragr1: social overcrowding has been found to induce psychiatric and metabolic disorders. How about communicable diseases? That would be important to include since this study specifically highlights non-communicable diseases as opposed to communicable diseases.

P4, paragr2: remove comma after “non-transmissible ones),”

P5,paragr3: rephrase first sentence: “biological model: ... progenitor cells”

P6, paragr2, social interactions (fig 2): Contact duration and number of contracts seem very correlated, is there an explanation for this? Is this correlated in individual flies as well? Trail length and number of contacts was similar that would make sense (the more they move, the more likely they interact), but if contact duration is longer, it seems there would be less time for meeting other flies. Thus, this suggests a double effect? Would it be possible to see this extra strong effect by analyzing amount of time spent alone?

P7,paragr1: The small size of the arena did not allow the authors to disentangle the direction of social contact. Could the size of the arena thus also have affected the conclusions in this study?

P7,paragr4: Fig 5 = Fig 4

P8,paragr4 “Even if not... with being sick”: if this is a general response, shouldn't cancerous flies also avoid other cancerous flies (which they don't)? If it is a general response, they may want to avoid flies with contagious infection despite themselves having cancerous cells. Please discuss.

P13, paragr3: Do the authors have data that wing-clipping (left or right) does not affect behavior?

Figure 1: adding asterisks showing statistical differences between groups would be helpful

Figure 3: remove “28” from x-axis

Figure 4: A header would be helpful. Interaction plotting such as figure 3 for consistency would also help the reader.