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Cancer and loneliness in *Drosophila*

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A recommendation of

Dawson E, Bailly T, Dos Santos J, Moreno C, Devilliers M, Maroni B, Sueur C, Casali A, Ujvari B, Thomas F, Montagne J, Mery F. 2017. **An interaction between cancer progression and social environment in *Drosophila*.** *BiorXiv*, 143560, ver. 3 of 19th September 2017. doi: 10.1101/143560

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Drosophila flies may not be perceived as a quintessentially social animal, particularly when compared to their eusocial hymenopteran cousins. Although they have no parental care, division of labour or subfertile caste, fruit flies nevertheless exhibit an array of social phenotypes that are potentially comparable to those of their highly social relatives. In the wild, *Drosophila* adults cluster around food resources where courtship, mating activity and oviposition occur. Recent work has shown not only that social interactions in these clusters condition many aspects of the behaviour and physiology of the flies [1] but also, and perhaps more unexpectedly, that social isolation has a negative impact on their fitness [2].

Many studies in humans point to the role of social isolation as a source of stress that can induce and accelerate disease progression. The ultimate proof of the connection between social interaction and disease is however mired in confounding variables and alternative explanations so the subject, though crucial, remains controversial. With a series of elegant experiments using *Drosophila* flies that develop an inducible form of intestinal cancer, Dawson et al [3] show that cancer progresses more rapidly in flies maintained in isolation than in flies maintained with other cancerous flies. Further, cancerous flies kept with non-cancerous flies, fare just as badly as when kept alone. Their experiments suggest that this is due to the combined effect of healthy flies avoiding contact with cancerous flies (even though this is a non-contagious disease), and of cancerous flies having higher quality interactions with other cancerous flies than with healthy ones. Perceived isolation is therefore as pernicious as real isolation when

it comes to cancer progression in these flies. Like all good research, this study opens up as many questions as it answers, in particular the why and wherefores of the flies' extraordinary social behaviour in the face of disease.

References

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[2] Ruan H and Wu C-F. 2008. Social interaction-mediated lifespan extension of Drosophila Cu/Zn superoxide dismutase mutants. *Proceedings of the National Academy of Sciences, USA*, 105: 7506-7510. doi: 10.1073/pnas.0711127105

[3] Dawson E, Bailly T, Dos Santos J, Moreno C, Devilliers M, Maroni B, Sueur C, Casali A, Ujvari B, Thomas F, Montagne J, Mery F. 2017. An interaction between cancer progression and social environment in Drosophila. *BiorXiv*, 143560, ver. 3 of 19th September 2017. doi: 10.1101/143560

Appendix

Reviews by Ana Rivero and Silvie Huijben: http://dx.doi.org/10.24072/pci.evolbiol.100030