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Comment on "Do Neonatal Mouse Hearts Regenerate following Heart Apex Resection"?

Michael I. Kotlikoff,[1,*] Michael Hesse,[2] and Bernd K. Fleischmann[2,*]
[1]Department of Biomedical Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853, USA
[2]Institute of Physiology 1, Life and Brain Center, University of Bonn, 53105 Bonn, Germany
*Correspondence: mik7@cornell.edu (M.I.K.), bernd.fleischmann@uni-bonn.de (B.K.F.)
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The recent article by Andersen et al. (2014) reports that following resection of the neonatal heart, "complete regeneration" does not occur, and contrasts these results with those of Porrello et al. (2011), who used a similar lesion model. The authors cite our work in support of the fact that complete regeneration does not occur within the neonatal mouse, as we reported that infarction of the neonatal mouse heart is accompanied by inflammatory repair, including $CD45^+$ cell influx, fibrosis, and vascularization of the ablated region of the neonatal myocardium (Jesty et al., 2012). However, the article misses a crucial point made in that paper, namely, that similar to the report of Porrello et al., neomyogenesis is a critical feature of neonatal heart repair, and one that is unique to the neonatal heart compared to the adult mouse heart (Porrello et al., 2011; Jesty et al., 2012; Hesse et al., 2014). Andersen et al.'s findings relative to the inflammation and revascularization that accompanies neonatal heart damage are similar to our results, but we caution that the work provides little quantitative information with respect to the critical issue of the myogenic response. Thus, while their work cites no increase in cell proliferation in the total heart and few proliferating myocytes within the heart apex, we note that these findings are not inconsistent with a model of precursor-driven cell differentiation, as proposed in our study (Jesty et al., 2012; Hesse et al., 2014).

We suggest that a focus on the unique capacity of the neonatal heart to undergo neomyogenesis, rather than on the less clearly defined concept of "regeneration," would be valuable. Whether or not "complete regeneration" occurs (and the authors provide compelling data that it does not), the mechanistic basis for neonatal postinjury myogenesis is likely to hold important hints for repair of the adult mammalian heart.

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