

# Isolation of theca cells from whole ovary tissues may not be a suitable method

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Zhi Ma<sup>‡</sup> and  Cuifang Hao<sup>§1</sup>

From the <sup>‡</sup>Medical College of Qingdao University, Qingdao 266071, China and <sup>§</sup>Center for Reproductive Medicine, Yantai Yuhuangding Hospital, Qingdao University, Yantai 264000, China

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The work by Liu *et al.* (1) helps us understand the crucial role of the BMP4–Smad signaling pathway in the pathogenesis of hyperandrogenism. Here, we briefly discuss and offer some suggestions for improving the method for isolating theca cells (TCs) from the mouse ovary used in this paper. As Liu and colleagues report, after puncturing follicles with a sterile hypodermic needle to release granulosa cells (GCs), the authors isolated TCs from the whole remaining ovary tissue through careful cutting, followed by digestion with collagenase and filtration. We note that this approach may not yield pure TC preparations as explained in the following. Folliculogenesis comprises several stages differing by GC morphology and ovary layers formed. The thecal layers are not formed until the follicle is activated and reaches the secondary stage of development (2). Because most puncturable follicles are antral follicles at this stage, the ovarian cortex still has many secondary and preantral

follicles that contain many GCs. Therefore, if at the secondary follicle stage TCs are isolated from the whole remaining ovary tissue, these GCs may potentially affect the purity of the TCs and confound results. From our perspective, large follicles should be dissected away from the ovarian stroma first, followed by release of GCs through puncturing and mechanical removal of the remaining follicular GCs with a platinum loop. The TCs then may be isolated by digestion of GC-free follicular linings (3). We propose that this suggested procedure may help to obtain purer TC preparations and yield more robust results.

## References

1. Liu, Y., Du, S.-Y., Ding, M., Dou, X., Zhang, F.-F., Wu, Z.-Y., Qian, S.-W., Zhang, W., Tang, Q.-Q., and Xu, C.-J. (2017) The BMP4-Smad signaling pathway regulates hyperandrogenism development in a female mouse model. *J. Biol. Chem.* **292**, 11740–11750 [CrossRef Medline](#)
2. Young, J. M., and McNeilly, A. S. (2010) Theca: The forgotten cell of the ovarian follicle. *Reproduction* **140**, 489–504 [CrossRef Medline](#)
3. McAllister, J. M., Byrd, W., and Simpson, E. R. (1994) The effects of growth factors and phorbol esters on steroid biosynthesis in isolated human theca interna and granulosa-lutein cells in long term culture. *J. Clin. Endocrinol. Metab.* **79**, 106–112 [CrossRef Medline](#)

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<sup>1</sup> To whom correspondence should be addressed. E-mail: [cuifang-hao@163.com](mailto:cuifang-hao@163.com).