Accepted Manuscript

Low oxygen level increases proliferation and metabolic changes in bovine granulosa cells

Shogo Shiratsuki, Tomotaka Hara, Yasuhisa Munakata, Koumei Shirasuna, Takehito Kuwayama, Hisataka Iwata

PII: S0303-7207(16)30304-5

DOI: 10.1016/j.mce.2016.08.010

Reference: MCE 9604

To appear in: *Molecular and Cellular Endocrinology*

Received Date: 19 April 2016

Revised Date: 6 August 2016

Accepted Date: 8 August 2016

Please cite this article as: Shiratsuki, S., Hara, T., Munakata, Y., Shirasuna, K., Kuwayama, T., Iwata, H., Low oxygen level increases proliferation and metabolic changes in bovine granulosa cells, *Molecular and Cellular Endocrinology* (2016), doi: 10.1016/j.mce.2016.08.010.

1 Title: Low oxygen level increases proliferation and metabolic changes in bovine granulosa cells

2

3 Shogo Shiratsuki, Tomotaka Hara, Yasuhisa Munakata, Koumei Shirasuna, Takehito Kuwayama,

4 Hisataka Iwata*

5

6 Laboratory of Animal Reproduction, Department of Animal Science, Tokyo University of

7 Agriculture, 1737 Funako, Atsugi-city, Kanagawa 243-0034, Japan

8 *Corresponding E-mail: h1iwata@nodai.ac.jp

9

10

11 Short title: Effect of low oxygen level on granulosa cells

12 **Key words:** granulosa cell, low oxygen, metabolism, cellular proliferation

13