**Additional file**

**Title:** Cellular hypoxia promotes osteogenic differentiation of mesenchymal stem cells and bone defect healing via STAT3 signaling

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**Figure S1**

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**Figure S1.** Quantitative analysis of western blots for protein expression in BMSCs on day 7 (Figure 2E). A – Col1α1. B – RUNX2. C – ALP. D – OSX. H1, H3, H5 and H7 represent hypoxia for 1, 3, 5 and 7 days, respectively. Inhibitor: STAT3 inhibitor. Data of quantitative analysis are the means ± SD from 5 independent experiments, n = 5. Significant effect of treatment, \*p < 0.05, \*\*p < 0.01 \*\*\*p < 0.001 compared with the control group.

**Figure S2**

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**Figure S2.** Quantitative analysis of western blots for protein expression in BMSCs after 3 h of culture (Figure 3A). A – HIF-1α/GAPDH. B –pSTAT3/tSTAT3. Data of quantitative analysis are the means ± SD from 3 independent experiments, n = 5. Inhibitor: STAT3 inhibitor. Significant effect of treatment, \*p < 0.05, \*\*p < 0.01 \*\*\*p < 0.001 compared with the control group; ###p < 0.001 compared with the CoCl2 group.

**Figure S3**

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**Figure S3.** Quantitative analysis of western blots for protein expression in BMSCs on day 7 (Figure 4E). A – Col1α1. B – RunX2. C – ALP. D –Osx. H1, H3, H5 and H7 represent hypoxia for 1, 3, 5 and 7 days, respectively. Inhibitor: STAT3 inhibitor. Data of quantitative analysis are the means ± SD from 5 independent experiments, n = 5. Significant effect of treatment compared to the control group: \*p < 0.05, \*\*p < 0.01 and \*\*\*p < 0.001; the CoCl2 group: ###p < 0.001; and the CoCl2 + inhibitor group: &&&p < 0.001.

**Figure S4**



**Figure S4. Representative X-Ray images of mice femurs with bone defects.** Inhibitor: STAT3 inhibitor.