

# RAT KIDNEY PAPILLA STEM CELLS ISOLATION AND ITS PROTECTIVE EFFECTS ON THE INJURED HUMAN KIDNEY TUBULAR EPITHELIAL CELLS

Cheng Qing-li<sup>1,2</sup>, Wen Jing<sup>1</sup>, Ma Qiang<sup>1,2</sup>, Qi Yun<sup>1</sup>, Zhao Jia-hui<sup>1,2</sup>

1, Department of Geriatric Nephrology; 2, State Key Lab of Kidney Diseases; Chinese PLA General Hospital, Beijing, 100853, CHINA



## Objective

The source of stem cells involved in kidney repair has been a controversial topic. Some studies showed there were adult kidney-derived cells which had potential as mesenchymal stem cells in the renal papilla. However, there is little research about the characteristics of the kidney stem cells. This study was to investigate the isolation of rat kidney papilla stem cells and their protective effects on the injured tubular epithelial cells.

## Methods

The kidney papilla stem cells (KSC) were isolated from two-month-old male SD rats. The morphological and directional differentiation ability of the KSC and the cell-surface markers were analyzed. The human kidney tubular epithelial cells (HKC) injury model was induced with 0.1 μmol/L antimycin A for 30 minutes. The injured HKC were co-cultured with KSC or supernatant of cultured KSC. The apoptosis rate of HKC was detected by flow cytometry. The changes of adenosine triphosphate (ATP) in the HKC and the level of malondialdehyde (MDA), superoxide dismutase (SOD) and lactate dehydrogenase LDH in the supernatant of cultured HKC were detected after co-cultured with KSC.

## Results

1. The KSC could be induced to differentiate into adipocytes and osteoblasts under proper inducing condition (Figure 1 and Figure 2, Compared with Bone Marrow Stem Cells, BMSCs ).

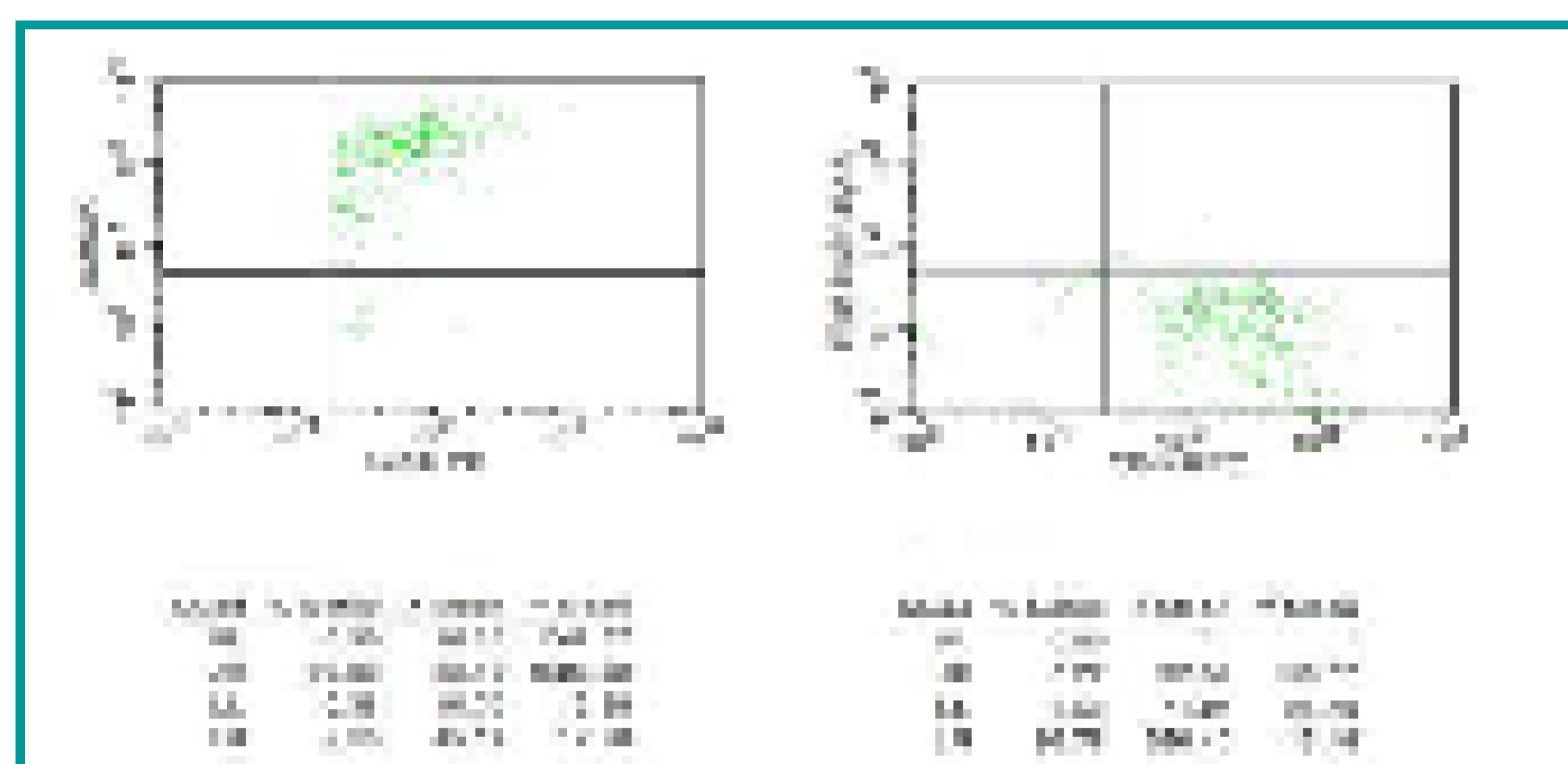


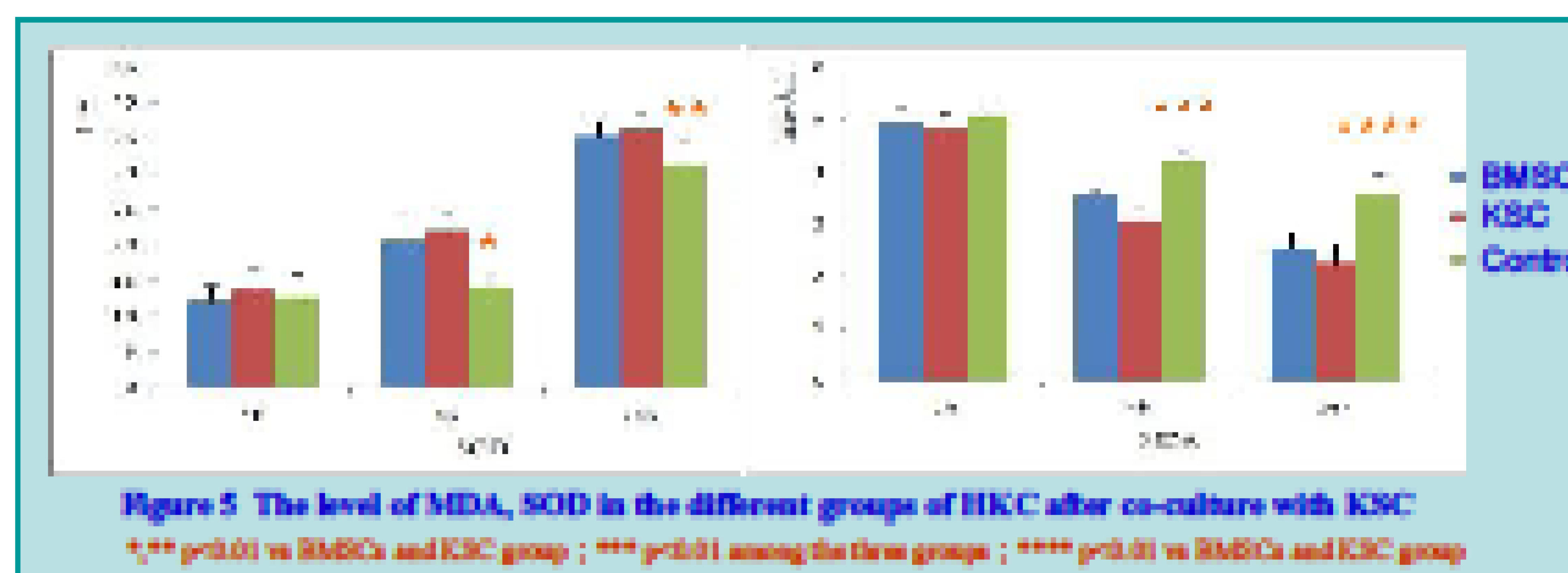
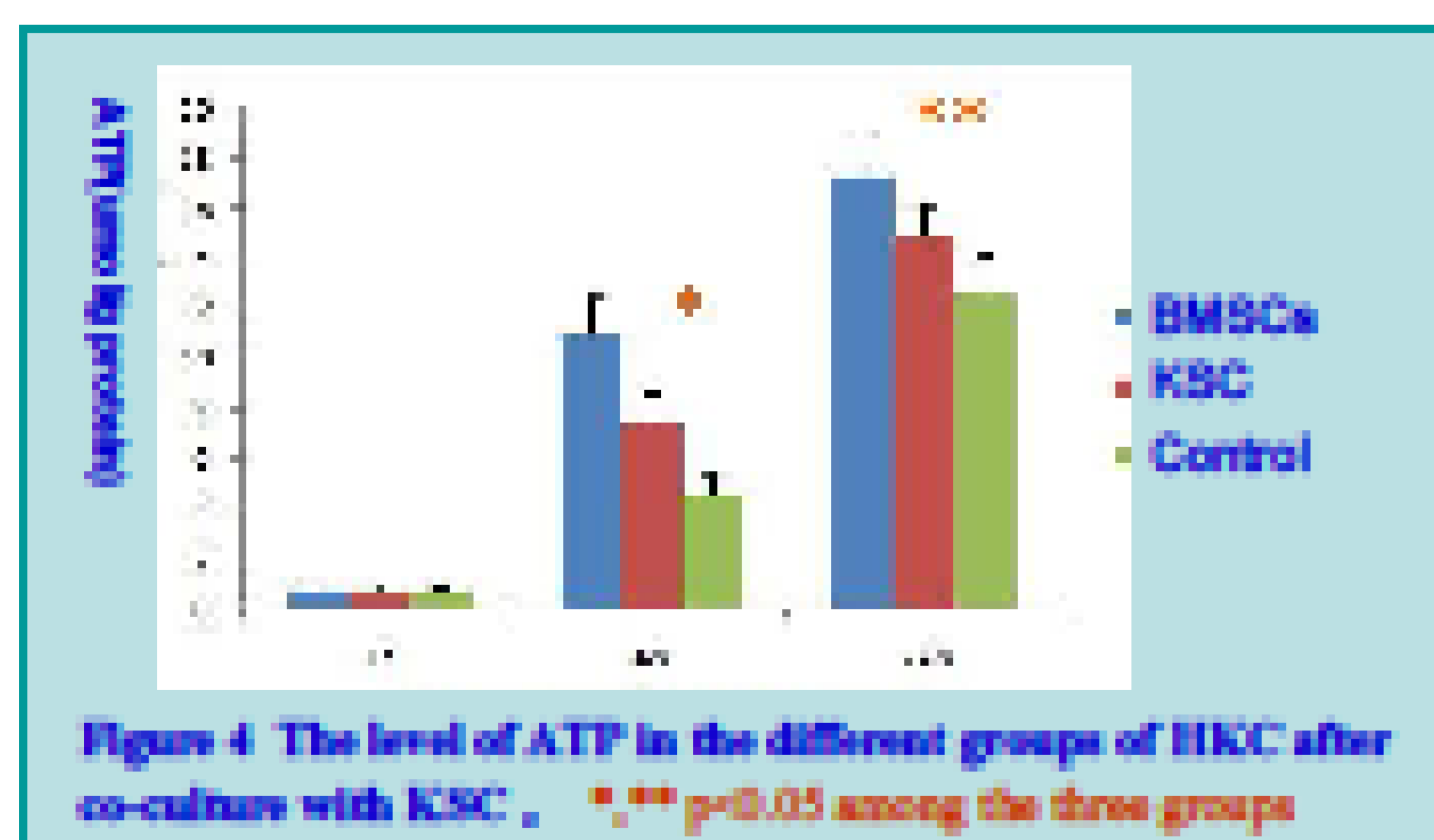
Figure 3 Flow cytometry of surface marker expression in kidney stem cells

2. The flow cytometer analysis showed that these cells were CD29, CD44, CD90 positive, and CD45 negative (Figure 3).

3. The co-culture of KSC and HKC study showed that KSC was capable to migrate into the injured HKC through the micropores of transwell.

4. After co-cultured with the KSC, the ATP content of injured HKC and the level of total SOD in the supernatant of injured HKC were increased markedly.

5. The level of MDA and LDH in the supernatant of injured HKC was decreased (Figure 4 and Figure 5).



## Conclusion

These results indicate that the kidney papilla may a niche of kidney stem cells which have the biological characteristics of stem cells by morphology, surface antigens and differentiation. The KSC has protective effects and participate in the repair of injured HKC.

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