CHAPTER V
OVERALL CONCLUSION

At present, the treatments available for osteoarthritis are not sufficiently effective, and many patients with early-stage osteoarthritis show severe symptoms. Knee replacement surgery is an expensive treatment, and many patients are unable to afford it. As a result, there is a need for more effective treatment options for this condition. This study was to differentiate human Wharton's jelly-derived mesenchymal stem cells (hWJ-MSCs) into chondrocytes for transplantation in OA-suffered guinea pigs. hWJ-MSCs were isolated using explant culture method and then their proliferation, phenotypes, and differentiation ability were evaluated. Subsequently, hWJ-MSCs-derived chondrocytes were induced and characterized based on immunofluorescent staining, qPCR, and immunoblotting techniques. Then, early OA-suffered guinea pigs were injected with hyaluronic acid (HA) containing either MSCs or 14-days old hWJ-MSCs-derived chondrocytes. This study demonstrates that early intervention with intra-articular injection of MSCs is effective in preventing the progression of early-stage osteoarthritis to severe osteoarthritis. These results are superior to those of HA injections, which are commonly used to treat early-stage osteoarthritis. In addition, the injection of early-stage chondrogenic differentiated cells from MSCs, rather than MSCs alone or HA, was found to be more effective in treating knee osteoarthritis. Novel method of injecting early-stage cartilage differentiated cells from MSCs was developed in this study and offers a superior treatment option for osteoarthritis compared to undifferentiated MSCs or HA alone. Thus, this approach could serve as a guide for the treatment of early osteoarthritis patients, where injection of chondrogenic differentiated cells into the knee joint could lead to recovery of the cartilage and prevent disease progression to severe osteoarthritis. This study demonstrated that injection of 1×10^6 chondrogenic differentiated cells into the knee joints of guinea pigs was effective for early

osteoarthritis treatment. However, further research is needed to optimize the treatment method for improved efficacy, including cell numbers, solvents, and numbers of injection. Additionally, future studies could investigate the treatment effects on moderate and severe osteoarthritis, ultimately leading to improved treatment options for human osteoarthritis patients.