

Assessment of Cell Viability of Fresh Osteochondral Allografts in N-Acetylcysteine-Enriched Medium.

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Abstract

Objective The purpose of this study was to evaluate the effect of N-acetylcysteine (NAC)-enriched storage medium on fresh osteochondral viability at 4°C. Our hypothesis was that the cell viability of chondrocytes obtained from human osteochondral tissue and stored at 4°C significantly improves in the presence of NAC. **Design** Controlled laboratory study. For this study, 8 samples of femoral condyle osteochondral tissue were obtained from patients undergoing total knee replacement. The samples were stored at either 4°C in phosphate-buffered saline (PBS) or at 3 different concentrations of NAC (NAC 1, 2, and 5 mM). Cell viability was analyzed at time 0 and 4 weeks by flow cytometry. The results of cell viability (median) were analyzed statistically using analysis of variance and Tukey's post hoc test. P values <0.05 were considered statistically significant. **Results** The viability at time 0 was 95.5% ± 3.7%. At 4 weeks, the cell viability was 56.8% ± 20.1% in the control group (PBS), 83.8% ± 11.9% in the group stored with NAC 1 mM, 73.4% ± 13.6% in the group stored with NAC 2 mM, and 66.4% ± 27.7% in the group stored with NAC 5 mM. A statistically significant difference from the baseline viability (time 0) was observed in the PBS control group (P = 0.0018) but not in the other groups. A statistically significant difference was observed in the NAC 1 mM group compared with the PBS group (P = 0.0255). **Conclusion** The use of NAC at 1 mM concentration improves cell viability after 4 weeks of storage in chondrocytes obtained from human osteochondral tissue.