SUCCESSFUL ISOLATION OF VIABLE STEM CELLS FROM CRYOPRESERVED MICROFRAGMENTED HUMAN ABDOMINAL ADIPOSE TISSUE FROM PATIENTS WITH KNEE OSTEOARTHRITIS

Introduction Treatment of knee osteoarthritis with stem cells from microfragmented adipose tissue (AT) has shown promising results. Cryopreservation and biobanking of stem cells are important for research, treatment of aged patients, and for repetitive treatments. Our aim was, therefore, to investigate if viable stem cells could be isolated and expanded from cryopreserved microfragmented AT by two different isolation methods.

Materials and Methods Microfragmented abdominal AT from knee osteoarthritis patients was cryopreserved at -80°C in cryoprotectant-medium containing 10% dimethyl sulfoxide. The samples were thawed for stem cell isolation by tissue explant culture (TEC) and enzymatic digestion (ED), respectively. Viability, population doublings, and doubling time were assessed by trypan blue staining. Cell type was investigated using flow cytometry. Osteogenic and adipogenic differentiation was assessed quantitatively by Alizarin-Red-S and Oil-Red-O staining, respectively. Statistical analysis was performed using paired t-tests. p-values <0.05 were considered statistically significant.

Results Microfragmented AT from 7 patients was cryopreserved for a period of 46–150 days (mean (SD) 115.9 days (44.3 days)). Viable stem cells were successfully recovered and expanded from all patients using both isolation methods with no significant difference in viable population doublings or doubling time from passage 1 to 3 (p>0.05). Stemness was assessed quantitatively by Alizarin-Red-S and Oil-Red-O staining, respectively. Statistical analysis was performed using paired t-tests. p-values <0.05 were considered statistically significant.

Conclusion Viable stem cells could be isolated and expanded from cryopreserved microfragmented AT by two different isolation methods.