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

Jasmin Bagge*, Per Hølmich, Freja Hammer, Jan Nehlin, Lars Bland, Lisbet Hølmich, Kristoffer Barfod. Sports Orthopedic Research Center – Copenhagen (SORC-C), Copenhagen University Hospital – Hvidovre, Kettegård Allé 30, Denmark; Department of Clinical Research, Copenhagen University Hospital – Hvidovre, Kettegård Allé 30, Denmark; Department of Orthopedic Surgery, Zealand University Hospital – Koge, Lykkehegedevej 1, Denmark; Department of Plastic Surgery, Copenhagen University Hospital – Herlev and Gentofte, Borgmester Ib Juds Vej 1, Denmark.

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 stain-cytometry. Osteogenic and adipogenic differentiation was assessed quantitatively by Alizarin-Red-S and Oil-Red-O stain-cytometry. Osteogenic and adipogenic differentiation was assessed quantitatively by Alizarin-Red-S and Oil-Red-O stain-cytometry.

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 as passage 1 to 3 (p > 0.05). Stemness was verified by surface markers and osteogenic and adipogenic differentiation. More pericytes were present when using TEC (25% (24%)) compared to ED (2% (2%)) at passage 4 (p = 0.04).

Conclusion Viable stem cells can be isolated and expanded from cryopreserved microfragmented AT using both TEC and ED. TEC provides more clinically relevant pericytes than ED.

CONCussion incidence amongst youth handball players participating in the health and performance promotion in youth sport (HAPPY) randomized controlled trial

Lisbeth Lund Pedersen*, Morten Bjerg, Søren Carstensen, Jan Hartvigsen, Merete Møller. University of Southern Denmark, The Faculty of Health Sciences, Department of Sports Science and Clinical Biomechanics, Campusvej 55, Denmark.

Introduction Knowledge of concussion in handball is limited. The aim of this study is to determine the incidence of concussion in Danish youth community handball.

Materials and Methods 758 players aged 11–17 years were followed prospectively as a part of a randomized controlled trial. Handball playing hours and head traumas were monitored weekly by the Oslo Sport Trauma Research Center Health questionnaire (OSTRC-H2) and a concussion specific question over 21 weeks using the app Athlete Monitoring. Players reporting a head injury via the OSTRC-H2 questionnaire or answered yes to the concussion specific question underwent a standardized 5–10-Minute telephone interview within 1 week.

Cases of concussion was defined according to the Consensus in Sport Group. Handball playing hours was defined as time spend in handball training and match. Incidence is reported as cases per 1000 playing hours.

Results 44 cases of concussion were identified. Overall incidence of concussion was 0.94 per 1000 hours [95% CI; 0.68–1.26]. Female athletes sustained twice as many concussions than male athletes (incidence rate ratio (IRR) 2.20 [95% CI; 1.09–4.84]). Concussion happened 9 times more often during match compared to training (9.09 [95% CI; 4.72–18.25]). No statistically significant difference in IRR between age groups (U13/U15 vs. U17; IRR 1.48 [95% CI; 0.59–3.24]) was found.

Conclusion This is the first study reporting concussion incidence in youth handball. Incidence was higher amongst female handball players compared to males and in match versus training. No difference in concussion incidence was found between age groups.