Influence of ischemic time and temperature on endothelial cell growth after transport

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Background: The preparation of tissue-engineered material is a complex procedure. The possibility to transport tissues between laboratories without losing endothelial cell (EC) function was examined.

Methods: In 3 months old juvenile sheep (n=6) a piece of vein (n=14) was harvested and transported over 900 km to the tissue laboratory in Dulbecco's Modified Eagle's Medium (=DMEM). Vein material of each animal was transported at 4°C (Group I, n=6) and 25°C (Group II, n=8). EC growth potential was evaluated in function of the medium temperature and the ischemic time (between 8-24 hours). At the end of the first passage the EC of Group I and II were put together to save autologous serum of the sheep. After the 2nd passage the EC were cryopreserved at -80°C to evaluate if the EC viability would change.

Results: The growth potential of the hypothermic Group I was equal in 16.7% (n=1), higher in 33.3% (n=2) and lower in 50% (n=3) than Group II which had the same ischemic time during transport. Increase in ischemic time up to 24 hours showed no decrease of growth potential. Cryopreservation had no significant influence on EC viability. Viability at the end of the second passage, after recultivation and at the end of the third passage was 97.4% ± 1.52, 95.5% ± 1.34 and 94.5% ± 1.08 respectively.

Conclusions: In sheep there is no need to transport the EC at a temperature of 4°C. Up to 24 hours growth potential and viability are maintained also at 25°C.

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