Can autologous vascular endothelial cell seeding increase the patency rate of small diameter No-React® treated bovine internal mammary arteries: an in vivo study in the juvenile sheep model.


Background
This study was performed to evaluate the possibility of seeding No-React® treated bovine internal mammary arteries (SIMA) and to record any improvement in patency compared to non-seeded SIMA arteries.

Methods
Eight juvenile sheep received either a seeded or a non-seeded SIMA, bypassing the carotid artery. In the seeded group (n=3), a piece of jugular vein was harvested to culture autologous endothelial cells. SIMA grafts were all coated with fibrin glue and seeded in a special developed bioreactor. In the control group (n=5) non-seeded SIMA grafts were implanted. No anti-coagulation was administered during follow up. Patency rate was examined prior to exsanguination. Grafts were evaluated by gross examination, histology and immunohistochemistry.

Results
The survival rate was 100%. In the seeded group, the mean endothelial cell density was $2.35 \times 10^5 \pm 0.04 \times 10^5$ cells/cm$^2$ showing a viability of $83.0\% \pm 7.8\%$ before implantation. At explantation, seeded grafts showed less inflammatory reaction compared to non-seeded grafts. Gross examination showed that all seeded grafts were patent whether the non seeded graft showed occlusion in three of five grafts. Histology showed a monolayer of endothelial-like cells on the inner surface of seeded SIMA’s. Immunohistochemistry confirmed that the monolayer were endothelial cells.

Conclusions
Seeding of No-React® treated SIMA arterial grafts with autologous endothelial cells increases the patency rate.