

Abstracts - 27th EACTS

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DECCELLULARIZED AORTIC AND PULMONARY ALLOGRAFTS IMPLANTED IN SHEEP: MORPHOLOGICAL EVIDENCE OF CELL SELF-REPOPULATION

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Objectives: The characterization of cell repopulation in decellularized aortic and pulmonary allograft roots implanted in sheep.

Methods: Eleven female sheep were studied, 1 unimplanted not decellularized control (1 aorta and 1 pulmonary artery), 2 unimplanted decellularized controls, 8 decellularized allografts: 2 aortic implanted in the aortic position (14 and 18.5 months respectively), 3 bicuspid pulmonary implanted in the

pulmonary position and 3 pulmonary implanted in the pulmonary position following the Ross operation (20 to 21 months). Gross X-ray, histology, immunohistochemistry (anti-smooth muscle cell actin, vimentin, CD57, CD31 antibodies) and transmission electron microscopy were performed.

Results: Decellularization appeared complete in unimplanted controls. Explanted allografts showed soft and pliable cusps, without calcium or tears. Repopulation occurred in all implanted decellularized allografts, especially in the outer part of wall ($71.27\% \pm 3.05\%$) with smooth muscle cell actin positive cells infiltrating the elastic lamellar units. Sporadically, a neo-myointimal layer, possibly from circulating precursors cells, was seen. Recellularization in the cusps was in ventricularis and spongiosa ($22.16\% \pm 3.06\%$) with smooth muscle cell actin cells and rare CD57 positive neural crest cells. Endothelial-like lining was restored. Patchy bone formation was in the wall of some allografts, with bone marrow, cartilage and ossification.

Conclusions: Self-repopulation in decellularized allografts occurs after implantation at both wall and cusp level. It consists of smooth muscle cell actin positive cells and rare CD57 positive neural crest cells in the cusps. The source is the adventitia for the allograft wall tunica media outer part and the blood itself for cusps and myointimal allograft wall layer.