**Introduction**

Autologous vein and artery are unrivalled for small diameter (<6mm) arterial bypass. However patients may lack suitable tissue. Patency rates of prosthetic alternatives (e.g. Dacron) are significantly lower. Acellular porcine ureter (AU) has potential for use as a scaffold. The aim of this study was to investigate the biocompatibility of AU for tissue engineering vessels.

**Materials and Methods**

Porcine ureters were decellularized by sequential incubation in PBS, hypotonic Tris buffer [10mM plus 0.1%(w/v) EDTA, aprotinin (10 KIU/ml) pH8.0], 0.1%(w/v) SDS and nuclease (1U/ml RNase, 0.5U/ml DNase) solution, and sterilised in 0.1% peracetic acid.

Biocompatibility was determined by contact and extract cytotoxicity tests with porcine smooth muscle (SMC) and endothelial cells (EC). The capacity of the AU to support SMC adhesion was determined by seeding 5x10mm sections of AU. Seeding was assessed by (1) seeding SMC and EC simultaneously or (2) seeding SMC first with EC to follow at a later stage. (1) SMC and EC were seeded simultaneously, at different concentrations, on a rotating AU conduit (1 rpm for 1-2 hours with SMC in the extra-luminal suspension and EC in the luminal suspension) at 37°C. (2) Independent SMC seeding only, was investigated in a similar fashion on a rotating AU conduit (1rpm for 24 hours with SMC in the extra-luminal suspension) at 37°C.

**Results**

The acellular ureter showed no toxicity to SMC or EC in the in vitro assays, and supported cell attachment. Simultaneous AU seeding allowed EC and SMC adhesion. Adhesion depended both on cell seeding density and seeding time. At a concentration of 1x10^6 SMC/ml with 0.5x10^6 EC/ml, cell adhesion after 1 hour seeding revealed a confluency of approximately 25% for SMC and 15% for EC, increasing to 60% for SMC and 40% for EC after 2 hours. Conversely, using a higher concentration of 2x10^6 SMC/ml and 1x10^6 EC/ml resulted in adhesion with a confluency of 25% for both SMC and EC after 1 hour, dropping to 15% for SMC and EC after 2 hours.

Independent seeding with SMC only, also allowed SMC adhesion. Furthermore it revealed a significantly higher level of confluence at 95% while using a lower concentration of SMC (2x10^5 SMC/ml). However this level of confluence was attained only after 24 hours of incubation.

**Discussion and Conclusions**

This study demonstrated that the AU is non-toxic, supporting both independent SMC adhesion and simultaneous EC and SMC cell adhesion.

**References**