Conclusion The number of positive results for microorganisms was higher in the case of hypothermic corneas and the Bio-surveillance notifications were also a little bit higher in hypothermic corneas (2,25%) comparing to organ cultured corneas (0.64%). The management of an eye bank with both preservation systems is challenging with its advantages and disadvantages. The main disadvantage of hypothermic corneas is the risk of not detecting contaminations because the corneas are released without any definitive results but it is compensated by the fact that they allow us to respond to emergencies, tissue returns, apart from the economic aspect.

P10-A128 TRENDING OF CONTAMINATION RATES ACROSS NHSBT EYE BANKS

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Introduction NHS Blood and Transplant Tissue and Eye Services (TES) is a human multi-tissue, tissue bank supplying tissue for transplant to surgeons throughout the UK. NHSBT has two Eye Banks.

NHSBT investigated all our corneas discard due to contamination with the aim to review for any patterns. NHSBT Eye Banks performs initial Microbiology sampling on all Corneas in Corneas in Organ Culture Media at 7 Days. Corneas undergo a 2nd Microbiology sampling the day after the cornea is transferred into dextran median.

Materials and methods Any Microbiology positive media Identified pre-transplant are sent to NHSBT's Microbiology Reference Laboratory (MSL) for Identification. Any organisms which are identified post-dispatch are sent to a Referral Laboratory for rapid Identification and Sensitivity/Specificity Testing.

Filton Eye Bank Contaminated Corneas in Organ Media: 2018- 28 (0.91%) 2019 -45 (1.10%), 2020- 27 (1.03%), 2021- 39 (1.41%), 2022- 43 (2.1%) (until 15/08/22)

Most common Identified Organisms: C.Ablicans C. glabrata C.paraphilotis

Contaminated In Dextran Pre-Transplant: 2018- 4 (0.17%) 2019 -6 (0.18%), 2020- 9 (0.46%), 2021- 0 (0%), 2022- 3 (0.3%) (until 15/08/22). Most common Identified Organisms: Bacillus species

Contaminated in Dextran Post Transplant: 2018- 0 (0%) 2019 -8 (0.23%), 2020- 2(0.10%), 2021- 2 (0.08%), 2022- 1 (0.11%) (until 15/08/22). Most common Identified Organisms: Bacillus species

David Lucas Eye Bank: Contaminated Corneas in Organ Media: 2020- 20(1.8%), 2021- 37(1.96%), 2022- 21(1.4%) (until 15/08/22). Most common Identified Organisms: C.Ablicans C. glabrata C.Kefyr

Contaminated In Dextran Pre-Transplant: 2020- 6(0.8%), 2021- 2(0.14%), 2022- 1(0.08%) (until 15/08/22). Most common Identified Organisms: Bacillus species

Contaminated in Dextran Post Transplant: 2020- 2 (0.26%), 2021- 1 (0.07%), 2022- 2 (0.16%) (until 15/08/22). Most common Identified Organisms: Bacillus species

Discussion Processes and facilities are of same standard between the two NHSBT Eye Banks and contamination rates are comparable. contamination is only identified in Approx1% of corneas processed. Corneas where growth is identified in Dextran is less than 1% of corneas Issued. Of the positive Microbiology samples identified post-Transplant, were mostly identified as Environmental Bacteria and had no patient impact on patient and assumed to have been contaminated by the operator.

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P12-A107 PORCINE CORNEA EX VIVO MODEL AS AN ALTERNATIVE TO HUMAN DONOR TISSUES FOR INVESTIGATING NEW PRESERVATION CONDITIONS

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Purpose Considering the growing shortage of corneal tissues for research, the present study aimed to develop and optimize a porcine cornea model with qualitative features comparable to those of human tissues.

Methods A new decontamination procedure of porcine eye bulbs was set up and its efficacy as well as endothelial mortality were evaluated. Human corneas unsuitable for transplant and porcine corneas were then compared after storage under hypothermic (4–8°C, Eusol-C, AL.CHI.MI.A. S.R.L) or organ-culture (31–35°C, Tissue-C, AL.CHI.MI.A. S.R.L) storage conditions for 14 days. A new method, based on the semi-automatic analysis of Trypan-blue stained endothelial areas by Fiji software, was developed to quantify the whole endothelium viability. Corneas were assessed for central corneal thickness (CCT), corneal transparency, endothelial morphology, and endothelial cell density (ECD) at days 0, 7, and 14 of storage. Portions of lamellar tissues consisting of Descemet's membrane and endothelial cells were prepared for histological investigations.

Results The new decontamination procedure of porcine eye bulbs resulted in 18% versus 89% ('no decontamination' control) of corneas still contaminated after 28 days of storage at 31°C. The decontamination protocol did not affect endothelium viability, as assessed by the new Fiji-based method. ECD (porcine: 3156 ± 144 cells/mm2; human: 2287 ± 152 cells/mm2), CCT (porcine: 1073 ± 151 µm; human: 581 ± 39 µm), transparency (porcine: 88.6 ± 11.0%; human: 76.3 ± 5.4%), and morphology score (porcine: 4.0 ± 0.0; human: 3.2 ± 0.4) measured in the porcine cornea at day 0 were significantly higher than in human corneas. Nonetheless, the qualitative parameters of porcine and human corneas showed comparable trends during the storage under hypothermic (4–8°C) and organ-culture (31–35°C) conditions for 14 days.

Conclusion The presented porcine cornea model represents a reliable and alternative model to human donor tissues for

preliminary investigations and can be used for testing new media, substances, drugs, or preservation conditions and their impact on corneal tissue quality and safety. Furthermore, the quantitative method to assess whole endothelium mortality can be implemented at eye banks for the evaluation of corneas intended for transplantation.

P13-A113 THE EVEIT BIOREACTOR SYSTEM AS PLATFORM FOR ARTIFICIAL CORNEA PROTOTYPES

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Purpose Corneal donor tissue is in short supply. Only a fraction of the demand is satisfied. The tissues can vary in quality and sometimes have limited use. To address the issue, the generation of artificial corneal grafts is intensively researched.

Various aspects of these prototypes need to be tested, ranging from structural integrity to cellular morphology. Our Ex Vivo Eye Irritation Test (EVEIT) is based on an air-lift organ culture system, where we currently are using rabbit corneas from food industry. We constantly expanded our capabilities in quantifying various parameters concerning metabolism, structural integrity and optical properties. This also opens up the possibility of using the system as a testing platform for prototypical artificial corneal constructs.

Methods Various ophthalmological aspects can be investigated using the EVEIT system:

- Self–healing of superficial injuries and morphological characteristics can be observed over several days by live–tissue staining macroscopy.
- Metabolic parameters are recordable via the endothelial nutrient supply mechanism.
- Acute changes in internal pressure can be measured in the artificial anterior chamber with high resolution.
- Corneal barrier functions and pharmacokinetic properties can be quantified using photometric analysis methods.
- Dry–Eye model and established corneal edema models can be employed to test the efficacy of potential therapeutics
- Advanced 3D design and printing methods allow us to quickly adapt the bioreactor, for example, to incorporate human corneas or to improve the mobility of the system.
- In order to comply with the 3Rs principle, testing of several different chemicals on one cornea is now also possible with the aid of automated multi–application
- Recent developments of the EVEIT system include the engineering of an artificial eyelid model.

Results Our long experience in using and optimizing the EVEIT system led to a unique adaptability to accommodate different testing conditions and requirements. Established disease models such as corneal edema and in dry eye syndrome (in process) are involved in testing new drugs.

Conclusion Our established EVEIT system, in addition to its experimental capabilities, could contribute to the development of artificial corneal grafts in the future, as we have shown in previous work. The flexibility of the system allows us to adjust and improve an enormous range of test conditions and parameters.

P14-A117 ASSESSMENT OF PERFORMANCE AND SAFETY OF CORNEAL CHAMBER HYPOTHERMIC STORAGE AND PSS-L CORNEAL RINSING IN HUMAN AND PORCINE CORNEAS

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Purpose To prove the safety and performance of the hypothermic corneal storage medium Corneal Chamber, containing Eusol-C solution (AL.CHI.MI.A. S.r.l.) and of the rinsing solution PSS-L (AL.CHI.MI.A. S.r.l.) in support to the new CE certification process in accordance to the EU 2017/745 Medical Device Regulation

Methods Fifteen (n=15) human donor corneas unsuitable for transplantation and n=11 porcine corneas were evaluated for the following quality parameters: ECD, HEX%, CV%, endothelial morphology, endothelial mortality and transparency at day 0 and after 14±1 days (day 14) of storage in Corneal Chamber at 2-8°C. Then, corneas were rinsed in PSS-L for 1' at room temperature (RT) and the same parameters were assessed Post Rinsing (Day 14PR). In order to evaluate the antimicrobial carryover after the corneal storage in Corneal Chamber(14 days at 4°C), gentamicin sulphate was quantified in human and porcine corneas homogenates by UHPLC.

Results Human and porcine corneas stored in Corneal Chamber at 2-8°C for 14 days showed a good overall quality of the tissue according to quality parameters evaluated. In particular, mean ECD, HEX% and CV% did not show statistically significant changes at the end of storage and endothelial mortality increased of 3.1±3.3% in human corneas and 7.8 ±3.5% in porcine corneas. Slight variations in endothelial morphology score and corneal transparency were observed. Rinsing with PSS-L did not negatively affect the quality parameters evaluated before and after rinsing and gentamicin sulfate residues were completely removed.

Conclusion The storage of corneal tissues in Corneal Chamber at 2-8°C for 14 days and the corneal rinse with 30 ml of PSS-L at RT for 1 min are safe and effective procedures allowing the preservation of the corneal quality parameters including ECD, endothelial mortality, endothelial morphology, HEX%, CV%, and corneal transparency and the elimination of gentamicin sulfate from the tissues before transplantation.

P15-A112 DESCEMET'S MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK) GRAFT PREPARATION IN PORCINE CORNEA

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Purpose Descemet's membrane endothelial keratoplasty (DMEK) is a frequently used treatment option for patients with corneal endothelial dysfunction. The aim of this study was to set up a method to prepare porcine DMEK grafts and to simulate DMEK surgery in porcine eye bulbs in order to establish an ex-vivo-model for laboratory investigations on DMEK surgery conditions.

Methods Ten (n=10) porcine eye bulbs from domestic pigs (Sus scrofa domestica), between 6 and 8 months old, were recovered at a local slaughterhouse, transported on ice and