

# CONDITIONING OF LUNGS FROM GGTA1-KO PIGS APPLYING EX VIVO MACHINE PERFUSION

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## Introduction

Despite considerable progress, artificial devices like ECMO can keep patients alive, but are not suited as destination therapy for patients suffering from end stage lung disease. Allogeneic lung transplantation is still the best therapeutic option, but due to shortage of human donor lungs, not all patients in need can be treated.

Therefore, novel destination therapies for lung failure are needed such as the use of pig lungs for xenotransplantation purposes.

In this study, lungs from genetically modified pigs were used in order to establish an *ex vivo* lung perfusion (EVLP) protocol that will allow the conditioning of lungs in future xenotransplantation experiments.

## Methods

Four GGTA1-KO pigs were used for lung retrieval after euthanasia (DCD) and flushed with ice cold Perfadex Plus solution according to standard procedure. After cold storage of 2 hours lungs were hooked to a clinically approved EVLP system primed with Steen solution. After establishing the perfusion, lungs were warmed and ventilated. After 2 hours of perfusion human erythrocytes were added to the system for further 15 minutes of perfusion.

## Results

We found that lung retrieval without anticoagulation treatment of the donor is feasible and all four GGTA1-KO pig lungs exhibited very good performance during 2 hours of perfusion with Steen solution. However, the addition of human erythrocytes caused a stark increase in pulmonary resistance, which normalized after further 15 to 20 minutes of perfusion. After perfusion with human erythrocytes the lungs became edematous.

## Conclusion

*Ex vivo* perfusion of genetically pig lungs using a clinically approved system and solutions is feasible, even after DCD, and can be used as model to study and improve the interaction with human blood components.

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