

Orthotopic Kidney Auto-Transplantation in a Porcine Model Using 24 Hours Organ Preservation And Continuous Telemetry

Wen-Jia Liu^{*1,2}, Lisa Ernst^{*2}, Benedict Doorschodt², Jan Bednarsch¹, Felix Becker³, Richi Nakatake², Yuki Masano², Ulf Peter Neumann^{1,4}, Sven Arke Lang¹, Peter Boor⁵, Isabella Lurje⁶, Georg Lurje^{1,6}, René Tolba², Zoltan Czigany^{1,2}

¹Department of Surgery and Transplantation, Faculty of Medicine, University Hospital RWTH Aachen ²Institute for Laboratory Animal Science, Faculty of Medicine, University Hospital RWTH Aachen ³Department of General-, Visceral-, and Transplantation Surgery, University Hospital Muenster ⁴Department of Surgery, Maastricht University Medical Centre (MUMC) ⁵Institute of Pathology, Faculty of Medicine, University Hospital RWTH Aachen ⁶Department of Surgery, Campus Charité Mitte | Campus Virchow-Klinikum, Charité-Universitätsmedizin

* These authors contributed equally

Corresponding Author

Zoltan Czigany
zczigany@ukaachen.de

Citation

Liu, W.J., Ernst, L., Doorschodt, B., Bednarsch, J., Becker, F., Nakatake, R., Masano, Y., Neumann, U.P., Lang, S.A., Boor, P., Lurje, I., Lurje, G., Tolba, R., Czigany, Z. Orthotopic Kidney Auto-Transplantation in a Porcine Model Using 24 Hours Organ Preservation And Continuous Telemetry. *J. Vis. Exp.* (), e61591, doi:10.3791/61591 (2020).

Date Published

August 21, 2020

DOI

10.3791/61591

URL

jove.com/video/61591

Materials

Name	Company	Catalog Number	Comments
Anesthesia materials, drugs and medications			
Aspirin 500mg i.v., powder for solution for injection	Bayer Vital AG, Leverkusen, Germany	4324188	antiplatelet agents
Atropine sulfate solution for injection, 100mg	Dr. Franz Köhler Chemie GmbH, Bensheim, Germany	1821288	parasympatholytic agent, premedication
Bepanthen ointment for eyes and nose	Bayer Vital AG, Leverkusen, Germany	1578675	eye ointment
BD Discardit II syringes, 2ml, 5ml, 10ml, 20ml	Becton Dickinson GmbH, Heidelberg, Germany	300928, 309050, 309110, 300296	syringes
BD Microlance 3 (20G yellow) Cannula	Becton Dickinson GmbH, Heidelberg, Germany	305888	venous catheter
BD Venflon Pro Safety (20G pink)	Becton Dickinson GmbH, Heidelberg, Germany	4491101	venous catheter
Buprenorphine (Buprenovet)	Bayer Vital AG, Leverkusen, Germany	794-996	analgesia
Cefuroxime 750mg, powder for preparing injection solution	FRESENIUS KABI Deutschland GmbH, Bad Homburg, Germany	J01DC02	antibiotics
Covidien Hi-Contour, Endotracheal Tube 7,5 with Cuffed Murphy Eye	Covidien Deutschland GmbH, Neustadt/Donau, Germany	COV-107-75E	endotracheal Tube
FENTANYL 0,5 mg Rotexmedica solution for injection	Rotexmedica GmbH Arzneimittelwerk, Trittau, Germany	4993593	opioide analgetic agent
Furosemide-ratiopharm 250 mg/25 ml solution for injection	Ratiopharm GmbH, Ulm, Germany	1479542	loop diuretics

Glucose 5% solution for infusion (500ml, 250ml)	B. Braun Deutschland GmbH & Co. KG, Melsungen, Germany	3705273,03705422	infusion fluid
Glucose 20% solution for infusion	B. Braun Deutschland GmbH & Co. KG, Melsungen, Germany	4164483	osmotic diuresis
Heparin-Sodium 5000 I.E./ml	B. Braun Deutschland GmbH & Co. KG, Melsungen, Germany	15782698	anticoagulant
Isoflurane-Piramal (Isoflurane)	Piramal Critical Care Deutschland GmbH, Hallbergmoos, Germany	9714675	volatile anaesthetic agent
Ketamine (Ketamine hydrochloride) 10%	Medistar Arzneimittelvertrieb GmbH, Ascheberg, Germany	0004230	general anaesthetic agent
MIDAZOLAM 15mg/3ml	Rotexmedica GmbH Arzneimittelwerk, Trittau, Germany	828093	hybnotica, sedative agent
NaCl 0,9% solution for infusion (500ml,1000ml)	B. Braun Deutschland GmbH & Co. KG, Melsungen, Germany	864671.8779	infusion fluid
Norepinephrine (Arterenol)	Sanofi-Aventis Deutschland GmbH, Frankfurt, Germany	16180	increase in blood pressure
Organ preservation solution (e.g. HTK)	Dr. Franz Köhler Chemie GmbH, Bensheim, Germany	should be decided based on preference and experimental design	organ preservation
Pantoprazole 40mg/solution for injection	Laboratorios Normon, Madrid, Spain	11068	proton pump inhibitor
Paveron N 25mg/ml solution for injection (Papaverine Hydrochloride)	LINDEN Arzneimittel-Vertrieb-GmbH, Heuchelheim, Germany	2748990	spasmolytic agent for vasodilatation
Pentobarbital (Narcoren)	Boehringer Ingelheim vetmedica GmbH, Ingelheim, Germany	1,204,924,565	used for euthanasia
Propofol 1% (10mg/ml) MCT Fresenius	FRESENIUS KABI Deutschland GmbH, Bad Homburg, Germany	654210	general anaesthetic agent
Ringer solution	B. Braun Deutschland GmbH & Co. KG, Melsungen, Germany	1471411	infusion fluid
Sterofundin ISO solution for infusion (1000ml)	B. Braun Deutschland GmbH & Co. KG, Melsungen, Germany	1078961	Infusion fluid
Stresnil (Azaperone) 40mg/ml	Elanco	797-548	sedative
Urine catheter ruffle 12CH	Wirutec Rüschi Medical Vertriebs GmbH, Sulzbach, Germany	RÜSCH-180605-12	transurethral urinecatheter
Surgical materials			
Appose ULC Skin Stapler	Covidien Deutschland GmbH, Neustadt/Donau, Germany	8886803712	skin stapler
Cavafix Certo 375	B. Braun Deutschland GmbH & Co. KG, Melsungen, Germany	4153758	central venous catheter
EMKA Easytel +L-EPTA Transponder	emka TECHNOLOGIES S.A.S, Paris, France	L-EEEEETA 100	telemetry transponder
EMKA Reciever and Data Analyzer System	emka TECHNOLOGIES S.A.S, Paris, France	Reviever	telemetry receiver
Feather Disposable Scapel (11)(21)	Feather, Japan	8902305.395	scapel
Prolene 2-0, blue monofil VISI-BLACK, FS needle	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	EH7038H	skin
Prolene 3-0, blue monofil, FS1 needle	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	EH7694H	skin
Prolene 5-0 (simply angulated, C1 needle) blue monofil VISI-BLACK	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	EH7227H	vascular
Prolene 5-0 (double armed, C1 needle) 60cm	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	KBB5661H	vascular

Prolene 6-0 (double armed, C1 needle) 60cm	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	EH7228H	vascular
Sempermed derma PF Surgical Gloves Seril Gr. 7, 7.5, 8	Semperit investment Asia Pte Ltd, Singapore	4200782,4200871,4200894	surgical gloves
Sentinex® PRO Surgical Gowns Spunlace XL 150cm	Lohmann & Rauscher GmbH & Co. KG, Neuwied, Germany	19302	surgical gown
Tachosil	Takeda Pharma Vertrieb GmbH & Co. KG, Berlin, Germany	MAXI 9,5 x 4,8 cm	haemostasis
Telasorp Belly wipes (green 45x45cm)	PAUL HARTMANN AG, Heidenheim, Germany	4542437	abdominal towel
Pediatric urine catheter	Uromed Kurt Drews KG, Oststeinbeck, Germany	PZN 03280856	used for the uretero-cutaneous stoma
VICRYL- 0 MH Plus	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	V324	fascial closure
VICRYL - 3-0, SH1 Plus needle, 75cm	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	W9114	subcutaneous suture, peritoneal suture,
VICRYL - 3-0, SH1 Plus needle, 4*45cm	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	V780	subcutaneous suture, peritoneal suture,
VICRYL - ligatures Sutopak purple braided, 3-0	Johnson & Johnson Medical GmbH - Ethicon Deutschland, Norderstedt, Germany	V1215E	threats for ligature
3M™ Standard Surgical Mask 1810F	3M Deutschland GmbH, Neuss, Germany	3M-ID 7000039767	surgical mask
Surgical instruments			
Anatomical forceps Standard	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	PZ0260	anatomical forceps
Atraumatic tweezers steel, De Bakey Tip 1,5mm 8"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	GF0840	anatomical atraumatic forceps
Bipolar forceps 16 cm straight, Branch 0,30 mm pointed, universal fit	Bühler Instrumente Medizintechnik GmbH, Tuttlingen, Germany	08/0016-A	biopolar forceps
Bulldog clamp atraumatic, curved, De Bakey 78 mm, 3"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	GF0900	bulldog clamps
DE BAKEY-SATINSKY vascular clamp 215mm	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	GF1661	vascular clamp
Dissecting scissors Mayo, 250 mm, 10"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	SC2232	Scissors for dissection
Dissecting scissors Metzenbaum-Fino, 260 mm, 10 1/4"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	SC2290	Scissors for dissection
Draeger CATO Anesthetic machine with PM8050 Monitor	Dräger, Drägerwerk AG & Co. KGaA, Lübeck, Germany	106782	Ventilation System
Fine Tweezers, ADSON 180 mm	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	ADSONPZ0571	fine forceps
Gosset abdominal wall spreader	CHIRU-INSTRUMENTE, Kaierstuhl, Germany	09-621512	abdominal retractor
HALSTEAD MOSQUITO, curved, surgical 125mm	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	KL2291	mosquito clamps
HF surgical device ICC 300, Electrocautery	Erbe Elektromedizin GmbH, Tübingen, Germany	20132-043	cautery, biopolar
MICRO HALSTED-MOSQUITO 100mm, curved	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	KL2187	mosquito clamps
Micro steel needle holder straight 0,5mm, with spring lock	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	MN1324D	microsurgical needle holder
Microsurgical/watermaker tweezers LINZ 150mm 6" Ergo round handle	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	MN0087	fine microsurgical forceps

needle holder Mayo-hegar, 190 mm, 7 1/2"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	NH1255	needle holder
Overhold Slimline Fig. 0 8 1/2"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	KL4400	overholds
Sterile Gauze 10X10	Paul HARTMANN AG, Heidenheim, Germany	401725	sterile gauze
Suction tip OP-Flex Handpiece Yankauer	Pfm Medical AG, Köln, Germany	33032182	suction
surgical forceps Standard 5 3/4"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	PZ1260	surgical forceps
surgical scissors standard pointed-blunt (thread/cloth scissors) 175 mm, 7"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	SC1522	surgical Scissors
Titanit vascular scissors POTTS-SMITH, 185 mm, 7 1/4" 60°	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	SC8562	Pott scissors
Tunneling instrument	Marina Medical Instruments Inc, Davies, US	MM-TUN06025	subcutaneous tunneling
Vessel loops	Medline International Germany GmbH, Kleve, Germany	VLMINB	hold and adjust the vessel
Wound spreaders Weitlander, Stump, 110 mm, 4 1/4"	ASANUS Medizintechnik GmbH, Tuttlingen, Germany	WH5210	wound care
Further material			
Heating pad	Eickemeyer - Medizintechnik für Tierärzte KG, Tuttlingen, Germany	648050 MHP-E1220	maintain body temperature during surgery
Laryngoscope, customized	Wittex GmbH, Simbach, Germany	333222230	expose the vocal cord
Rectal temperature probe	Asmuth Medizintechnik, Minden, Germany	ASD-RA4	measure body temperature
Spray wound film	Mepro-Dr. Jaeger und Bergmann GmbH, Vechta, Germany	2830	keep sterile condition
Sterile organ bag	Raguse Gesellschaft für medizinische Produkte, Ascheberg, Germany	800059	organ preservation
swine jacket small, adult Landrasse swine 30-50kg, customized for Emka Telemetry and urinary catheterization	Lomir Biomedical Inc., United Kingdom	SS J1LAPMP	swine jackets to protect implanted catheters and store urine bag
Ultrasound device, Sonosite Edge-II	FUJIFILM SonoSite GmbH, Frankfurt, Germany	V21822	ultrasound and color Doppler
Urine bag 2000ml Volume	ASID BONZ GmbH, Herrenberg, Germany	2062578	disposable urine bag connected to the uretero-cutaneous fistula catheter