Annual Report 2018

Division of Surgical Research

Department of Surgery
University Hospital Zurich
Switzerland

University of Zurich[UZH]

USZ Universitäts Spital Zürich

Content

Preface

Dear Colleagues

2018 was a very eventful and productive year for the Division of Surgical Research. The number of publications increased to more than 450 and numerous symposia and courses were organized. For years, the Division for Surgical Research has grown beyond the borders of the surgical departments and has become an appealing scientific interaction platform for other research groups not only within the USZ but for the entire scientific community in Zurich and abroad.

This success would not have been possible without the highly professional and very efficient support of our core services. The histology and immunohistochemistry labs, small and large animal experimental surgery facilities, the photography/graphics services, and the MRI facility have once again supported a multitude of projects with outstanding motivation and dedication.

Special thanks go to Prof. Dr. Rolf Graf who was the Division's co-head for more than a decade and has headed the Division since 2016. With his great commitment, together with Prof. Dr. Gregor Zünd, he has shaped the Division to what is now, a leading platform for surgical research. We wish him much success and all the best in his future endeavors.

We will continue along this path offering the members of the Division a versatile platform for the continued success of our competitive research and for strengthening our established excellent reputation. In addition to the daily organizational activities, the future will bring new challenges. In particular, planning the new small animal surgical facilities in Schlieren, the new large animal facilities on Irchel campus, as well as our new laboratories on the future Berthold-Areal.

We would like to thank all members of our Division for their excellent work, for the fruitful collaboration and discussions, and the great atmosphere.

PD Dr. sc.nat.
Paolo Cinelli
Head Division of
Surgical Research

Prof. Margarete
Arras, DVM
Co-Head Division
of Surgical
Research

PD Dr. sc.nat. Paolo Cinelli
Head Division of Surgical Research

Prof. Margarete Arras, DVM
Co-Head Division of Surgical Research

1. Organisation

Prof. Dr. med. Pierre-Alain Clavien, PhD, Director Clinic of Visceral & Transpl. Surgery

Prof. Dr. med. Hans-Christian Pape, Director Clinic of Trauma Surgery

Prof. Dr. med. Walter Weder, Director Clinic of Thoracic Surgery

Prof. Dr. med. Francesco Maisano, Director Clinic of Cardiovascular Surgery

Prof. Dr. med. Pietro Giovanoli, Director Clinic of Plastic - Hand & Reconstr. Surgery

Prof. Dr. med. Tullio Sulser, Director Clinic of Urology

Prof. Dr. med. dent. Martin Rücker, Director Clinic of Cranio-Maxillo-facial Surgery

Prof. Dr. med. Reto Schüpbach, Head of Intensive Care Medicine

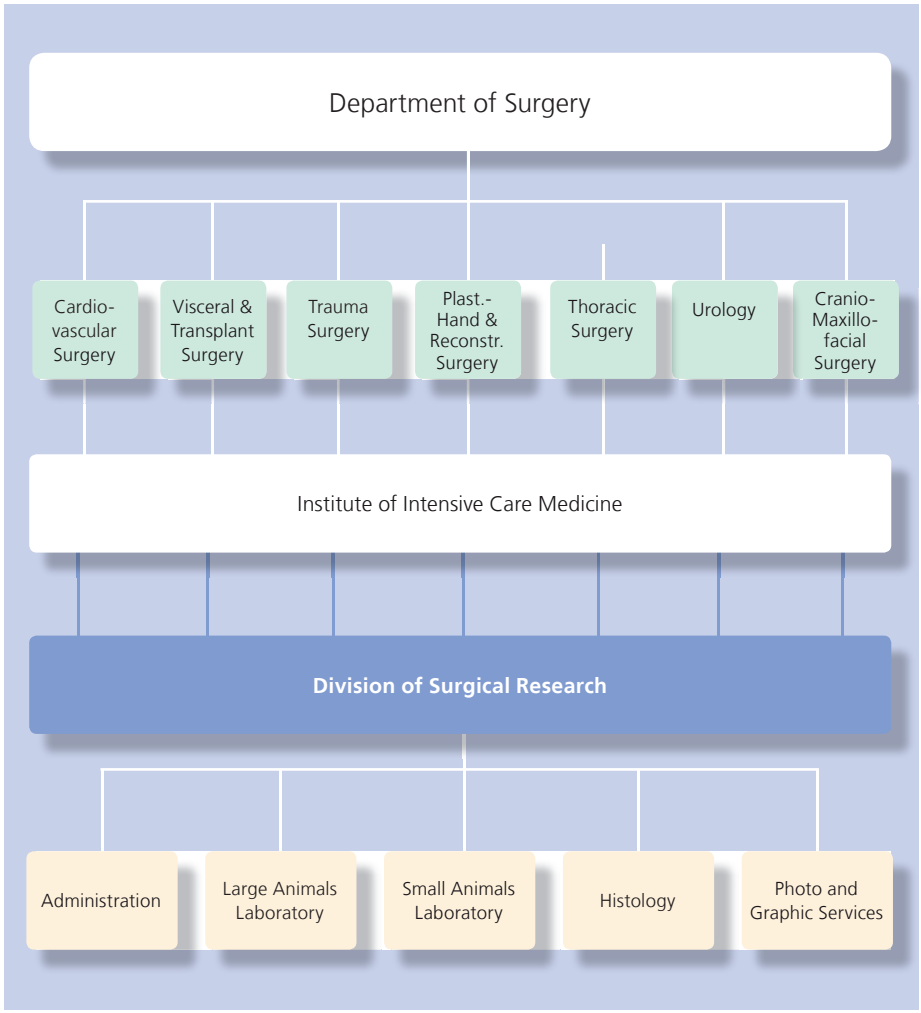
PD Dr. sc. nat. Paolo Cinelli, Head Division of Surg. Research

Prof. Margarete Arras, DVM Co-Head Division of Surg. Research

Tina Wentz Manager Division of Surgical Research

Donata Gröflin Teaching Coord. Division of Surg. Research

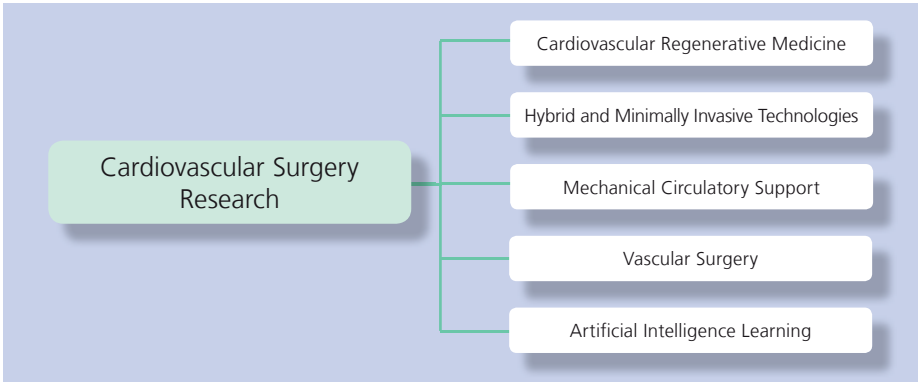
Position of the Division of Surgical Research within the Department of Surgery



2. Research and Development

Cardiovascular Surgery Research

Prof. Dr. med.
Francesco Maisano,
Director



Valvular heart-disease and heart failure represent a major cause of mortality around the globe. Both entities are interdependent. The therapy options for affected patients with valvular heart disease are currently undergoing rapid changes and in addition to conventional, surgical valve operations on heart lung machine representing the standard of care since several decades, transcatheter techniques have entered the clinical-routine representing an efficient alternative for the treatment of elderly high-risk patients. Given sufficient long- term safety, it can be predicted that these minimally-invasive techniques may have a major impact on the treatment strategy of patients with VHD and will further be expanded to a broader and younger patient population. Recent trials suggest higher safety profile of transcatheter aortic valve implantation as compared to surgery in patients with low-risk profile. As a result, catheter based procedures are becoming first line option in patients above 70 years. To further expand indications and to improve long term durability and sustainability of the procedures, research and development and collaboration with industry partners is fundamental. On this background, the research of the department of cardiovascular surgery has a broad translational and multidisciplinary approach covering the ground from cellular and molecular biology to preclinical research to first in man and large scale clinical studies. Conceptually, we develop novel minimally invasive or transcatheter devices and treatment strategies for patients with valve and heart failure, involving the latest technologies in devices and imaging. To that end, our experimental research lines are as follows:

Novel Models and treatments for Heart Failure

Valve regurgitation is a pathological state where a unidirectional heart valve has become insufficient in its function and allows blood to leak back. In consequence, the downstream blood ejection volume decreases, while the regurgitant blood volume causes overload in the upstream heart chamber. The upstream heart chamber undergoes morphological and cellular changes which can cause dysfunction and heart failure. The left ventricle undergoes thinning of the ventricular wall and remodeling of cardiac cellular structures attributed to prolonged stress caused by volume overload. These changes are believed to be irreversible and are involved in several features of heart failure.

However, the exact mechanisms behind these adaptive phenomena of the left ventricle are still poorly understood. On this background, we develop and validate a novel animal model to study morphological and cellular changes in subacute left ventricular volume overload and afterload mismatch. This model allows to identify functional parameters and early biomarkers specific to left ventricular volume overload and remodeling; to investigate blood and tissue biomarkers known to be elevated in chronic left ventricular remodeling at early stages of left ventricular volume overload; to investigate early changes in myocardial fiber architecture as well as myocardial metabolism by means of Dynamic Nuclear Polarization and Diffusion Tension Imaging, to study cellular, subcellular and metabolic characteristics of early signaling and response.

Another concept involves the concept of fluid-structural interaction between global and regional wall motion and the intracavitary blood stream (vortex). The ideal interaction happens in healthy hearts by exact synchronization of wall motion, valve function and flows, as demonstrated by several MRI and blood speckle tracking studies. Using a device specially developed for this task (a rotating disk mitral prosthesis), we investigate the role of flow redirection in the inflow of the left ventricle as a potential factor involved in the determination of heart failure. The study involves intraprocedural LV loops and MRI studies of fluid-structure interactions.

Heart failure is a multifactorial disease, with a large spectrum of clinical presentations. As a consequence, there is a large opportunity to investigate new targets of therapy. We investigate the role of respiratory mechanics in heart failure, by diaphragm stimulation in a novel animal model to precisely analyse the role of the interaction between chest dynamics and right ventricular hemodynamics and left ventricular diastolic properties. In this project, old techniques like auscultation have been rejuvenated by integrating them in sophisticated imaging and monitoring modalities, inspiring new opportunities for clinical monitoring and early diagnosis.

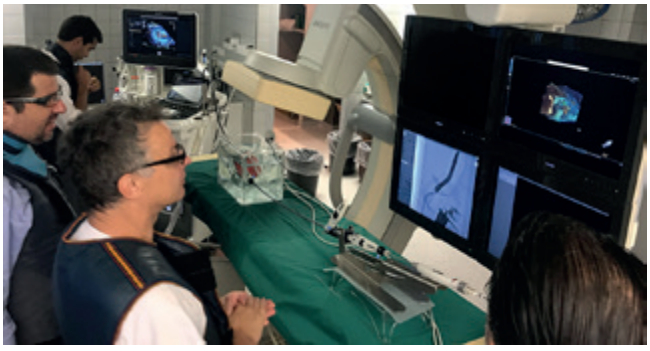


Figure 1: Simulation-based Research and Development of new procedures is today a viable alternative to animal experiments, particularly in the early stage of the research. It is also the best solution for physician training and education. In this picture, a multidisciplinary team is testing a new catheter based tricuspid annuloplasty system, with multimodality imaging.

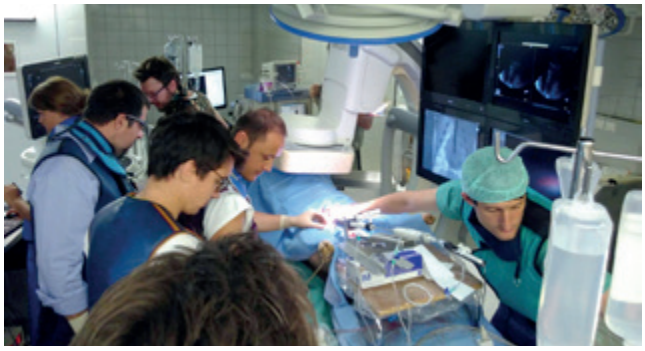


Figure 2: A state of the art animal lab allows the use of latest imaging technologies to develop new procedures, test and improve the standard operating procedures in the late phase of the preclinical testing. Here the multidisciplinary team is testing the same catheter based tricuspid annuloplasty system, with multimodality imaging as shown in figure 1, but in an animal model of tricuspid regurgitation.

Next generation bioengineered implants

Congenital heart defects represent a major cause of death around the globe. Although current therapy strategies have rapidly developed over the last decades, the currently used artificial prostheses are still considered to be suboptimal. They do not promote regeneration, physiological remodeling or growth (particularly important aspects for children) as their native counterparts. This leads to the continuous degeneration and subsequent failure of such substitutes which is associated to an increased morbidity and the need for multiple re-interventions. To overcome this problem, the concept of regenerative medicine comprising of tissue-, bioengineering and hybrid technologies has been suggested as a next generation approach to enable native like cardiovascular replacements with regenerative and growth capacities, amendable to young adults and children. However, despite promising data from preclinical and first clinical pilot trials, the translation and clinical relevance of such technologies is still very limited. The reasons for that are multifaceted and comprise of scientific, logistical, infrastructural and regulatory challenges that need to be systematically addressed in order to facilitate clinical translation of such next generation cardiovascular substitutes.

Development of Novel Devices, training and education

Development of novel devices is frequently performed in collaboration with industry partners and often based on own intellectual property. We investigate feasibility and safety in the porcine model, and work towards optimization of device characteristics, investigating hemodynamics, ventricular and device function in detail and assessing long-term effects in order to prepare for translation into clinical application. Various devices designed to allow for minimally invasive or percutaneous treatment of mitral valve regurgitation, tricuspid valve regurgitation, chordae replacement, leaflet augmentation and ventricular aneurysm were evaluated. Progressively, this field evolved in direction of *ex vivo* and *in vitro* testing.

Our laboratory is becoming more and more specialized in non-animal testing using the facility resources (imaging, instrumentation, etc.) to develop new technologies, implants and instruments to an advanced level before being tested in living animals. This is achieved using sophisticated dynamic simulators which can be used under X-rays and replicated the exact intraprocedural conditions to develop the devices and optimize and standardize the procedures minimizing the need of animal experiments. This experience has also induced a strong investment in training simulators, to eliminate the need for physician training with living animals. Simulation training experimentation using physical simulators is a very active field of investigation, using augmented reality and artificial intelligence methodologies to improve the assessment methodology of skill and competence training.

Development of novel strategies for procedural planning and guidance

A novel minimally invasive device typically asks for specific procedural planning and intra-operative, imaging based guidance. This is especially true as the heart is a 3D moving structure and many technologies that allow for real-time imaging are restricted to 2D visualization, while others, such as MRI and CT are not available for the operator in the hybrid operation room and/or not suited to allow for direct manipulation with therapeutic devices. We focus on developing new approaches for the fusion of several imaging techniques, such as MRI, CT and echocardiography with fluoroscopy in real time in order to optimize catheter based procedures, to reduce X-ray contrast volume and radiation exposure.

We also work in the field of machine learning and automation of procedures, integrating this process in our device development programs.

Collaborations:

- Wyss Institute for Biologically Inspired Engineering, Harvard University, Boston, USA
- Department of Biomedical Engineering, Technical University Eindhoven, The Netherlands
- Center for Integrative Human Physiology, University of Zurich, Switzerland
- Department of Materials, Federal Institute of Technology, Zurich, Switzerland
- Department of Biochemistry, University of Zurich, Switzerland
- Department of Mathematics, Federal Institute of Technology, Zurich, Switzerland
- Department of Computational Science, Federal Institute of Technology, Zurich, Switzerland
- Department of Veterinary Surgery, MSRU Vetclinics, University of Zurich, Switzerland
- Department of Cardiac Surgery, Children‘s Hospital, Harvard Medical School, Boston, MA, USA
- Department of Pathology, Brigham and Women‘s Hospital, Harvard Medical School, Boston, MA, USA
- Massachusetts Institute of Technology (MIT), Cambridge, MA, USA
- Laboratory for Tissue Engineering, German Heart Centre, Berlin, Germany
- Department of Cardiology, Medical University of Vienna, Austria
- Institute of Nuclear Medicine, University of Debrecen, Hungary
- Institute of Chemistry and Applied Biosciences, Federal Institute of Technology Zurich, Switzerland
- Institute of Anatomy, University of Bern, Switzerland
- Human Genetics Laboratory, Genetica AG, Zurich, Switzerland
- Departments of Pathology, Neurosurgery, Cardiology, and Laboratory for Transplantation Immunology, UniversityHospital, Zurich, Switzerland
- Randall Division of Cell and Molecular Biophysics, King’s College London, UK
- Embryonic Stem Cell Laboratory, Fraunhofer Institute for Biomedical Engineering IBMT, St. Ingbert, Germany
- Department of Pathology and Immunology, Geneva University, Switzerland
- Experimental Cardiology Unit, Department of Medicine, University of Lausanne Medical School, Switzerland
- Philips Healthcare (Best, Netherlands)
- Swiss Federal Institute of Technology (ETH) Zürich, Computer Vision Laboratory (Zürich)
- Swiss Federal Institute of Technology (ETH) Zürich, Centre for Mechanics (Zürich)
- Lenox Hill Heart and Vascular Institute (New York, USA)
- Erasmus Universiteit - Thorax Center (Rotterdam, Netherlands)
- Experimental Cardiology Unit, Department of Medicine, University of Lausanne Medical School, Switzerland
- pd|z Product Development Group Zurich, Department of Mechanical and Process Engineering, ETH Zürich (Prof. M. Meboldt)
- Wyss Translational Center Zurich, Swiss Federal Institute of Technology (ETH) Zurich, Center for Mechanics Zürich
- Institute for Dynamic Systems and Control, Department of Mechanical and Process Engineering, ETH Zürich (Prof. C. Onder, Prof. L. Guzzella)
- Micro- and Nanosystems, Department of Mechanical and Process Engineering, ETH Zürich (Prof. C. Hierold)
- Professor Dr. Isabelle Van Herzeele, Ghent University Hospital (Gent, Belgium) and Sint - Maarten Hospital (Duffel, Belgium)
- Division of Cardiology, University Hospital Zurich
- Philips Healthcare (Netherlands)
- Division of Urology and Division of Visceral and Transplant Surgery, University Hospital Zurich
- Endospan Ltd. (Herzliya, Israel)

Awards:

F. Maisano: ESC Paul Hugenholtz Lecture for Innovation Award 2018
F. Maisano: ICI Lifetime Achievement in Research and Teaching in the Field of interventional Cardiology Award 2018

Prof. Dr. med.
Francesco
Maisano,
Director

Prof. Dr. med.
Michele Genoni,
Director of Research
a. i.

PD Dr. med.
Evelyn Regar, PhD
Director of Research

Prof. Dr. med.
Michel Zuber

Prof. Dr. med.
Markus Wilhelm

PD Dr. med.
André Plass

Dr. med.
Stefano Benussi

Dr. med.
Diana Reser

Dr. med.
Ahmed Ouda

PD Dr. med.
Zoran Rancic

PD Dr. med.
Hector Rodriguez

Andrea Guidotti
Scientific Assistant

Luca Vicentini
Scientific Assistant

Dr. med.
Devdas Inderbitzin

PD Dr. med.
Maurizio Taramasso

Dr. med.
Marco Luciani

Dr. med.
Matteo Saccocci

Dr. med.
Alberto Pozzoli

Dr. med.
Shingo Kuwata

Barbara Jenny,
Scientific Assistant

Melanie Bächli,
Study Nurse

Alice Birkner,
Study Nurse

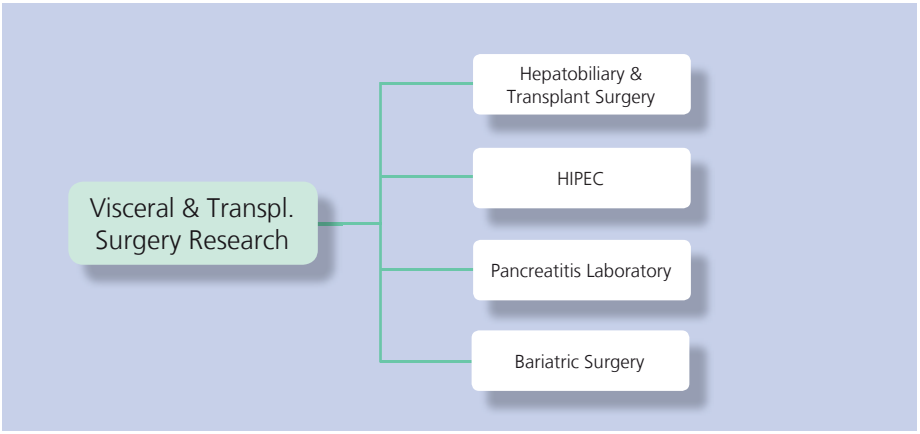
Uta Bonitz,
Study Nurse

Simone Frank,
Study Coordinator

Emmanuel
Barmettler,
Research Finance

Chen Rong, PhD Student

Visceral & Transplant Surgery Research



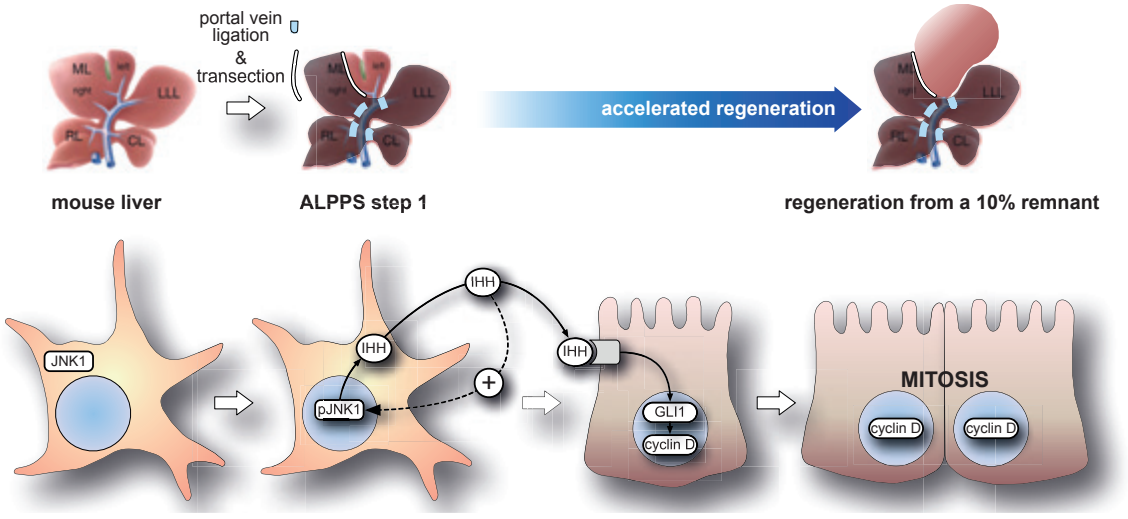
Prof. Dr. med. Pierre-Alain Clavien, PhD, Director

Prof. Dr. Rolf Graf

The research within the Department of Visceral & Transplant Surgery has always focused on clinically relevant questions. Thus, our research team – consisting of surgeon scientists and basic scientists - is dedicated to the development of novel surgical techniques for transplantation/liver resection, the association between beriatric surgery and metabolic health, the exploration of pancreatitis & pancreatic cancer, and the treatment of visceral malignancies. In addition, we use experimental animal models to understand molecular mechanisms underlying the above translational studies.

We have established multiple mouse and rat models for arterialized orthotopic liver transplantation, transplantation of critically small grafts, normal liver regeneration (68%-hepatectomy), or failed (86%-, 90%-hepatectomy) and accelerated (ALPPS surgery) liver regeneration.

These models were instrumental in revealing key mechanisms such as:
1) The role of paracrine JNK1-IHH signaling between stellate cells and hepatocytes in the acceleration of liver regeneration through ALPPS
2) Lipids as prime fuel of the regenerating liver, and the promotion of lipid oxidation for the protection from posthepatectomy liver failure
3) Combining our surgical models with dietary induction of fatty liver disease, we were able to show that fish oil and exercise are efficient in normalizing the metabolic state of fatty liver while improving both its stress tolerance and its regenerative capacity.
Additionally, we have developed syngeneic orthotopic mouse models of metastasizing colorectal cancer and of liver cancer.



Parakrine JNK1-IHH signaling from stellate cells underlies the accelerated hepatocyte proliferation following ALPPS surgery

With the help of these models, we could demonstrate that oxygenation through the novel molecule ITPP enhances chemotherapy efficacy while inhibiting metastasis. Likewise, we could show that the neurotransmitter serotonin may have important immunomodulatory functions in the periphery. Notably, we were able to transfer our knowledge from bench to bedside via the initiation of novel clinical & outcome studies, such as the first-in-patient trial on ITPP.

Hypothermic Oxygenated Liver Perfusion (HOPE) is a novel preservation technique developed in our labs that enables the use of marginal liver grafts for transplantation. Currently, a large mutlicentric trial on HOPE is running, and the technique has been expanded to kidney transplants. In parallel, rodent models are being used to understand the protective mechanisms behind HOPE, pointing to improved mitochondrial function as a key event.

In collaboration with the ETH, a completely novel perfusion machine has been developed that mimics essential body functions and keeps liver alive for up to 10 days ex corpore. This project is part of the Wyss Translational Center and aims at extending surgery to formerly inoperable liver cancer.

Using mouse models of chronic, acute and autoimmune pancreatitis, the Pancreas Research Lab has uncovered the epigenetic regulation of pancreatitis and identified the pathological features that separate acute from chronic pancreatitis. Since pancreatitis may lead to pancreatic cancer, we further have assessed the sequence of pancreatic metaplastic changes and discovered pancreatic gastrokine secretion as a biomarker of early stage malignancy. Our ongoing clinical and experimental studies have established pancreatic stone protein (PSP) as a reliable marker of sepsis in the clinic.

Bariatric or metabolic surgery is currently the most effective treatment of obesity and its associated diseases. However, the underlying physiologic mechanisms are not entirely understood. The recently established Research Group of bariatric surgery implements translational approaches to investigate the effect of Roux-en-Y gastric bypass on ingestive behavior, Rodent models of gastric bypass, as well as exploratory clinical studies have been set up to study changes in taste preferences, food reward, food selection and in the microstructural organization of postoperative nutrient intake.

Selected patients with peritoneal carcinomatosis (PC) may benefit from the combination of cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC). Exploring underlying mechanisms, our recently established Surgical Oncology Group has revealed that HIPEC treatment induces re-expression of immunogenic testis antigens on colorectal cancer cells, which leads to their enhanced immune recognition. Furthermore, using a PC mouse model, the laboratory is trying to exploit the enhanced immunogenicity as to improve HIPEC efficacy.

Collaborations / Sponsors:

- Prof. Michelangelo Foti (University of Geneva)
- Prof. Jean-Francois Dufour (University of Bern)
- Prof. Gerald Schwank (ETH Zurich)
- Prof. Sabine Werner (ETH Zurich)
- Prof. Maries van den Broek (University of Zurich)
- Prof. Jean-Marie Lehn (University of Strasbourg)
- Prof. Gregory Gores (University of Minnesota Majo Clinics)
- Prof. Scott Friedmann (New York University Mount Sinai School of Medicine)
- PD Dr. Andreas Boss, Department of Radiology USZ
- PD Dr. Deborah Stroka (University of Bern)
- Prof. Dr. Mathias Heikenwälder, PhD, (TUM Munich)
- Prof. Dr. Adrian Hehl, MD, (University of Zurich)
- Prof. Dr. Achim Weber, MD, Dept of Pathology, USZ
- Prof. Aurel Perren (Universität Bern)
- Prof. Arnold von Eckardstein, Dept of Clinical Chemistry USZ
- Prof. Thorsten Hornemann, Dept of Clinical Chemistry USZ
- Prof. Martin Pruschy (University of Zurich)
- Dr. Daniela Lenggenhager (University of Zurich)
- Dr. Johannes vom Berg (University of Zurich)
- Prof. Philipp Rudolf von Rohr (ETH Zurich)
- PD Dr. Martin Hübner (CHUV, Lausanne)
- Various clinical collaborations

Awards:

Sabrina Steiner: Travel Grant, European Pancreas Club Meeting Berlin 2018
Gitta Seleznik, Sabrina Steiner: Travel Grant, United European Gastroenterology Week Vienna
Marcel Schneider: 17th Day of Clinical Research Prize USZ
Marcel Schneider: Felix Largiadèr-Preis Schweizerische Gesellschaft für Viszeralchirurgie
Lilian Roth: ESMO-immunooncology 2018, travel grant
Xavier Müller: Swiss Transplant Society Award (clinical)
Philipp Kron: Swiss Transplant Society Award (basic)
Xavier Müller: Transplantationspreis USZ
Henrik Petrowsky: Publons Peer Review Award for 1% of Top Reviewers in Clinical Medicine
Karoline Horisberger: Posterpreis Schweizerische Gesellschaft für Chirurgie
Marco Bueter: Best Abstract, 8th Congress of the International Federation for the Surgery of Obesity and Metabolic Disorders, Greece

Prof. Dr. med.
Pierre-Alain Clavien,
PhD, Director

Prof. Dr.
Rolf Graf

Prof. Dr. med.
Philipp Dutkowski

Prof. Dr. med.
Yinghua Tian

Prof. Dr. med.
Marco Bueter,
PhD

Prof. Dr. med.
Kuno Lehmann,
PhD

PD Dr. Bostjan
Humar,
PhD

Dipl. phil. II
Theresia Reding
Graf

Anurag Gupta,
PhD

Pieter Borger,
PhD

Gitta Maria
Seleznik,
PhD

Dr. med. Lucia
Bautista,
PhD

Ekaterina Kachaylo,
PhD

Udo Ungethüm
Lab Manager

Catherine
Hagedorn,
Lab.Technician

Dr. med. pract.
Dilmurodjon
Eshmuminov, Fellow

Nathalie Borgeaud,
PhD Student

Rong Chen,
PhD Student

Dr.med.
Daniel Gero,
PhD Student

Ermanno Malagola,
PhD Student

Xavier Muller,
Fellow

Dr. med.
Liliane Roth,
PhD Student

Dr. med.
Marcel Schneider,
PhD Student

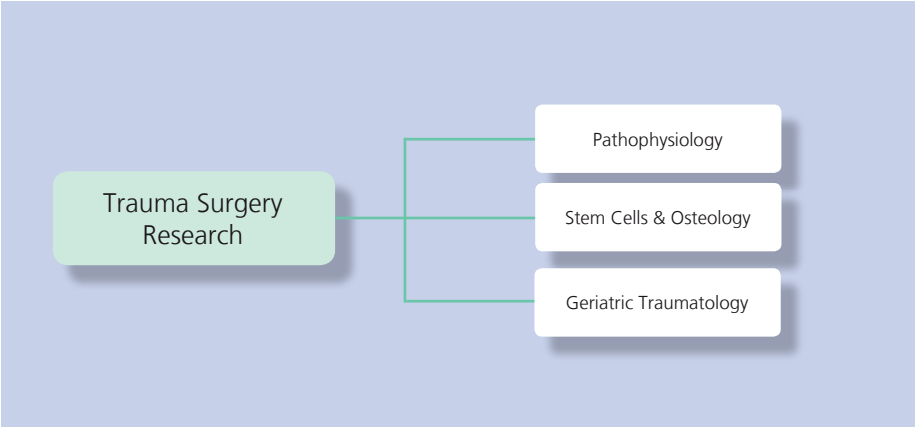
Sabrina Steiner
PhD Student

Matea Stopic,
Master Student

Leandro Mancina,
Trainee

Daniel Gero, MD, PhD Student

Trauma Surgery Research



Prof. Dr. med. Hans-Christoph Pape, Director

PD Dr. sc.nat. Paolo Cinelli

The research focus of the Department of Trauma is the improvement of the treatment of severely injured patients. We are interested in all aspects of research that can improve treatment of severely injured patients at basic, translational and clinical levels.

Our main interests are the study of the pathophysiology of trauma, the development of regenerative approaches for improving bone healing and the impact and treatment of fractures in older patients. To approach these clinically relevant challenges we have built a team of surgeon scientists and basic scientists that closely work together.

Pathophysiology of Trauma

Traumatic injuries induce a complex host response that disrupts immune system homeostasis and trigger a systemic inflammatory response that predisposes patients to opportunistic infections and inflammatory complications leading to secondary complications, such as nosocomial infections, sepsis or multi-organ failure. Our studies aim at the identification of mechanisms linked to complicated courses after severe trauma by a systems biology approach combining clinical data and omics (transcriptomics, proteomics and metabolomics) approach. This approach is useful to improve the prognostic performance and individual risk stratification in trauma patients. In parallel to clinical studies on patients we have established a porcine polytrauma model and are analyzing locally, at the site of injury, and systemically how inflammation and immune response are initiated and how they are regulated (Figure 1).

This standardized model allows to study the timely changes in local and systemic inflammation following multiple injuries. The combination of clinical and translational studies allows further dissecting of the molecular mechanisms underlying these physiological changes.

Figure1: Surgical setup for large animal polytrauma model

Skeletal Stem Cells & Osteology

The capacity of bone to regenerate is of outmost importance in the case of injury. Regeneration consists of a well-orchestrated series of biological events that comprise bone induction and conduction, involving a number of cell types and intracellular and extracellular molecular signaling pathways, with a definable temporal and spatial sequence, with the final goal to optimize skeletal repair and restore skeletal function. The process of fracture healing involves many events including the signaling, recruitment and differentiation of skeletal stem cells during the early phase; formation of a hard callus

and extracellular matrix, angiogenesis and revascularization during the mid-phase; and finally callus remodeling at the late phase of fracture healing.
Unlike in other tissues, the majority of bony injuries (fractures) heal without the formation of scar tissue, and bone is regenerated with its pre-existing properties largely restored, and with the newly formed bone being eventually indistinguishable from the adjacent uninjured bone. Despite the fine degree of orchestration during fracture healing, the process may be impaired. Currently, 10–15% of the fractures that occur annually result in poor or unresolved healing, so called non-unions or critical size defects. These fractures which cannot heal completely from alone over a long period of time represent a major clinical orthopedic surgery. The gold standard treatment is the use of autogenous bone grafts in combination with alloplastic material. Usually the iliac crest is used as a donor site for bone harvesting. Nevertheless, this procedure has some drawbacks for clinical applications, such as limited availability of bone graft, morbidity, and donor site pain. Alternatively, biocompatible materials can be used but unfortunately, to date no single synthetic material offers all the benefits of the patient's own bone.
Tissue engineering represents a very promising technique, which combines the use of stem cells with scaffold of synthetic or natural biomaterial together with molecular signals, such as growth or differentiating factors. Mesenchymal stem cells (MSCs) represent a good source of regeneration-competent cells. They can be isolated from a variety of tissues and are able to differentiate under the right culture conditions, into osteoblasts, chondrocytes, and adipocytes.
The major problem with the use of MSCs isolated from bone marrow or fat tissue is that the isolated cells contain heterogeneous populations of stem and progenitor cells. Thus, for the clinical use of MSCs for regeneration purposes, it is urgently needed a better characterization of the cells and a standardization of the isolation and culture protocols.
In our studies we test the possibility to enrich defined subpopulations of stem/progenitor cells for direct therapeutic application without requiring an *in vitro* expansion. The most promising enriched stem cells populations are tested for their regeneration capacity in mouse models. For the identification of new cell subpopulations we employ modern technologies like Cytometry by time-of-flight (CyTOF) allowing the real-time analysis of single cells in complex populations. Single cells, labelled with stable heavy metal isotopes are analyzed by a combination of classical flow cytometry and mass spectrometry analysis.
We are also developing new scaffolds for bone regeneration by combining synthetically produced scaffolds with extracellular matrix (ECM) produced by stem cells (collaboration with Prof. Wendelin Stark and Olivier Gröninger, ETH). Cells are first seeded on electrospun scaffolds. After cultivation, the cells deposit on the scaffold surface ECM components and hydroxyapatite. In further step the scaffolds are being decellularized thereby eliminating the cells from the scaffold surface but retaining the ECM components and hydroxyapatite. The scaffold can be then stored and used when needed. This approach allows the preparation of off-the-shelf bone graft substitutes with low risks for rejection promoting constructive remodeling of bone tissue and eliciting various biologic responses including angiogenesis and chemotaxis of bone forming cells. We finally test our scaffolds in a mouse model for critical size bone injury.

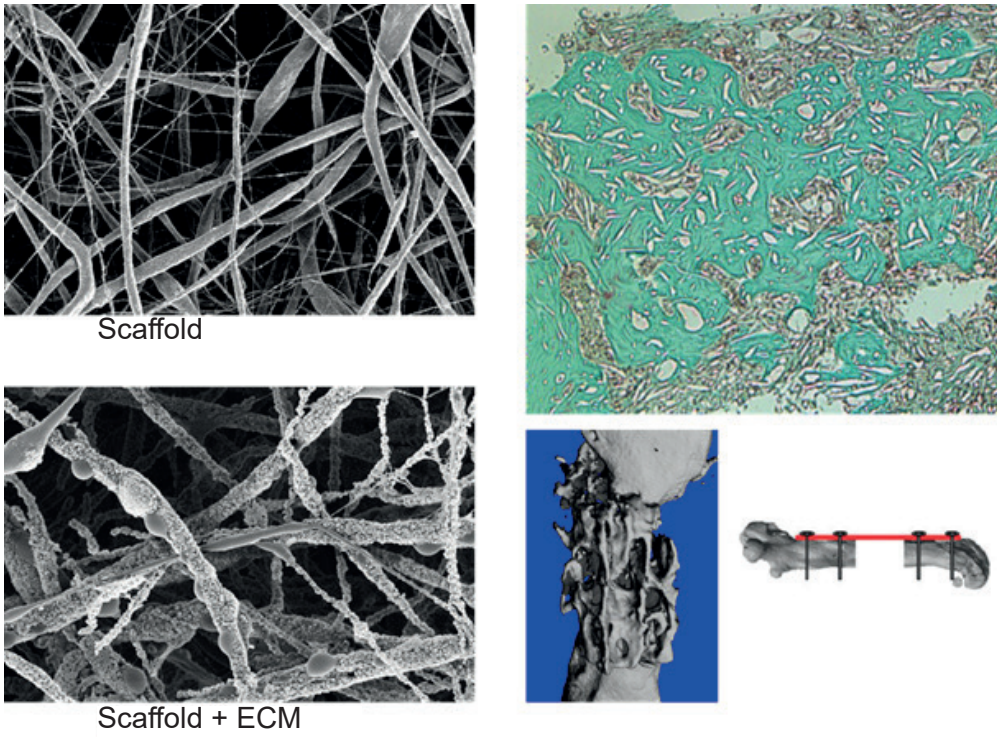


Figure 2: Preparation of scaffolds with extracellular matrix components (Simon Tiziani, Olivier Gröninger).

Geriatric Traumatology

Bone is a rigid organ that provides support and physical protection to various vital organs of the body and is permanently in a dynamic balance, a process called remodeling, which allows a constant regeneration of bones (e.g. in the adult human body, the entire skeleton is renewed every 7 years). The tightly regulated processes responsible for continuous bone remodeling involve a complex coordination of multiple bone marrow cell types: bone formation by osteoblasts and resorption by osteoclasts. An important clinical aspect of bone remodeling is the imbalance between bone formation and resorption, which results in various diseases, such as osteopetrosis, osteopenia, and osteoporosis

The population worldwide is ageing and life expectance is steadily increasing. The decrease in bone density and quality in osteoporotic patients leads often to fractures often as consequence of a fall from a standing height. Osteoporotic fractures are associated with high rates of morbidity and mortality and the overall cost of treatment is very high. The role of trauma surgery in older patients is therefore of great importance. The main goal of treatment is to provide stable fixation that allows early weight bearing and mobilization. Our research focuses on one side in optimizing the surgical procedures by assessing through biomechanical testing the stability of different osteosynthesis devices. On the other side we aim at studying the cellular events underlying the development of osteoporosis. A current hypothesis is that a decrease in the number and function of bone and bone marrow derived MSCs is responsible of age-related bone loss. In a current clinical study, we are making use of our newly developed cytometry by time-of-flight technology to monitor at single cell level the changes occurring in MSCs isolated from osteoporotic bone upon fracture.

Collaborations/Sponsors:

- Clinical Trials Center, University Hospital Zurich
- Orthopedic Research Laboratory, Biomechanics, University Hospital Balgrist, Zurich
- Institute for Biomechanics, ETH, Zurich
- Institute for Regenerative Medicine (IREM), University of Zurich
- Translational Large Animal Research Network (TREAT)
- Center for Applied Biotechnology and Molecular Medicine (CABMM), University of Zurich
- Jan Schwab, Klinik und Poliklinik für Neurologie & Experimentelle Neurologie, Charité Universitätsmedizin Berlin
- Markus Huber-Lang, Dept. of Traumatology, Hand-, Plastic and Reconstructive Surgery, University Hospital Ulm, Germany
- Michael Bauer, Institute for Anesthesiology and Intensive Care Medicine, University Hospital Jena, Germany
- Martijn van Griensven, Dept. of Experimental Trauma Surgery, Klinikum rechts der Isar, Technical University of Munich, Germany
- Armin Curt, Spinal Cord Injury Center, University of Zurich and University Hospital Balgrist
- Manfred Claassen, Institute for Molecular Systems Biology, Department of Biology, ETH Zurich, Switzerland
- Valerio Orlando, King Abdullah University of Science and Technology, Saudi Arabia
- Wendelin Stark, Olivier Gröninger, Institute for Chemical and Bioengineering, Department of Chemistry and Applied Biosciences, ETH Zurich, Switzerland.
- Todd McKinley, Indiana University, Purdue University, Indiana, USA
- University of Pittsburgh, Dept. of Orthop. Surgery, F Fu / V. Musahl, USA

Awards:

Michel Teuben: 2018 SICOT Young Investigator Research Award, SICOT Annual Congress in Montreal.
Hans-Christoph Pape: Publication of the Year 2018, German Society for Trauma Surgery (DGU).
Roman Pfeifer: 1st Prize Award for best oral presentation 19th European Congress of Trauma and Emergency Surgery in Valencia, Spain.


Prof. Dr. med.
Hans-Christoph
Pape, Director


PD Dr. sc.nat.
Paolo Cinelli


PD Dr. med.
Roman Pfeifer


Dr. sc.nat.
Elisa Casanova
Zimmermann


PD Dr. med.
Georg Osterhoff


PD Dr. med.
Valentin Neuhaus


Dr. med.
Kai Sprengel


Dr. med.
Kai Jensen


PD Dr. med.
Ladislav Mica,
PhD


Sonja Märsmann,
Lab. Technician


Sonja Hemmi,
Lab. Technician


Florencia Vonarburg
Scientific
Administration


Daisy Canepa,
PhD Student


Benjamin
Eggerschwiler,
PhD Student


Dr. med.univ.
Sascha
Halvachizadeh,
Clinical Science
PhD Student


Dr. med.
Simon Tiziani


Dr. med.
Michel Teuben


Lisa Stähli,
Master Student


Paola Nocchi,
Master Student


Larissa Baradaran,
Master Student

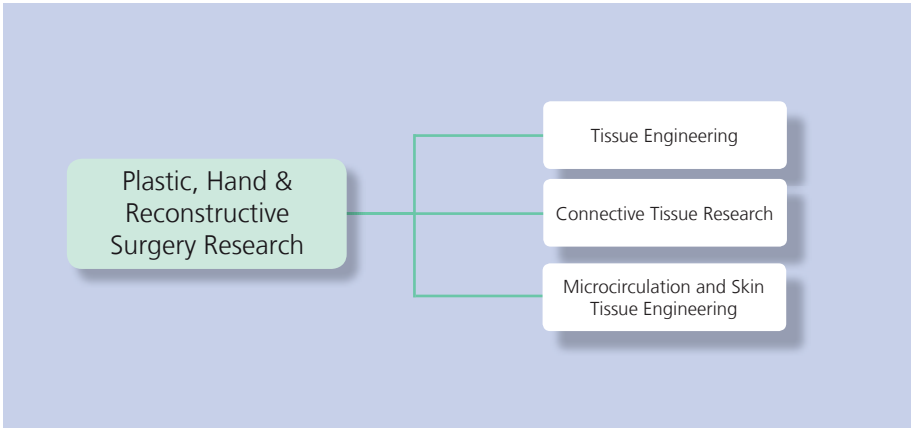

Yannik Kalbas

Benjamin Eggerschwiler, PhD Student

Plastic, Hand & Reconstructive Surgery Research

Prof. Dr. med.
Pietro Giovanoli,
Director

PD Dr. med.
Maurizio Calcagni



Research activities in the Plastic Surgery and Hand Surgery lie in the fields of microcirculation, wound healing, connective tissue research, tissue engineering, skin grafts, motion analysis, inflammatory biomarkers in burns, HLA sensitization in burns and vascularized composite allotransplantation.

For 2018, the Microcirculation and Skin Tissue Engineering group lead by Prof. N. Lindenblatt has engaged in several multidisciplinary projects in the fields of wound healing, preclinical drug development and tissue engineering.

Effect of TOP-N53 on angiogenesis and vascular leakage in diabetic mice
Diabetic foot ulcers are a serious complication in diabetic patients, characterized with impaired wound healing and deficient blood supply. In collaboration with Topadur Pharma AG and financed by the Swiss Innovation Agency (Innosuisse), the group is currently performing a preclinical proof-of-concept study in diabetic mice to test the efficacy of TOP-N53, a pro-angiogenic novel compound. The compound can be potentially used to treat diabetic foot ulcers by promoting angiogenesis and oxygen supply.

Molecular profiling of autologous fat graftings
The group is investigating the underlying molecular mechanisms that contribute to the regenerative properties of autologous fat graftings (microfat and nanofat) through mass spectrometry and molecular biology methods. Nanofat is prepared through mechanical shearing and is used successfully in our clinic to treat hyperthrophic scars and rejuvenate skin. The successful identification of factors involved in nanofat's regenerative properties may lead to advantageous therapeutic benefits, resulting in direct clinical translation and research application in regenerative medicine.

Construct pre-vascularization with adipose tissue
Successful integration of skin grafts and skin substitutes depends on appropriate vascularization. Failed vascularization

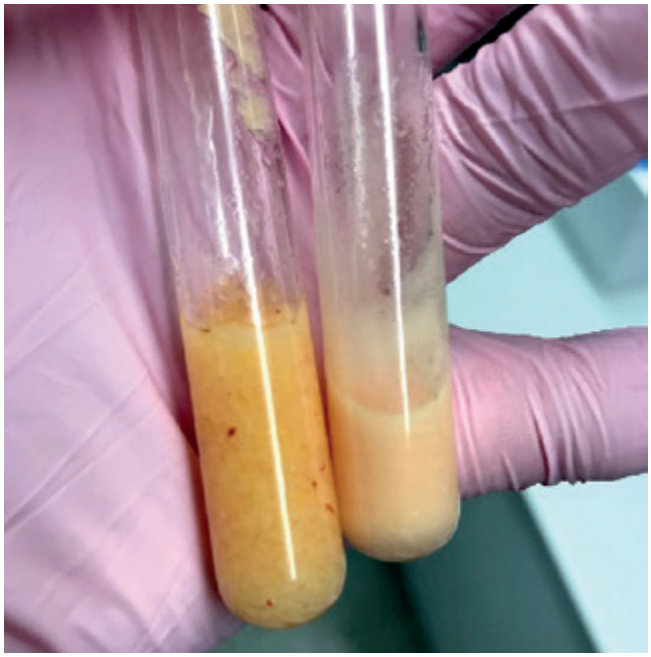


Figure 1: Comparison between microfat (left) and nanofat (right). Nanofat, an oily injectable emulsion, is prepared through mechanical shearing and filtering of microfat.

of grafts causes necrosis and rejections. Adipose tissue is rich in endothelial cells, mesenchymal stem cells and growth factors, which have been reported to significantly enhance biomaterial vascularization. With that, *in vivo* studies were carried out on C57BL/6 mice in order to investigate the neovascularization process of constructs composed of lipofragments.

***In situ* bioengineered dressing for chronic wounds**
The Lindenblatt group is highly involved in the Hochschulmedizin Zurich Flagship 2016 Project "Skintegrity", where innovative approaches for diagnosis and therapy of skin diseases and of wound healing are being investigated. In col-

laboration with Prof. S. Ferguson and Prof. K. Würtz (ETHZ), the group is developing a personalized wound dressing that combines electrospun membranes and nanofat as a healing factor.

Motion analysis

The group of PD Dr. med. Maurizio Calcagni performs motion analysis, among others. The aim of motion analysis is to quantify the function of the hand after medical treatment and to determine the effects of restrictions on daily activities. After validation of the method in healthy volunteers, the clinical measurements of 10 patients after partial wrist fusion were completed in 2018.

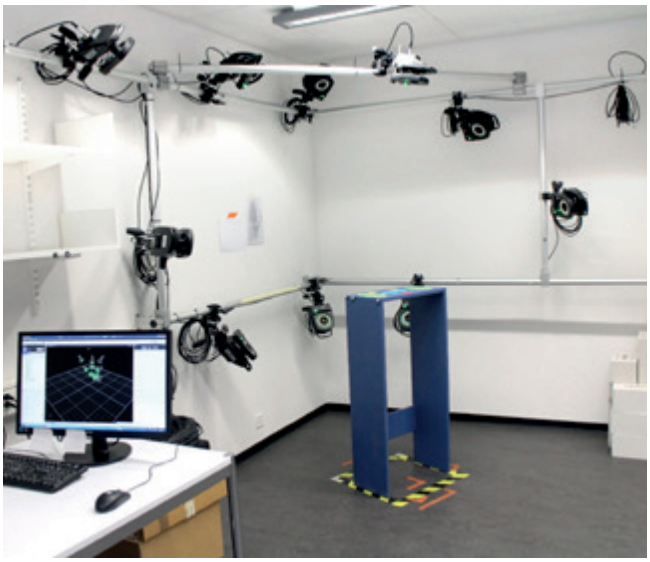


Figure 2: Motion analysis laboratory, equipped with a set of cameras to assess finger movements during daily acitvities.

Our results suggest that measurements of the range of motion in the isolated planes of motion (flexion/extension or radial/ulnar deviation) cannot predict the effect of motion restriction on performance in combined movements (such as daily activities). Therefore, postoperative function of the wrist could be better assessed with measurements of wrist mobility in combined planes, in addition to the classical goniometer measurements. In order to transfer these results into clinical practice and to ensure easy application, we are currently working on the validation of a portable sensor for the wrist. Furthermore, the application of our three-dimensional motion analysis routine will continue in 2019 for patients with major injuries of the fingers.

Epidermal Autografts

A further project is to optimize the production of cultivated epidermal autografts (CEA) and therewith the quality as well as the safety of the CEA for the treatment of severe burn patients.

The team of PD Dr. Maurizio Calcagni has discovered different biomarkers to screen the keratinocyte sheets for safety and efficacy at vario us stages of their development. Furthermore, we were able to show that the influence of temperature, specifically that hypothermal conditions alter and even enhance secretome release of human keratinocytes *in vitro*. We could demonstrate, that intermediate cultivation temperature of 33°C beneficially affects the production of immunomodulatory (IFN-γ, GM-CSF), anti-inflammatory (IL-10, IL-4) as well as angiogenic (VEGF, PDGF-bb) biofactors released by keratinocytes during CEA cultivation. In fact, pro-inflammatory factors (IL-1b, IL-8, TNF-α) are also most expressed in the intermediate temperature range; however, they show a positive feedback loop in wound healing.

These findings could improve the overall CEA production (Figure 3). The proteomic analysis could serve to identify a maximal engraftment window and therewith may provide better clinical results with enhanced graft take rate in patients.

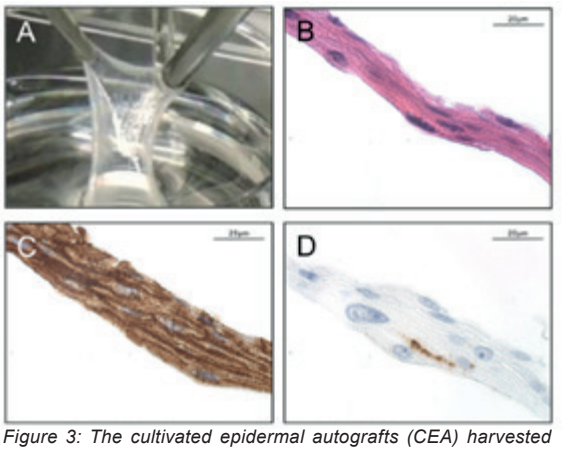
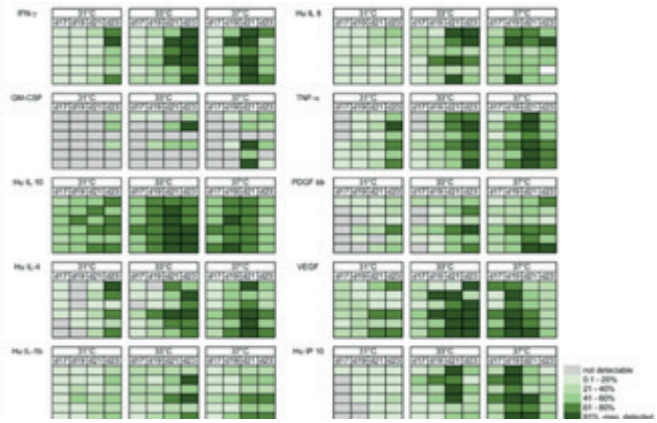


Figure 3: The cultivated epidermal autografts (CEA) harvested after 21 days (A)show a cell multilayer (B, Hematoxylin Eosin) of keratinocytes in an early stage differentiation status (C, Desmoglein 3). In contrast the late stage differentiation is only slightly detectable (D; Filaggrin). (Magn. x63)



Heat map indicating the time and temperature dependent cytokine release from human keratinocytes during CEA cultivation in vitro

The group of Prof. Dr. Jan Plock is focusing on clinical research in burns and reconstructive surgery and vascularized composite allotransplantation in basic science.

Clinical Research

Inflammatory biomarkers in burns
Pancreatic stone protein (PSP) has recently emerged as promising diagnostic and prognostic marker in severe trauma. Preliminary analyses from our group suggested serum PSP levels to be strongly associated with the presence of infection and mortality irrespective of the patients' age and total burned surface area. In that way, PSP might serve as helpful biomarker for timely identification of patients needing intensified medical care. So far, we have included over 100 patients giving rise to a comprehensive data-/biobank. As to that, future analyses will also address further inflammatory biomarkers in burns beyond PSP.

HLA sensitization in burns
Since the inception of clinical VCA over a decade ago, burn victims have been identified as immunologically complex patients for these procedures due to preformed (HLA) antibodies. Yet it remains unclear whether detected HLA antibodies are the result of former alloantigenic events or if their de novo formation occurs during primary burn care. Our interim analysis demonstrated that the formation of HLA antibodies during acute burn care might be lower than previously expected by using glycerol-preserved donor skin as well as restrictive administration of blood products as only 3 patients demonstrated verified de novo sensitization during acute burn care.

Multicenter Studies
In collaboration with Children's Hospital skin tissue engineering group (Profs. Meuli, Reichmann, Schiestl) clinical studies regarding autologous tissue engineered skin replacement have been initiated (TBRU-ds-BA-PIIb and TBRU-ds-RAC_PII). Moreover funding from the Swiss National Science Foundation was obtained for developing the clinical aspects of skin tissue engineering further (IICT 180418).
Together with Prof. Annelies Zinkernagel and PD Dr. Barbara Hasse from the Department of Infectious Diseases we were able to collaborate for a Clinical research priority program funded by the University of Zurich and by the Swiss National Science foundation (BacVivo – Precision medicine for bacterial infections; SNSF 31BL30_185401).

Basic Science – Vascularized Composite Allotransplantation

Graft Vasculopathy
Graft vasculopathy is a characteristic feature of acute and chronic rejection, that are both inevitable during allotransplantation. To better understand the pathophysiology of graft vasculopathy, this project studies inflammation and extracellular matrix remodeling within the vascular wall. The study is based on a rat model of hind limb transplantation and an *in vitro* model of vasculopathy.

Immunomodulation
To reduce the burden of immunosuppression in allotransplantation the potential of mesenchymal stromal cells (MSCs) is explored. While prolongation of graft survival has been achieved, long-term survival through immunomodulation and Treg upregulation rather than a tolerance approach is currently our goal. In a translational approach we examine combinations of systemic immunosupression as well as regional modulation of the regional allorecognition process. Furthermore MSCs interfere with the development of graft vasculopathy. The therapeutic or prophylactic potential is further investigated.

Connective Tissue Research and Tissue Engineering
In collaboration with the ETH Zurich (Prof. Vogel) and the company ab medica, Italy, tendon rupture repair by an implant has been optimized: an emulsion electrospun and a coaxially electrospun DegraPol® tube that is biocompatible, biodegradable and very elastic, enabling the surgeon an easy handling during implantation has been developed and tested in the full transection rabbit Achilles tendon model. Biomechanical results are promising, because three weeks post-operation, tensile strength was doubled if a growth factor was applied compared to the factor-free situation. Moreover, in-depth histological analyses were performed.

Bone tissue engineering *in vitro* is performed and several new approaches including bioreactors are conducted (collaboration with Prof. Stark ETH Zürich). The impact of calcium phosphate nanoparticles was investigated in terms of gene expression in human adipose-derived stem cells, aiming at a spontaneous osteogenic differentiation without medium supplementation.

A novel method to assess perfusion capacity by MRI and vascular architecture and morphology by micro-CT in different biomaterials intended at bone regeneration is being developed (collaboration with Prof. Emmert (Wyss Translational Center Zurich and Charité Berlin). For that purpose, biomaterials are grown on the chorioallantoic membrane of the chicken embryo and after one week analyzed by MRI *in vivo* and by micro-CT after automated perfusion with MicroFil® *ex vivo*.

Prof. Dr. med.
Pietro Giovanoli,
Director

PD Dr. med.
Maurizio Calcagni

Prof. Dr. med.
Nicole Lindenblatt

PD Dr. med.
Jan Plock

PD Dr. sc.nat.
Johanna
Buschmann

Gabriella Meier-
Bürgisser,
M.sc.

Dr. med.
Lisa Reissner

Gabriella Fischer,
M.sc.

Dr. med.
Holger Klein

Dr. med.
Riccardo Schweizer

Fatma
Kivrak Pfiffner,
M.sc.

Nadia
Sanchez Macedo,
PhD

Pranitha Jayadev
Kamat,
PhD

Michelle McLuckie,
PhD Student

Olivera Evrova,
PhD Student

Anna Wang,
med. Student

Ursula Steckholzer,
Lab. Technician

Petra Wolint,
Lab. Technician

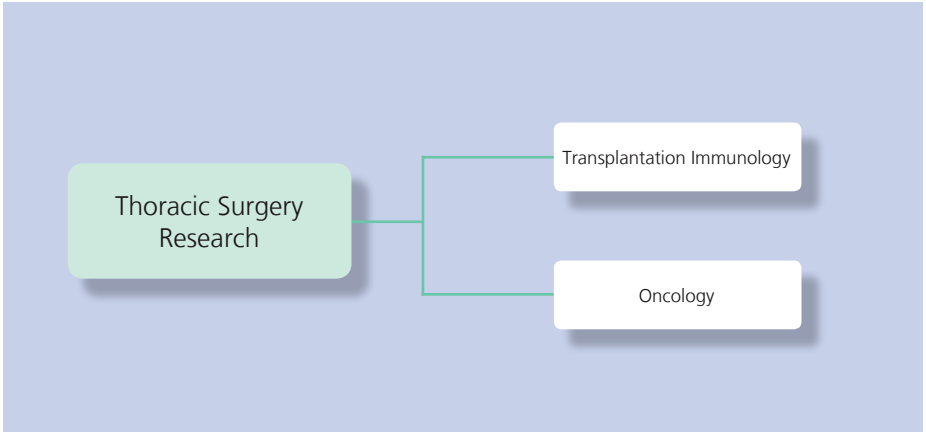
Collaborations:

- Dr. Aldo Ferrari, PhD, Dr. Simone Bottan, PhD. Hylomorph AG and Laboratory of Thermodynamics in Emerging Technologies. ETH Zurich
- Prof. Dr. Sabine Werner, Laboratory of Tissue Repair and Cancer, ETH Zurich
- Topadur Pharma AG, Schlieren
- Ast. Prof. Dr. Tomás Egaña, PhD, Pontificia Universidad Católica de Chile, Santiago, Chile, and TUM Munich, Germany
- Prof. Dr. Brigitte Vollmar, MD, Institute for Experimental Surgery, University of Rostock, Germany
- Prof. V. Vogel, PhD, ETH Zurich
- Prof. W.J. Stark, PhD, ETH Zurich

Thoracic Surgery Research

Prof. Dr. med.
Walter Weder,
Director

Prof. Dr. med.
Isabelle Opitz



Research in thoracic surgery focuses on different areas, such as oncology and transplantation.

Malignant Pleural Mesothelioma (MPM)

One of the topics in cancer research is the identification of novel biomarkers and development of therapeutic strategies for malignant pleural mesothelioma (MPM), an incurable thoracic malignancy related to asbestos exposure. To achieve these goals, various tumor tissue biomarkers that can help in the prediction of disease aggressiveness and response to treatment are assessed in translational studies (protein expression, mutation profiles and microRNAs). For example, could we identify that mutations or deletions of the BAP1 gene were associated with resistance to chemotherapy.

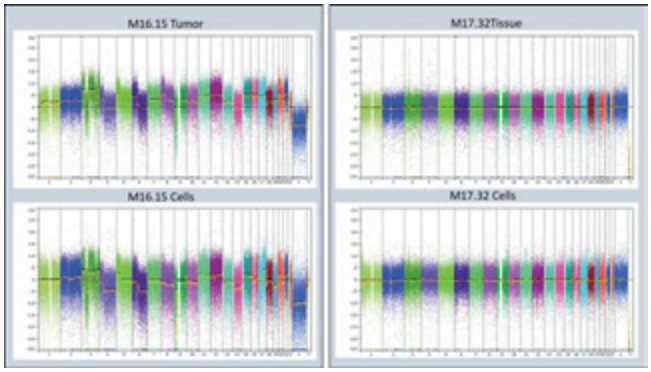


Figure 1: Copy Number Variation (CNV) analysis applied for verification of primary cell lines. Left: Example of a CNV analysis of a primary MPM cell line and the matching primary tumor tissue, in which the observe chromosomal changes are identical. Right: Example of a non-MPM primary cell line and the matching tissue sample, which both do not show any chromosomal alterations

Furthermore, our current projects particularly emphasize the identification of markers that can be detected in the blood of the patients, such as free circulating or microvesicle (exosomes) encapsulated nucleic acids, as these represent a very attractive tool for non-invasive diagnosis, outcome prediction, or disease monitoring. Besides, we are exploring novel targets for the treatment of MPM using *in vitro* cell models and pre-clinical animal models. For this, we are establishing a primary cell bank for mesothelioma.

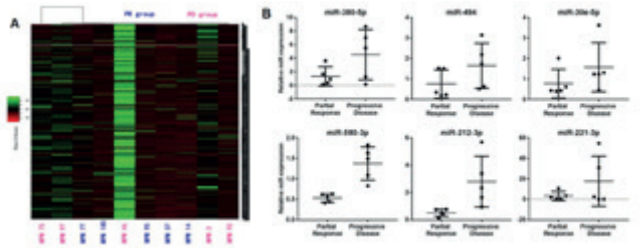


Figure 2: Identification of biomarkers associated with response of MPM to chemotherapy. A) Heat map obtained from profiling of 754 individual microRNAs. B) Expression of selected microRNA biomarekrs candiadtes in tissue samples from responders (partial response) and non-responders (progressive disease) to cisplatin-pemetrexed chemotherapy

In addition, we currently apply intracavitarily cisplatin/fibrin after macroscopic complete resection in a phase II trial to prevent local tumor recurrence (NCT01644994). So far, we included 17 out of 20 patients in the protocol.

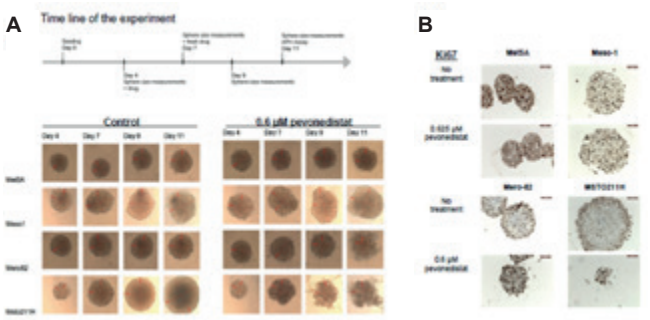
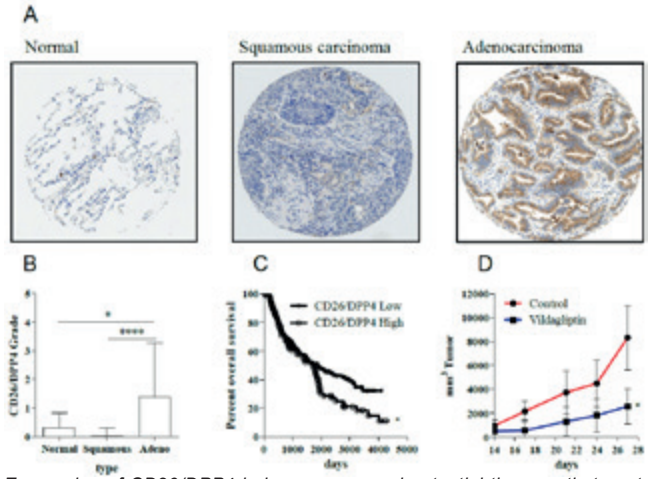


Figure 3: Effect of pevonedistat on CUL4A overexpressing MPM cell lines grown in 3D. A) Cells were grown in 3D spheroids, and 4 days after seeding, spheres were treated with either pevonedistat or DMSO. The presence of dead cells was clearly visible only in CUL4A overexpressing cell lines (Mero82 and MSTO211H). B) The accumulation of cells positive for Ki67 (proliferation markers that are positive in proliferating cells especially in S/G2 phase) were detected in the remaining cells in the spheroids of Mero-82 and MSTO211H.

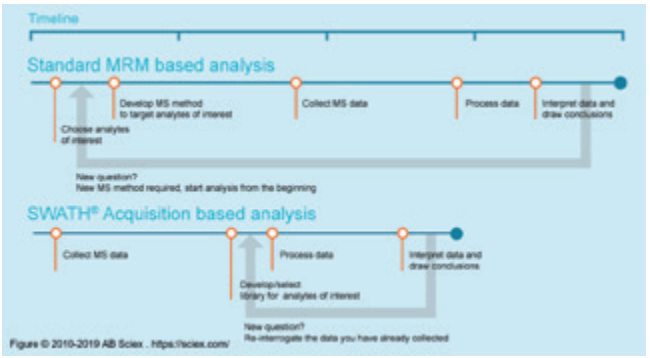
In parallel, we are evaluating the combination of intracavitary cisplatin/fibrin with post-operative radiotherapy in a preclinical animal model.
In further studies aiming to achieve a better understanding of MPM, we used experimental animal models exposed to asbestos to explore mechanisms of mesothelioma development. This led us to the discovery of pathways activated in pre-neoplastic lesions and we are currently characterizing them. We made public our collection of live-biobank of primary mesothelioma cells and we keep charactering them at the genomic level. We also explored how growth in 3D under different stiffness conditions changes the phenotype of mesothelioma cells.

Lung cancer
As lung cancer is the most prominent cause of cancer-related death, novel treatment strategies are urgently needed. In our research work, we found CD26/DPP4 to be significantly increased in lung adenocarcinoma compared to normal lung. Moreover, a higher CD26/DPP4 expression was significantly correlated with a worse survival of patients suffering from adenocarcinoma.



Expression of CD26/DPP4 in lung cancer and potential therapeutic target. CD26/DPP4 stain shows significantly higher expression in adenocarcinoma compared to normal lung or squamous carcinoma (A, B). Overall survival of adenocarcinoma patients is significantly correlated with the expression level of CD26/DPP4 (C). The treatment of CD26/DPP4 inhibitor Vildagliptin suppressed growth of tumor in a model of lung cancer (D).

On the base of these clinical data, we hypothesized that the inhibition of CD26/DPP4 can suppress lung cancer. In order to test our hypothesis, the CD26/DPP4 inhibitor vildagliptin was applied in a mouse model of lung adenocarcinoma induced by subcutaneous injection of the Lewis Lung Carcinoma (LLC) cell line. We found that vildagliptin treatment significantly reduced the size of tumor via activation of intratumoral NK cells. We therefore deem that CD26-inhibition can be a novel target to treat lung cancer.
In order to validate previously discovered prognostic biomarkers in lung adenocarcinoma (LAC) we are currently developing in collaboration with a group in ETHZ, a mass spectrometry approach called SWATH (Figure SWATH) for the quantitation of serine hydrolases (SH) enzymatic activities. With the newly established ABPP-SWATH MS workflow and starting with 24 LAC stage IIIA biopsies, we obtained MS/MS spectral information. Our ultimate goal is now to measure the proportion of “inactive SHs” from the “total” SHs and potentially follow 400 enzymes activities of the SH superfamily in our lung resection specimens.



Lung transplantation
In order to overcome organ shortage for lung transplantation and reduce waiting list mortality our group is working on *ex vivo* lung perfusion technology to improve the function of damaged lung grafts. We are doing experiments in large and small animal models with oxygen carrier (perfluorocarbon octyl bromide). Perfusion temperature is also one of the targets in our optimization strategy. We also investigate the potential of adeno-associated virus as vector for gene therapy in a small animal model during *ex vivo* lung perfusion in order to reduce ischemia reperfusion injury and the alloimmune response after transplantation.

Awards:

Claudio Caviezel: Prize of the Swiss Society of Thoracic Surgery (SGT) for the best clinical publication “Lung volume reduction surgery in selected patients with emphysema and pulmonary hypertension”

Collaborations:

- Institut klinische Biochemie der Universität Antwerpen, Belgien
- Eidgenössische Technische Hochschule (ETH) Zürich, CH
- Klinik für Pneumologie, Universität Leuven, Belgien
- Institute of Physiology, Perelman University Pennsylvania, Philadelphia, USA
- Institut für Molekularbiologie, Universitätsspital Zürich, Universität Zürich, CH
- Klinik für Immunologie, Universitätsspital Zürich, CH
- Centre Hospitalier, Department of Thoracic Surgery, Strasbourg, France (Gilbert Massard)
- Dr. Shampa Chatterjee, Associate Professor, Institute for Environmental Medicine University of Pennsylvania
- Gilles Willemin, Mouse Metabolic Evaluation Facility (MEF), Center for Integrative Genomics, University of Lausanne
- Dr. Serena Di Palma, Functional Genomics Center Zurich, ETH Zurich/University of Zurich
- Dr. Keke Yu, Department of Pathology, Shanghai Chest Hospital, Shanghai, China
- Dr. Tatjana Sajic and Prof. Ruedi Aebersold, Department of Biology, Institute of Molecular Systems Biology (IMSB), ETH Zurich, Switzerland
- Dr. S. Gray, Translational Cancer Research Group, Trinity Center for Health Sciences, Institute of Molecular Medicine, St. James's Hospital, Dublin, Ireland
- Prof. Dr. H. Moch, PD Dr. A. Soltermann, Dr. B. Vrugt, Institut für klinische Pathologie, UniversitätsSpital Zürich
- Prof. Dr. M. de Perrot, Dr. G. Allo, Dr. M. Tsao, Dr. Licun Wu, Division of Thoracic Surgery, Toronto General Hospital and Princess Margaret Hospital, University of Toronto, Toronto, Canada
- Dr. V. Serre Beinier, Département de chirurgie, Université de Genève
- Prof. Dr. W. Klepetko, Dr. M. Hoda, Division of Thoracic Surgery, Medical University Vienna
- Prof. Dr. R. Bueno, Department of Surgery, Brigham and Women's Hospital, Boston
- Dr. A. Jetter, Institut für Pharmakologie und Toxikologie, UniversitätsSpital Zürich
- Prof. Dr. D. Günther, Labor für organische Chemie, ETH Zürich
- Prof. Dr. B. Seifert, Department of Biostatistics, Epidemiology, Biostatistics and Prevention Institute, University of Zürich
- PD Dr. T. Frauenfelder, Dr. D. Nguyen-Kim, PD Dr. A. Boss, Institut für diagnostische und interventionelle Radiolgie, UniversitätsSpital Zürich
- Prof. Dr. M. Pruschy, Fabienne Tschanz, Institut für molekulare Radiologie, UniversitätsSpital Zürich
- Prof. Dr. M. Carbone, Prof. Dr. H. Yang, Prof. Dr. G. Gaudino, University of Hawai'i, Cancer Center, Honolulu
- Prof. Dr. G Reid, Prof. Dr. N. van Zandwijk, Asbestos Diseases Research Institute, Sydney, Australia
- Dr. Alessandra Curioni, Prof. Rolf Stahel, Clinic of Oncology, Zurich University HospitalDr. Hubert Rehrauer, Functional Genomic Center, University of Zurich
- Prof. Lorenza Penengo, IMCR, University of Zurich
- Prof. Beat Schwaller, Department of Medicine, University of Fribourg
- Prof. Egbert Smit, NKI, Amsterdam
- Dr. Victor Van Beusechem, Department of Medical Oncology VUmc, Amsterdam
- Prof. Dr. Marie Pierre Krafft, CNRS Research Director, University of Strasbourg, Institut Charles Sadron Strasbourg, France
- Dr. Didier Jean and Dr. Marie-Claude Jaurand, INSERM, Inserm U.1162 Research Unit - Universities Paris-Descartes, France
- Dr. Emanuelle Barillot & Dr. Laurence Calzone, Institut Curie, Paris, France
- Prof. Maries van den Broek, Institute of Experimental Immunology, University of Zurich, Switzerland

Prof. Dr. med.
Walter Weder,
Director

Prof. Dr. med.
Isabelle Opitz

PD Dr. med.
Sven Hillinger

Prof. Dr. med.
Ilhan Inci

Prof. Dr. med.
Dr. sc.nat.
Wolfgang
Jungraithmayr

Dr. med.
Claudio Caviezel

Dr. med.
Olivia Lauk

Dr. med.
Katarzyna Maria
Furrer

PD Dr.sc.nat.
Emanuela Felley-
Bosco

Dr.sc.nat.
Stephan Arni

Mayura Meerang,
PhD,
Postdoctoral
Fellow

Michaela Kirschner,
Dr. sc. hum.
Research
Coordinator

Jae Hwi Jang,
PhD,
Research Fellow

Dr. med.
Tatsuo Maeyashiki,
PhD,
Research Fellow

Dr. med.
Yan Zhang,
Research Fellow

Dr. med.
Masaki Hashimoto,
Research Fellow

Miriam Patella,
Research Fellow

Dr. med.
Ilker Iskender,
Research Associate

Jonas Ehrsam,
Research Associate

Kathrin Oehl,
PhD Student

Jelena Kresoja-
Rakic,
PhD Student

Agata Okonska,
PhD Student

Florian Janker,
Doctoral Student

Christine Opelz,
Lab. Technician

Vanessa Orlowski,
Lab Technician

Manuel Ronner,
Lab Technician

Elia Roth,
Apprentice

Dr.med.vet.
Martina Friess,
Data Manager

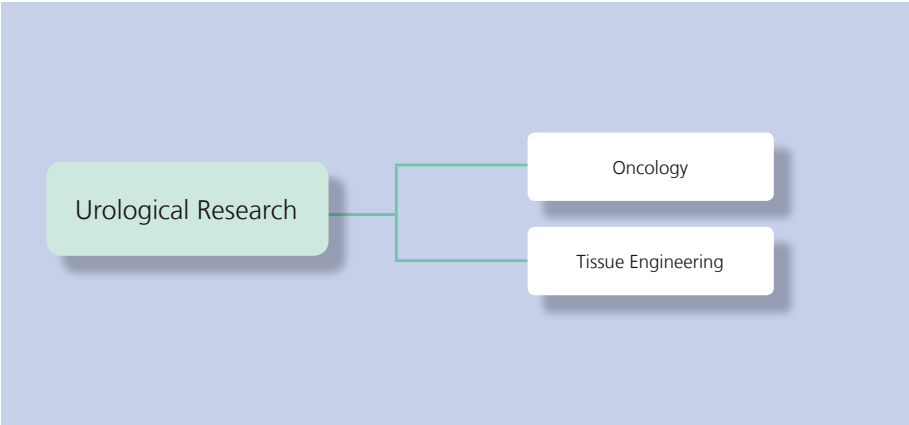
Cordelia Bommeli,
Study Coordinator

Nadine Bosbach,
Study Coordinator

Chloé Spichiger, PhD
Scient. Administration

Nadia Sanchez Macedo, PhD

Urological Research



Prof. Dr. med. Tullio Sulser, Director

PD Dr. med. Maurizio Provenzano, PhD

The department of Urology focuses its research interests on the two areas Uro-Oncology and Tissue Engineering/Regenerative Medicine.

Focus Prostate Cancer Studies

Based on our previously submitted patent on “Novel Urine Biomarker for Prostate Cancer”, we perform a pre-validation study testing the clinical relevance of the biomarker for diagnosis and prognosis of prostate cancer (PCa) and the possibility to substantially reduce the number of unnecessary biopsies.
As an alternative biomarker type we explore for PCa diagnostics, extracellular vesicles (EVs) are particularly intriguing. EVs, which are membrane-bound nanoparticles secreted by cells into the blood or media, are known to carry essential specific to their cell of origin. Using advanced *in vitro* models, we harvested EVs produced by PCa cells and analyzed them with proteomics (LC-MS/MS) to determine which cargo are related to disease progression. Candidate proteins are being validated in retrospective analysis of patient samples from the proCOC (prostate cancer outcome study) biobank.

Multiple androgen receptor (AR) dependent and independent resistance mechanisms limit the efficacy of current treatment modalities for castration resistant prostate cancer (CRPC). Autophagy is a survival mechanism in cells exposed to anti-cancer treatment. We hypothesized that also a promising N-terminal or C-terminal targeting-AR treatment may lead to up-regulation of autophagy, which can be targeted by a combination therapy with autophagy inhibitors. Current research focuses on *in vitro* and *in vivo* studies investigating the antitumor effect of a double-treatment using autophagy and AR inhibitors.
PCa is responsible for the second most cancer-related deaths in men after lung cancer in Switzerland. Precise visualization and therapy of primary and recurrent PCa foci is one of the prominent challenges in these tumor patients. Prostate-specific membrane antigen (PSMA) based imaging and therapy is increasingly used for targeted PCa management. However, a low PSMA surface expression in patients with low-volume and low-grade cancer can limit accurate imaging and therapy. *In vitro* and *in vivo* data has demonstrated that androgen deprivation therapy (ADT) induces PSMA surface expression. However, ADT might negatively influence disease progression in certain patients. We hypothesize that upregulation of PSMA expression can also be induced by other commonly used FDA-approved compounds indirectly targeting the AR pathway. We aim to identify these pharmacological compounds inducing the PSMA expression *in vitro* and *in vivo*.
We participate in several academic international randomized controlled trials and prospective studies (REDUSE, IMPROVE, PEACE III, PBCG) to improve outcomes in patients with advanced PCa. As a first results of the international multicenter PBCG (prospective biopsy collaboration group) study a new risk calculator for PCa and has been published 2018 (“A Contemporary Prostate Biopsy Risk Calculator Based on Multiple Heterogeneous Cohorts”, Eur Urol 2018). We are currently gathering funding for a phase I and II trial on bipolar androgen therapy (BAT) with a new medical compound in advanced PCa patients. The aim is to identify which PCa subtypes may respond to BAT and find predictive markers. For future biomarker discovery, we established the two biobanks proCOC and metaPROC (metastatic prostate cancer).

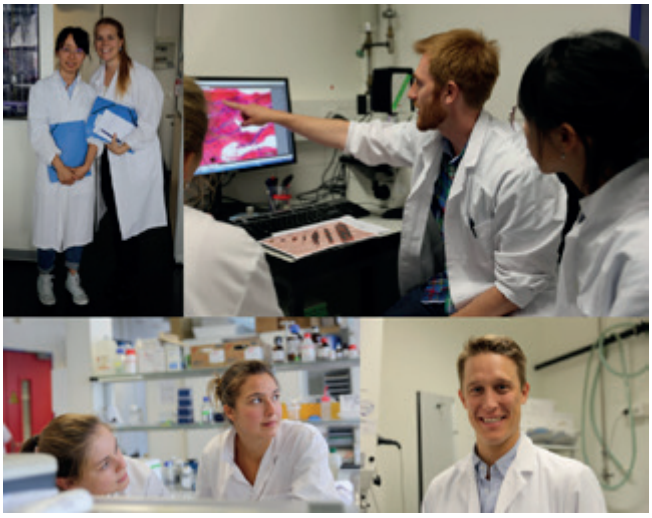
Focus Testicular Cancer Studies

As participating institution in the Swiss Austrian German Testicular Cancer Cohort Study (SAG TCCS) we are studying the quality of life and follow-up schedules in patients with testicular cancer. In addition, we are currently conducting a research project funded by the Swiss Cancer League to define the role of microRNAs in the management of testicular cancer patient surveillance. Additionally our group contributes clinical patient data to several international collaborations to optimize clinical care.

Urologic Tissue Engineering

Targeting urologic diseases such as urinary incontinence, the Tissue Engineering group is following different approaches to grow stem cells and initiate tissue regeneration.

In a first approach, we use human skeletal muscle precursor cells (MPCs) for tissue (re)generation. We coordinate an international consortium of the Horizon 2020 EU program and a project entitled Multisystem Cell Therapy for Improvement of Urinary Incontinence (MUSIC) (www.music2020.ch). In this first phase clinical trial, we will treat 40 patients with their autologous muscle precursor cells. Patient-specific cell batches are produced in clean room facilities under GMP conditions. In combination with post injection electromagnetic stimulation, we expect an improved regeneration of the sphincter muscle.
A second approach uses adipose derived stem cells (ADSC) as a key instrument to bioengineer contractile bladder tissue. The ADSCs can differentiate to smooth muscle cells (SMC) under natural conditions. Their long-term cell fate *in vivo* however is uncertain. We evaluate different combinations of cells to improve the bladder tissue formation by modification of the microenvironment and the enhancement of cell-to-cell interactions. As autologous SMC cannot be harvested from organs with end-stage disease and tissue regeneration requires large amount of functional SMC, there is an urgent need for other cell sources. We investigate the functional role of autophagy during differentiation and remodeling of ADSCs to SMC *in vitro*. Furthermore, we aim to develop a functional substitute for the improvement of the bladder wall function for patients suffering from end-stage bladder disease. We are investigating the regenerative capabilities of primary bladder SMCs and pre-differentiated, smooth muscle-like ADSCs in compressed collagen hydrogel scaffolds.



Tissue Engineering: A Road Trip from Bench to Bedside

A central concern associated with the use of any cell source for tissue engineering is the non-invasive monitoring of *in vivo* tissue formation. We therefore apply MRI to directly assess stem cell differentiation and skeletal muscle fiber formation. Since the regenerated tissue quality after stem cell therapy is crucially important for its proper function, we apply neuromuscular electromagnetic stimulation (NMES) to support *in vivo* tissue development, cell survival and innervation.

Collaborations:

- PD Dr. med S. Santourlidis, Heinrich-Heine University, Düsseldorf, Germany
- Prof. Dr. Michael Detmar, Institute of Pharmaceutical Sciences, ETHZ
- Prof. Dr. Peter Wild, Senckenberg Institut für Pathologie, Universitätsmedizin Frankfurt, Germany
- Proteomedix AG, Schlieren
- University of Applied Science North Western Switzerland (FHNW)
- Prof. Dr. Arnold von Eckardstein, Institute of Clinical Chemistry
- Dr. Andrew Vickers, Memorial Sloan Kettering Cancer Center, New York, USA
- Prof. Dr. Donna Ankerst, Technical University, Munich
- Prof. Rita Gobet & PD Dr. Maya Horst Division of Pediatric Urology, University Children's Hospital Zurich
- Prof. Hans Uwe Simon, Pharmacology Institute; Bern
- Prof. Dr. Simon M. Ametamey, Dpt. Pharmaceutical Sciences, ETHZ, Zurich, Switzerland
- Prof. Dr. Christoph Handschin, Biozentrum Basel, Basel, Switzerland
- PD Dr. med. Andreas Boss, Institute for Diagnostic and Interventional Radiology, USZ
- Dr. sc. nat. Martin Ehrbar, Division of Obstetrics, University Hospital Zurich

Awards:

Christian Fankhauser: “Automated Gleason grading of prostate cancer via deep learning” Prize for best presentation at the European Multidisciplinary Congress on Urological Cancers (EMUC) 2018.
Ch. Fankhauser: Forschungsstipendium 2018 der Walter und Getrud Siegenthaler Stiftung.
Ch. Fankhauser: Validierung der automatischen Befundung von Prostatakrebs durch künstliche Intelligenz, Marlies Geiser-Lemken Stiftung.

Prof. Dr. med.
Tullio Sulser,
Director

PD Dr. med.
Maurizio
Provenzano,
PhD

PD Dr. med.
Daniel Eberli,
PhD

PD Dr. med.
Thomas Hermanns

PD Dr. med.
Cédric Poyet

Souzan Salemi,
PhD

Deana Mohr,
PhD

Jenny Prange,
PhD

Christopher Millan,
PhD

Rosa Angelica Alves
de Sousa,
M.sc.

Dr. med.
Christian
Fankhauser

Dr. med.
Benedikt Kranzbühler

Dr. med.
Lukas Gstrein

Dr. med.
Florian Schmid

Alexandra Veloudios,
Study Nurse

Yvonne Döring,
Study Nurse

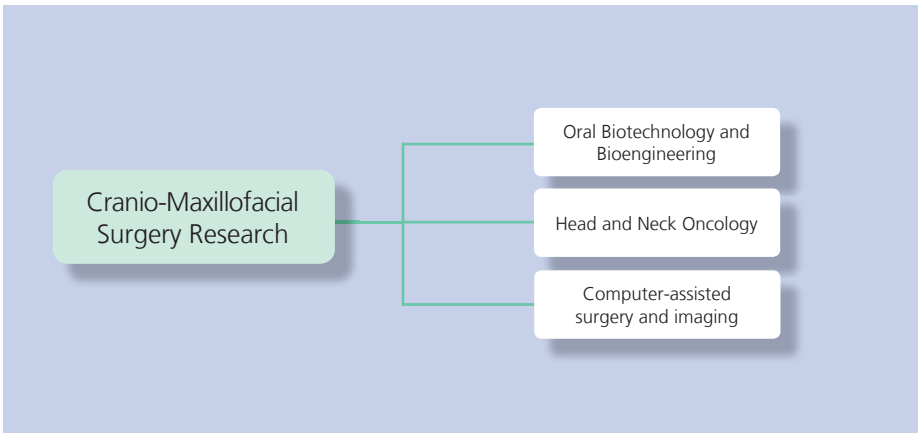
Anka Baltensperger,
Datamanager

Damina Balmer,
M.sc.
Scientific Coordination

Cranio-Maxillofacial Surgery Research

Prof.
Dr. med. dent.
Martin Rücker

Prof. Dr.sc.nat.
Franz E. Weber,
PhD



Research in the Department of Cranio-Maxillofacial Surgery covers head and neck oncology, computer assisted surgery, photodynamic therapy, and oral biotechnology & bioengineering.

The projects of the latter one are epigenetic active small chemicals to be applied for bone regeneration, treatment of bone defects in inflammation-compromised situations, adiposity, and even male contraception.

The other major field of oral biotechnology & bioengineering is additive manufacturing of bone substitutes with the final aim to provide our patients with osteoconductive bone substitutes from calcium phosphate and Bioglass, and to realize the use of personalized bone substitutes for our patients. The project on additive manufacturing of bone substitutes is funded by the Swiss National Science Foundation and includes partners from the University of Applied Science (Muttenz, Switzerland) and the PolyU (Hong Kong).

Figure 1 Diverse calcium phosphate-based bone substitutes produced by additive manufacturing (Ghayor & Weber FE (2018); Frontiers in Physiology doi: 10.3389/fphys.2018.00960)

After we have unraveled the microarchitecture of lattice structures and pore-based structures to yield in accelerated bone ingrowth and defect bridging, we now shift towards a better understanding of the biology of osteoconduction as a major driving force for bone regeneration and repair.

A third project of oral biotechnology & bioengineering is funded by a Bundesstipendium and deals with the preservation and regeneration of the pulp to keep teeth alive, to postpone tooth loss, and replacement by dental implants.

Computer assisted surgery is another focus in our department. Here we want to optimize the digital planning of operations and move on towards automation of planning and quality control. Finally, we want to offer our patients patient-specific implants and osteosynthesis materials.

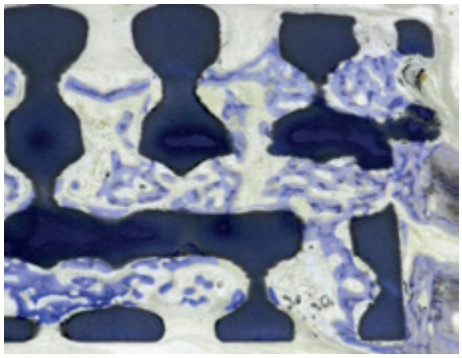


Figure 2: Bony bridging realized by an optimal osteoconductive microarchitectures for a 6 mm defect in 4 weeks. (Bone blue; scaffold black). (Ghayor & Weber FE (2018); Frontiers in Physiology doi: 10.3389/fphys.2018.00960)

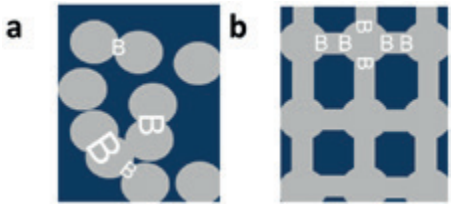


Figure 3: Conventional (a) and additively manufactured (b) microarchitecture of bone substitutes. For additively manufactured bone substitutes, the microarchitecture in terms of pore location and connections between pores (B: bottleneck) is well defined. (Pores are grey and the scaffold dark blue). (Ghayor & Weber FE (2018); Frontiers in Physiology doi: 10.3389/fphys.2018.00960).

Photodynamic therapy is a promsing treatment for medication-related osteonecrosis of the jaw (MRONJ).

MRONJ is a severe adverse drug reaction, manifested in a progressive irreversible bone destruction in the maxillofacial region, associated with discomfort and pain for the patients.

Collaborations:

- University of Applied Sciences Northwestern Switzerland, School of Life Sciences, Institute for Medical and Analytical Technologies (Prof. Michael de Wild).
- Department of Fixed and Removable Prothodontics and Dental Material Science, University of Zurich, Switzerland (Prof. Ch. Hämmerle, Prof. Dr. Ronald Jung, PD Dr. Daniel Thoma).
- Division of Preventive Dentistry, Periodontology, and Cariology, University of Zurich Center of Dental Medicine, Zurich, Switzerland (Prof. T. Attin, Prof. M. Zehnder, Prof. P. Schmidlin).
- Department of Masticatory Disorders, University of Zurich, Switzerland (Prof. L. Gallo)
- Division of Obstetrics (Prof. R. Zimmermann, Dr. Martin Ehrbar)
- ETH Zurich, Cartilage Engineering + Regeneration (Prof. M. Zenobi-Wong)
- Universität Hongkong, Prof. R. Zwahlen.
- UZH, Biochemistry, Prof. Amedeo Caflisch
- Biolitec research GmBH, Jena, Germany
- Orcos Medical, Küsnacht, Switzerland
- University of Zurich, Center of Dental Medicine, Division of Preventive Dentistry, Periodontology, and Cariology, Zurich, Switzerland (Prof. T. Attin, Dr. T. Thurnheer)
- University of Zurich, Institute of Anatomy (Prof. C. Maake)
- ETH Zurich, Department of Health Sciences and Technology, Institute for Biomechanics, Laboratory for Bone Biomechanics Zurich, Switzerland (Prof. R. Müller)
- University of Zurich, Department of Chemistry, Zurich, Switzerland (Prof. G. Patzke)
- University Hospital of Zurich, Department of Infectious Disease and Hospital Epidemiology, Zurich, Switzerland (Prof. A. Zinkernagel)

Prof. Dr. med. dent.
Martin Rücker

Prof. Dr.sc.nat.
Franz E. Weber,
PhD

Chafik Ghayor, PhD

PD Dr. med. dent.
Harald Essig

Dr. med. dent.
Paul Schumann

PD Dr. med. dent.
Thomas Gander

Bhattacharya
Indranil, PhD

Kathrin Schumann,
PhD
Scient. Administration

Alexander
Tchouboukov,
Lab. Technician

Ana Perez,
Lab. Technician

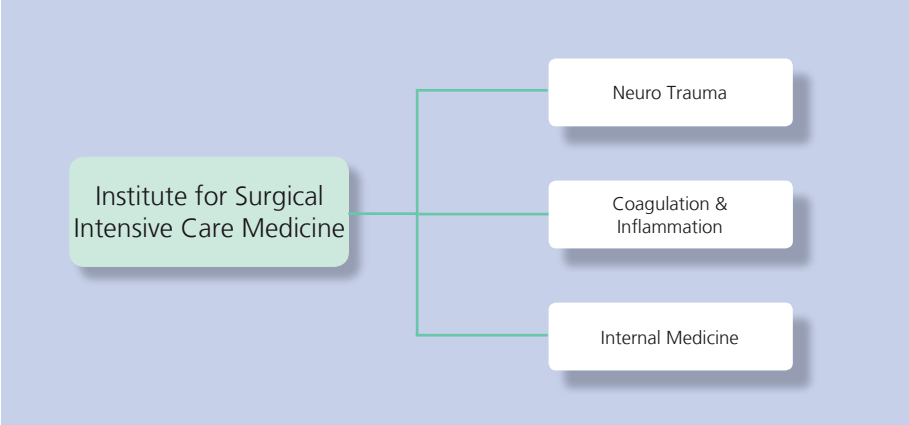
Tse-Hsing Chen,
PhD Student

Nurpur Khera,
PhD Student

Anja Ivica,
PhD Student

Bhattacharya Indranil, PhD

Institute for Surgical Intensive Care Medicine




Prof. Dr. med. Reto Schüpbach, M.Sc.


KD Dr. med. Peter Steiger


Prof. Dr. med. Marco Maggiorini

Basic research coagulation and inflammation
The focus lies on the protease-activated receptors (PARs), a small family of GPCRs, which regulate the complex interactions between coagulation and inflammation in acute and as chronic inflammatory conditions. PAR1, PAR3 and PAR4 are major regulators of platelet activation and vascular barrier function while PAR2 plays a major role in the regulation of extravascular inflammation and cancer.
In acute systemic inflammation, activated Protein C (aPC) activates PAR1 preventing endothelial barrier dysfunction. We constructed a novel type of PAR1 agonist, mimicking aPC activation that may lead to novel therapeutic options. Further, we are interested in the role of thrombin-activated PAR2 in chronic lung diseases.
In addition, PAR's are activated by various exoproteases from bacteria, fungi or plants. We investigate the role of proteases on the PAR activation in a collaboration with the research group of Prof. Annelies Zinkernagel. The effects of inflammatory modulators and copper on angiogenesis have been tested *in vitro* and ex ovo in a collaboration with PD Johanna Buschmann.

Clinical Studies in the ICU:
Visual attention and situation awareness in ICU
During the last years, patient safety and adherence to standardized protocols while treating patients have gained increasing attention and importance in medicine, especially in the field of critical care and complex medical environments.
In our current observational research project, we analyze visual behavioral patterns in intensive care with the help of the eye-tracking technique. Intensive care units are high-risk working areas due to the intense workload, critically ill patients, need for aseptic working techniques, required manual skills or complex invasive interventions and monitoring. Visual attention is of particular importance for all these processes and is the basis for decision-making and situation awareness and thus have a high influences on the patients' state of health and their better outcomes.

Infection and inflammation in burn patients
The skin and its microbiota (i.e., associated microorganisms) are a natural barrier and immune organ that defends the human body from invasion of pathogens and plays an essential role in fluid hemostasis and thermoregulation. Disturbance of the balance between the host and its microbiome - as well as barrier disruption - (can) lead to local and systemic disease.
An in-depth understanding of the skin microbiota's compositional and organizational disruption is necessary to identify future strategies to combat multidrug resistance and improve clinical outcome in burn patients with local wound or systemic infection. As of the moment, only little data on microbiota changes in burn patients exist. Furthermore, the relation between alteration of skin integrity, microbiome disruption and clinical disease manifestation is unknown.
This study project pursues the long-term goal of identifying novel therapeutic and preventive approaches to reduce the burden of morbidity and mortality due to infections and multi-drug-resistant bacteria in burn patients. The working hypotheses of this study is 1) that burn injuries lead to a predominance of virulent bacteria - normally controlled by skin commensals - and 2) that antibiotic broad-spectrum treatment favors the selection of resistant subpopulations of bacteria with a fitness-loss that will be overcome by compensatory mutations in a time-dependent manner.

The Re-Energize Study: A RandomizEd trial of ENtERal Glutamine to minimIZE thermal injury
The Re-Energize Study is a trial lead by Dr. Daren Heyland and his team at the Clinical Evaluation Research Unit (CERU). The objective of the study is to evaluate effect of glutamine on 6 months mortality in severe burn patients. This is a large, multicenter, double blind, randomized controlled trial of 2700 patients with severe burns randomly allocated to receive enteral glutamine or placebo. Since June 2019, USZ has qualified as the only Swiss study center out of 45 study centers worldwide.

TEN Network

As part of the so-called European Reference Network for TENs, we are in the process of launching a Delphi exercise with international experts to establish recommendations for the best supportive care at SJS/TEN. In this context, we are part of the burn intensive specialists in this Delphi project.
Together with Prof. Schmid (head of allergology USZ) and Dr. Mirjam Nägeli (Consultant of dermatology USZ) we want to improve and build up the interdisciplinary support of patients after severe cutaneous drug allergies (especially toxic epidermal necrolysis). In the context of this cooperation, we establish clinical and experimental research interests in TEN and establish an international register for TEN with Prof. French (Head of dermatology Munich). (www.irten.org).

Collaborations:

- ECKS: Indikatoren / Kontraindikatoren – Berliner Charité & Universitätsmedizin Göttingen
- Visus: Visual behaviour of intensivists in usual daily situations – ETH Zürich PDZ, Kinderspital Zürich
- ECMO: factorial survery – Berliner Charité & Universitätsmedizin Göttingen
- The RE-ENERGIZE Study – A Randomized Trial of Enteral Glutamine to minimize Thermal Injury (a worldwide study with 41 partner institutions) Lead: Clinical Evaluation Research Unit (CERU) Canada
- SPHN –PSSS (Personalized Swiss Sepsis Study)
- TEN Network – Klinikum Uni München

Prof. Dr. med.
Reto Schüpbach,
M.sc.

Prof. Dr. med.
Marco Maggiorini

KD Dr. med.
Peter Steiger

Dr. med.
Christoph Ganter

Dr. med.
Giovanna Brandi

Dr. med.
Stephanie Klinzing

Dr. med.
Silvia Cottini

Dr. med.
Karl Philipp Bühler

Dr. med.
Matthias Hilty

Dr. nat.
Alessandro
Franchini, PhD

Dorothea
Heuberger,
PhD Student

Ozlem Altintas,
PhD Student

Catharina Giese,
Head Development
and Administration

Dr. sc. ETH
Jan Bartussek,
Coordinator
Data management
and analysis

Lionel Chok, MD

Animal Welfare in Biomedical Research

Prof.
Margarete Arras,
DVM

Nikola Cesarovic,
DVM, PhD

Anesthesia and peri-operative Pain Research

An important reason for suffering in experimental animals is pain induced by invasive procedures, diseases and injuries. But pain management is more than an animal welfare concern, as it has important scientific and methodological implications for the design of experiments and the quality of the resulting data. To ensure high-quality scientific outcomes and humane treatment of laboratory animals sufficient anesthesia, reliable alleviation of pain and supporting experimental housing conditions are essential.

In the past, we have developed and evaluated physiology and behavior based pain assessment tools for laboratory mice.

Since 2017 we focus our work also on the development of tools for the legally required severity assessment in animal experimentation. Therefore, we combine well-established severity assessment methods with new approaches like cognitive bias testing to detect changes in the animal's affective state. This work is conducted as part of the research consortium DFG FOR2591 in collaboration with 15 different research groups in Germany and Switzerland. Within the consortium we are collaborating with several research groups to establish remote and automated systems to grade severity fast, objectively and in a non-invasive way (e.g. Automated Mouse Grimace Scale). The overall aim is the assessment of severity in different animal models with validated and easy-to-use parameters. With the implementation and evaluation of refinement measures (e.g. improved housing conditions or local anesthesia) we aim to minimize severity and to contribute to the 3R principles.

These tools are also used to improve analgesia protocols for the treatment of pain in mice without affecting experimental read-out. We characterized for example the opioid Tramadol (Fig. 1) as well as Tramadol-Paracetamol combinations in abdominal surgery (Fig. 2) and in orthopedic models and the antipyretic Paracetamol in embryo transfer surgery. In a collaboration with the University of Basel we are currently developing a new sustained release buprenorphine formulation for stress-free and continuous analgesia administration in rodents.

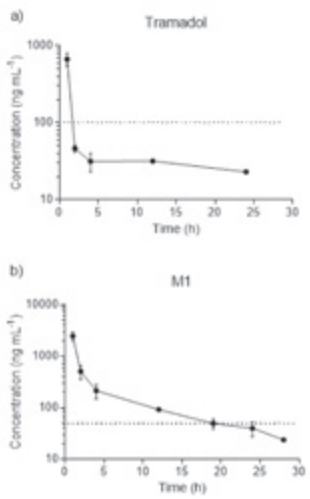


Figure 1: Serum concentrations after oral Tramadol administration. *a) Semi-log plots of mean serum tramadol concentrations over time (h) after subcutaneous administration of 25 mg kg-1 tramadol followed by 25 mg/kg of tramadol in drinking water for 24 hours. The horizontal line represents the minimal analgesic concentration of tramadol (100 ng mL-1) in humans.*

b) Semi-log plots of mean serum M1 concentrations over time (h) after subcutaneous administration of 25 mg kg-1 tramadol followed by 25 mg kg-1 of tramadol in drinking water for 24 h. The horizontal line represents the minimal analgesic concentration of M1 (40 ng mL-1) in humans.

Reference: Evangelista R, Bergadano A, Arras M, Jirkof P (2018) Evaluation of the analgesic efficacy of a 25 mg/kg Tramadol s.c. injection-oral combination in a surgical model in C57BL/6J mice. JAALAS, accepted.

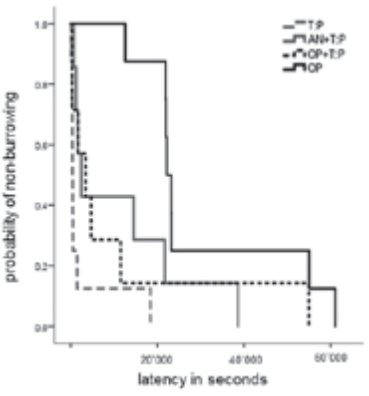


Figure 2: Burrowing Test. *A prolongation of burrowing latency indicates post-surgical pain in mice. Oral Tramadol:Paracetamol treatment results in comparable burrowing latencies as control treatments. Burrowing latencies differed significantly between T:P and An + T:P (p= 0.024) and OP compared to all other groups: OP vs T:P (p < 0.0001), OP vs. An + T:P (p= 0.032) and OP vs. OP +T:P (p=0.019). T:P = TP in drinking water only, An +T:P = anesthesia and T:P in the drinking water, OP+ T:P =anesthesia and surgery with T:P in the drinking water; OP =anesthesia and surgery only. Reference: Jirkof P, Arras M, Cesarovic N (2018)Tramadol:Paracetamol in drinking water for treatment of post-surgical pain in laboratory mice. Applied Animal Behaviour 198: 95-100, doi.org/10.1016/j.applanim.2017.09.021*

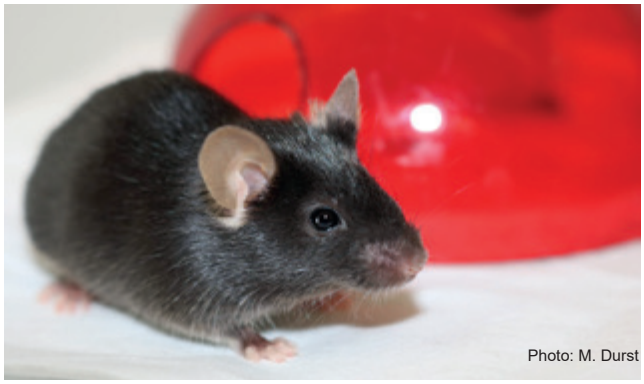


Photo: M. Durst

Collaborations:

- Andre Bleich, Institute for Laboratory Animal Science, Hannover Medical School
- Brianna Gaskill, Animal Sciences, Purdue University
- Micheal Czaplik, Department of Anesthesiology, RWTH Aachen University
- Jörg Huwyler, Pharmazeutische Technologie, University of Basel
- Annemarie Lang, Clinic for Rheumatology and Clinical Immunology, Charité Berlin, Germany
- Dorit Mehrhof, Institute of Imaging and Computer Vision, RWTH Aachen University
- Heidrun Potschka, Institute for Pharmacology, Toxicology and Pharmacy, Ludwig-Maximilians-University Munich
- Petra Seebeck, Zurich integrative Rodent Physiology, University of Zurich
- Rene Tolba, Institute for Laboratory Animal Science & Experimental Surgery and Central Laboratory for Laboratory Animal Science RWTH Aachen University

Prof.
Margarete Arras,
DVM

Nikola Cesarovic,
DVM, PhD

Flora Nicholls,
Dipl. biol.

Miriam Lipiski,
DVM

Paulin Jirkof,
PhD

Thea Fleischmann,
DVM

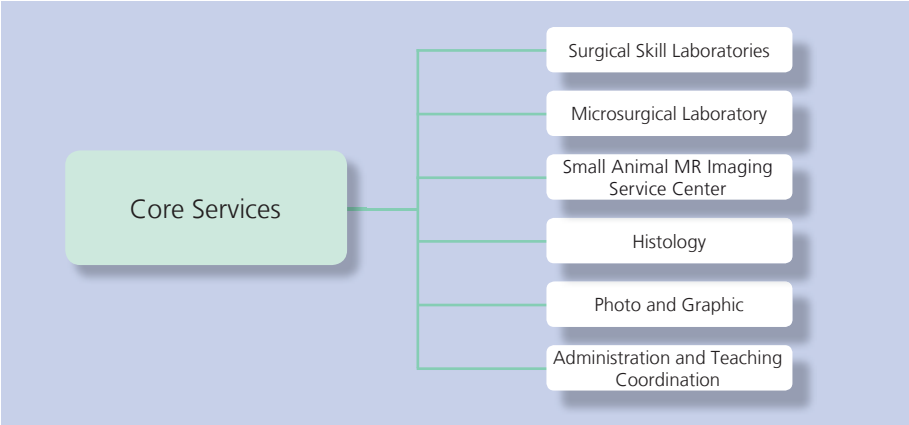
Mareike Sauer,
DVM

Marko Canic,
DVM

Mattea Durst,
PhD Student

Marko Canic, DVM

3. Core Services



Surgical Skill Laboratories

Surgery requires a number of practical and manual skills that can be trained in skill laboratories. In our facilities which are open to all members of the department we provide a number of tools and machines in a surgical environment. To perform operations under conditions similar to the clinical situation, technical help is provided by our staff which is also responsible for the maintenance of our facilities.

Microsurgical Laboratory

The microsurgery laboratory is a separate section in which several operating microscopes are available to all members of the department requiring special equipment. Maintenance of this laboratory includes all aspects of preparation of surgical instruments, sterilization and handling of waste materials. In addition, an intravital microscope including video equipment is available. This facility also provides for histological work-up.

Small Animal MR Imaging Service Center

The Small Animal MRI Service Center (SAMISC) is now administered as part of the Center of Surgical Research and Conny Waschkies, PhD, was recruited to oversee its activities. SAMISC is equipped with a Bruker 4.7T PharmaScan® MRI system designed for high throughput preclinical imaging. It features routine MRI sequences optimized for mice and rats, and is operated by ParaVision® 5 and 6 software packages for data acquisition, reconstruction, analysis and visualization. An EchoMRI system is available for body fat composition analysis in mice and tissue probes (down to 0.3g).

Histology

The laboratory for Histology provides a histological work-up from preserved specimen to sectioning and staining. The laboratory contains an embedding machine, several microtomes, cryostat and staining devices. Several techniques including paraffin embedded, frozen and plastic embedded tissue can be processed.

Teaching Coordination and Administration

The Surgical Research Division is responsible for organization of the learning and teaching units in the Department of Surgery, including both lectures and clinical courses in coordination with the University of Zurich, as well as the coordination of the clinical rotations during the last years of study. Further tasks include financial management (accounting, controlling, reporting) and personnel administration of the Division, as well as organization and coordination of various events.

Prof. Margarete Arras, DVM

Nikola Cesarovic, DVM, PhD

Dr. sc.nat. Conny Waschkies, Scientific Administrator

Andrea Garcete-Bärtschi, Lab. Technician

Ines Kleiber-Schaaf, Lab. Technician

Carol De Simio, Scientific Illustrator

Nico Wick, Photographer

Christoph Stulz, Photographer

Tina Wentz Manager Division of Surgical Research

Donata Gröflin, Teaching Coordination Division of Surgical Research

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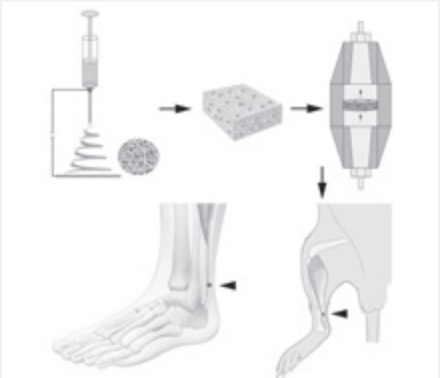
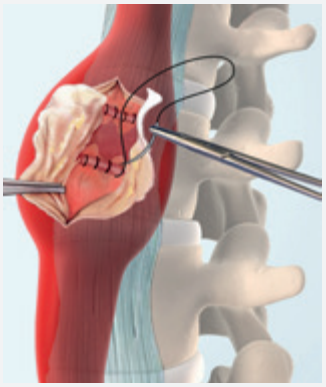
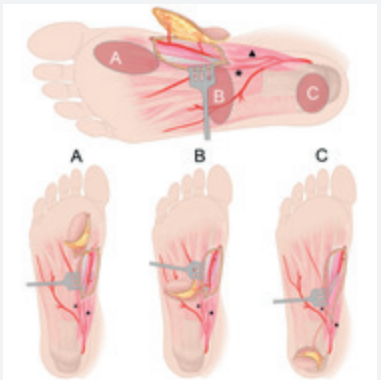
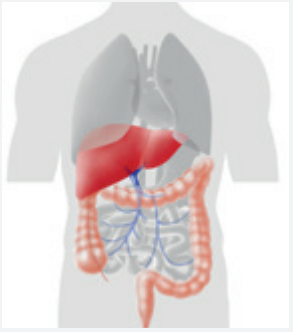
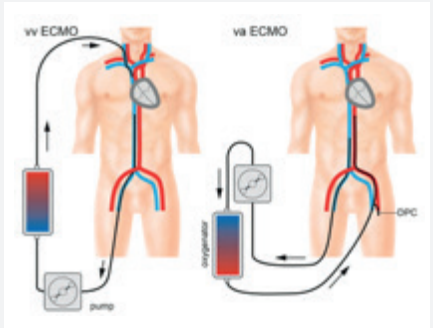
- layout of printing matters
- preparation of files for external printing
- print service
- cutting and converting of video-files for presentation and web
- construction and maintainance of websites
- maintainance of the digital image archives

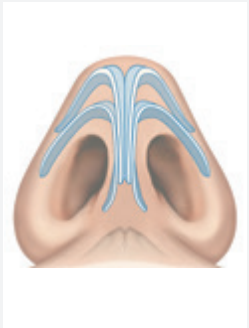


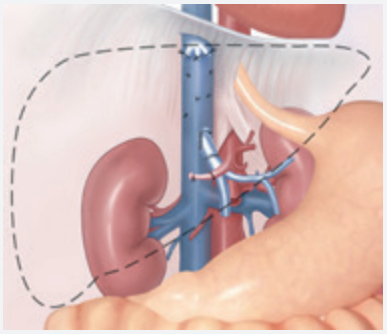












4. Events and Workshops at the Division of Surgical Research 2018

17th Day of Clinical Research, April 5, 2018

Lab Retreat, Les Diablerets, January 12 – 14; photos: Bostjan Humar

Surgical Suture Skills Course, Winterthur, May 30- 31; photo: Lorenzo Kaeser

Christmas Lecture and Apéro, December 20; Speaker: Dr. Christina Giger, Lucerne University

5. Grants

Cardiovascular Surgery Research:		
Swiss Heart Foundation	Impact of mitral valve replacement on intracardiac fluid dynamics and left ventricular efficiency	F. Maisano
Stiftung für Herz-und Kreislauferkrankheiten	EpiPhrenic POrcine Study (EPOS) - Physiologie Mechanism Behind Cardiac Enhancement Therapy, a Novel Implantable Therapy Concept for Heart Failure Patients with Narrow-QRS and/or no Evidence of Mechanical Intra-Ventricular Dyssynchrony	F. Maisano
USZ Innovationspool	Nahtfreier (Sutureless) Aortenklappenersatz	A. Ouda
USZ Innovationspool	Interkardiale Verwendung vom AngioVac Aspirationssystem	A. Ouda
USZ Innovationspool	Cerebral protection in transcatheter aortic valve replacement procedures	F. Maisano
Industry Grant	Development of minimally invasive and transcatheter therapeutic approaches	F. Maisano
Industry Grant	Development multimodality-imaging guided minimally invasive interventions	F. Maisano

Visceral & Transplant Surgery Research:		
SNF Project grant	Molecular strategies for improved outcomes after major liver resection	Clavien P.-A.
SNF Project grant	HOPE for Human Liver Grafts obtained from Donors after Brain Death	Dutkowski P.
SNF Project grant	Behavioral mechanisms underlying changes in food selection and intake in humans after Roux-en-Y Gastric Bypas	M. Bueter
SNF	Serotonylation promotes pancreatic cancer by regulating cytoskeletal dynamics	Graf R.
SNF Sinergia grant	Metabolic control of hepatocyte proliferation in regeneration and cancer	Humar B., Clavien P.-A.
SNF Investigator Initiated Clinical Trials programme	Hypothermic oxygenated perfusion (HOPE) for human livers - a prospective randomized European liver transplant trial	Dutkowski P.
FOUNDATIONS:		
Liver and Gastrointestinal Disease Foundation	HPB fellowship	Clavien P.-A.,
Liver and Gastrointestinal Disease Foundation	ITPP clinical trial	Clavien P.-A., Graf R.
Helmut Horten Stiftung	*Ex vivo* long term liver perfusion 'Liver4Life'	Clavien P.-A, Eshmuminov D.
ProMedica	*Ex vivo* long term liver perfusion 'Liver4Life'	Clavien P.-A, Eshmuminov D.
Olga Mayenfisch Stiftung	Behavioral mechanisms underlying changes in food selection and intake in humans after Roux-en-Y Gastric Bypass	Bueter M.
Amelie Waring Stiftung	Role of deoxy-sphingolipids in acinar cell pathobiology following diabetes mellitus	Sonda S.
INSTITUTIONAL GRANTS:		
Clinical Research Priority Program (CRPP), UZH	Non-resectable liver tumors – from palliation to cure	Clavien P.-A.
Wyss Translational Center Zurich	Liver4Life	Clavien P.-A., von Rohr P. (ETHZ)
Edoardo R.-, Giovanni, Giuseppe und Chiarina Sassella-Stiftung	Impact of HIPEC-tumor-specific immunity	Roth L.

Edoardo R.-, Giovanni, Giuseppe und Chiarina Sassella-Stiftung	Improving radiotherapy efficacy through ITPP-mediated tumor oxygenation	Borgeaud N.

Trauma Surgery Research:		
Novartis Stiftung für Biologisch-Medizinische Forschung	The role of Pramel7 in chromatin remodeling during the switch from pluripotency to differentiation	P. Cinelli
Theodor und Ida Herzog-Egli Stiftung	The switch between pluripotency to differentiation: The role of Pramel7 in embryonic stem cells	P. Cinelli
Edoardo R., Giovanni, Giuseppe und Chiarina Sassella-Stiftung	Role of the PRAME Gene Family in Cancer Stem Cells	P. Cinelli
Stiftung für wissenschaftliche Forschung an der UZH	Role of the Prame Gene Family in Cancer Stem Cells	P. Cinelli
Gottfried und Julia Bangerter-Rhyner-Stiftung	Identification of subpopulation of adipose derived stem cells for bone bioengineering by CyTOF analysis	P. Cinelli
AO Research Fund	Effects of standard reaming and RIA techniques on local soft tissue and systemic homeostasis in a porcine trauma model	M. Teuben, HC Pape
Olga Mayenfisch Stiftung	Real-time high-dimensional level analysis of stem cell heterogeneity at single cell resolution by mass cytometry	P. Cinelli
USZ INOV00040	Visual Analytics in Trauma Surgery WATSON Health	L. Mica
USZ INOV00049	Telemedizin	HC Pape

Plastic, Hand & Reconstructive Surgery Research:		
Allergan Inc., Irvine, CA, USA) , SNSF through NCCR Kidney.CH	*In vivo* characterization of the integration and vascularization of a silk-derived Surgical Scaffold	N. Lindenblatt
Swiss National Science Foundation	Cellular and molecular mechanisms of vascular maturation for therapeutic angiogenesis	A. Banfi, Basel; N. Lindenblatt (Co-Applicant)
Swiss National Science Foundation	New vascularization strategies for skin tissue engineering	N. Lindenblatt
Research Grant Olga Mayenfisch Stiftung, Zürich, Schweiz	Effect of fat and adipose-derived stem cells (ADSCs) on vascularisation and nerve regeneration in a new *in vivo* mouse model	N. Lindenblatt
Novartis Stiftung für Biologisch-Medizinische Forschung	Mass spectrometry of Nanofat: a novel systems biology approach to identify tissue regeneration factors	N. Lindenblatt
Commision for Technology and Innovation/Innosuisse	*In vivo* proof of concept for TOP-N53, a highly potent topical drug for acceleration of wound healing	N. Lindenblatt
Hochschulmedizin Zürich	Skintegrity - An interdisciplinary approach to understand, diagnose and treat skin diseases and wounds-P6	N. Lindenblatt
Werner-Siemens Stiftung	Center for artificial muscles in reconstructive medicine` (Co-applicant, PI: Yves Perriard, EPFL, 2. Co-applicant: Thierry Carrell, Inselspital Bern)	N. Lindenblatt

Hartmann-Müller Stiftung, Zürich, Schweiz	Molecular profiling of nanofat: a systems biology approach to understand tissue regeneration	N. Lindenblatt
Research Grant Allergan, Irvine, USA	Evaluation of the vascularisation and inflammatory reaction of the silk-based synthethic surgical scaffold SERI *in vivo*	N. Lindenblatt
Hartmann-Müller Stiftung, Zürich, Schweiz	Guided wound healing in full and split thickness wounds	N. Lindenblatt
Hartmann Müller-Stiftung für Med. Forschung	Fat grafting nerve	N. Lindenblatt
Forschung und Nachwuchsförderung der Universität Zürich	Hauttransplantate	N. Lindenblatt
Swiss Life Research Grant, Zurich	Skin grafting and tissue engineering of skin substitutes in burn surgery - what we can learn from nature	N. Lindenblatt
Hartmann Müller-Stiftung für Med. Forschung	Knochenersatzkonstrukte	J. Buschmann
Wolfermann-Nägeli-Stiftung	Sehnenreparatur mit einem reversibel expandierbaren Schlauch - Kaninchenmodell *in vivo*	J. Buschmann
EMDO Stiftung, Zürich	Fabrikation eines Polymerschlauches zur Sehnenreparatur	J. Buschmann
AbMedica, Lainate (Italy)	Sehnenreparatur mit einem reversibel expandierbaren Schlauch - Kaninchenmodell *in vivo*	J. Buschmann
Hartmann-Müller Stiftung	Sehnenreparatur unter Zuhilfenahme eines mit PDGF-BB bestückten DegraPol®-Rohrs	J. Buschmann
Kurt und Senta Hermann Stiftung	Fabrikation eines Polymer-Trägers: Bioaktivität und Release-Kinetik des Wachstumsfaktors Platelet-Derived Growth Factor-BB (PDG-BB) vom elektrogesponnenen Träger DegraPol®	J. Buschmann
La Colline PhD Fellowship	Skin Engineering Platform	M. Calcagni
Innovationspool USZ	Adipose derived stromal vascular fraction for the treatment of finger contractures in patients affected by systemic sclerosis	M. Calcagni, O. Distler, P. Giovanoli
Innovationspool USZ	Skin Engineering Platform	P. Giovanoli, M. Calcagni
Heubergstiftung	Investigating the effect of hypothermal conditioning on the quality and growth potential of *in vitro* cultured keratinocytes for skin grafting	M. Calcagni, S. Darwiche

Thoracic Surgery Research:

Zürcher Krebsliga	Prognostic Marker for MPM	I. Opitz
Vontobel Stiftung	MikroRNAs als prognostische und prädiktive Tumormarker für die multimodale Behandlung des malignen Pleuramesothelioms	I. Opitz, M. Kirschner
Verein Lunge Zürich	MicroRNAs as prognostic and predictive tumour markers assisting the selection of patients with malignant pleural mesothelioma for multimodality treatment	I. Opitz, M. Kirschner
Krebsforschung Schweiz	Mesoscape 001-pS6: Construction of a multi-institutional European Tissuebank	I. Opitz
Polianthes Foundation (SAKF)	Comprehensive Investigation of Predictive Biomarkers for Chemotherapy Response and Novel Drug Targets in Patients with MPM by Next Generation Sequencing	I. Opitz

SAKF Foundation	Multi-omics profiling for identification of novel circulating biomarkers for malignant pleural mesothelioma	I. Opitz
SNF	Improving Mesothelioma Patients Outcomes by Early Non-Invasive Diagnosis	I. Opitz
Polianthes Foundation	Next Generation Sequencing of Malignant Pleural Mesothelioma for Therapy Response Prediction	I. Opitz
Walter Bruckerhoff Stiftung	Targeting epigenetic deregulation	E. Felley-Bosco
Stiftung für Angewandte Krebsforschung	“Overcoming development of resistance and progression to mesenchymal phenotype in mesothelioma” and “Alternative splicing in BAP1: implications in DNA damage response and drug sensitivity in mesothelioma”	E. Felley-Bosco
CTI	Entwicklung einer Matrix-basierten Technologieplattform für die Hochdurchsatz-Analyse von 3D Zellkulturen	E. Felley-Bosco
Krebsliga Zürich	Sonic Hedgehog MPM	E. Felley-Bosco
Huggenberger-Bischoff Stiftung	Genome-wide copy number analysis of live cell malignant pleural mesothelioma biobank of Zürich University Hospital	E. Felley-Bosco
Schweizer Nationalfonds	RNA editing in mesothelioma: a new therapeutic target?	E. Felley-Bosco
Innovationspool	Implementierung der „Synapse 3D®“ Software von Fujifilm zur Planung und Simulation von (minimal-invasiven) anatomischen Lungenresektionen, Lungenvolumenreduktionschirurgie und minimal-invasiven Zugängen	C. Caviezel
Swiss National Fond	Reconditioning of marginal donor lung in *ex vivo* lung perfusion system using Perfluorocarbon based oxygen carrier	I. Inci
Foundation A. P. Naef (Lausanne)	Inhibition of ischemia-reperfusion injury using ATP sensitive potassium channel modulators in *ex vivo* lung perfusion system in lung transplantation	I. Inci
Lungenliga Graubünden	Inhibition of ischemia-reperfusion injury using ATP sensitive potassium channel modulators in *ex vivo* lung perfusion system in lung transplantation	I. Inci
Swiss Lung Foundation	A small animal model for reconditioning marginal donor lung in *ex vivo* lung perfusion system using an advanced perfluorocarbon emulsion before transplantation	I. Inci
CytoSorbents Europe GmbH	Cytokine removal during *ex vivo* lung perfusion improves early post-transplant lung function	I. Inci
Hartmann-Müller Stiftung	The protective effect of local anesthetics on primary graft dysfunction after experimental lung transplantation	W. Jungraithmayr
Stiftung für wissenschaftliche Forschung	Ein neues Therapiekonzept zur Bekämpfung des Lungenkarzinoms durch Hemmung der CD26/DPP4	W. Jungraithmayr
Stiftung für Krebsbekämpfung, University Zurich	Ein neues Therapiekonzept zur Bekämpfung des Lungenkarzinoms durch Hemmung der CD26/DPP4	W. Jungraithmayr
Stiftung für Angewandte Krebsforschung (SAKF) Zurich	Targeting human lung cancer by synergistic CD26- and checkpoint inhibitor	W. Jungraithmayr
Sophien-Stiftung, Zurich	A new therapeutic concept against lung cancer by inhibition of CD26/DPP4	W. Jungraithmayr
Stiftung Krebsforschung Schweiz	LC inhibition CD26/DPP4	W. Jungraithmayr
Stiftung für Angewandte Krebsforschung	Biomarkers with enzymatic activities for improved risk stratification of lung cancer patients	S. Hillinger
Stiftung für Angewandte Krebsforschung	Lung Cancer Screening	S. Hillinger

Urological Research :		
Max & Hedwig Niedermayer Stiftung	N-terminal androgen receptor targeting and autophagy inhibition to overcome resistance development during the evolution of prostate cancer treatment	B. Kranzbühler
Horizon 2020 Förderung, Staatssekretariat für Bildung, Forschung und Innovation	MUSIC: Multisystem Cell Therapy for Improvement of Urinary Continence	D. Eberli
Kurt und Senta Hermann Stiftung	N-terminal androgen receptor targeting and autophagy inhibition to overcome resistance development during the evolution of prostate cancer treatment	B. Kranzbühler
Commission for technology and Innovation (CTI)	Banking of human antibody repertoires for therapeutic use	M. Provenzano
Swiss National Science Foundation	Non-invasive monitoring of muscle precursor cell differentiation *in vivo* by magnetic resonance imaging	D. Eberli, Co-Applicant
Helmut Horten Stiftung	Cell-enriched hydrogel biomaterial with optimized release of NGF and VEGF for the improvement of innervation and functionality of bioengineered bladder tissue	D. Eberli
Baugarten Stiftung, Zürich	Neuro-elektromagnetische Stimulation und menschliche Muskelstammzellen zur Behandlung von Urininkontinenz	D. Eberli
Commission for technology and Innovation CTI	Biomarker discovery engine for novel cancer diagnostics based on liquid biopsy	D. Eberli
Commission for technology and Innovation CTI	Biomarker discovery engine for novel cancer diagnostics based on liquid biopsy	D. Eberli
Edoardo R. Giovanni, Giuseppe und Chiarina Sassella-Stiftung	Upregulation of prostate-specific membrane antigen (PSMA) expression by approved pharmacological compounds for improved prostate cancer imaging and therapy	B. Kranzbühler
Max und Hedwig Niedermaier Stiftung	Authophagy inhibition and second-line Hormone Therapy as a combined Therapy for Prostate Cancer	Souzan Salemi
Julius Müller Stiftung	Assay development for EV biomarker validation	Christopher Millan
Angela Reiffer Stifung	Development of a liquid biopsy diagnostic test for prostate cancer base on novel extracellular viscle-based biomarkers	Christopher Millan
Krebsforschung Schweiz	miRNAs in testicular cancer patient surveillance	Thomas Hermanns, Christian Fankhauser, Jörg Beyer

Cranio-Maxillofacial Surgery Research:		
Schweizer National Fond	Osteoconductive and osteoinductive customized implants for large mandibular defects	F. E. Weber
Bundesstipendium	Pulp Regeneration	F. E. Weber

Surgical Intensive Care Medicine:		
Vontobel-Stiftung	Biased PAR-2 Signaling by Thrombomodulin Bound Thrombin	R. Schüpbach
SPHN	Swiss Personalised Sepsis Study	R. Schüpbach
Béatrice Ederer-Weber Foundation	The bacterial microbiota in burn patiends – understanding microbial evolution under antibiotic selection pressure for future therapeutic and preventive approaches	P.Bühler

Animal Welfare in Biomedical Research:		
DFG Project funding in FOR 2591 Forschungsverbund	Severity assessment in animal based research	P. Jirkof, M. Arras
SGV Travelgrant	for Congress «Measuring Behaviour» in Manchester UK	M. Durst
Bf3R, Berlin, Project Funding	Integration of a refinement project on pain management in the mouse osteotomy model in a basic research study on bone healing (Refine-MOMo 1328-54) Project Funding	P. Jirkof, M. Durst

6. Publications 2018

1.. Abbott, T.E.F., et al., The surgical safety checklist and patient outcomes after surgery: a prospective observational cohort study, systematic review and meta-analysis. British Journal of Anaesthesia, 2018. 120(1): p. 146-155.

2. Abela, I.A., et al., A cluster of scedosporiosis in lung transplant candidates and recipients: the Zurich experience and review of the literature. Transplant Infectious Disease, 2018. 20(1): p. e12792.

3. Abu Hilal, M., et al., and P.-A. Clavien, The Southampton Consensus Guidelines for Laparoscopic Liver Surgery: From Indication to Implementation. Annals of Surgery, 2018. 268(1): p. 11-18.

4. Ajdler-Schaeffler, E., et al., Increased pathogen identification in vascular graft infections by the combined use of tissue cultures and 16S rRNA gene polymerase chain reaction. Frontiers in Medicine, 2018. 5: p. 169.

5. Allbright, K.O., et al., Delivery of adipose-derived stem cells in poloxamer hydrogel improves peripheral nerve regeneration. Muscle & Nerve, 2018. 58(2): p. 251-260.

6. Almahmoud, K., et al., Impact of pelvic fractures on the early clinical outcomes of severely injured trauma patients. European Journal of Trauma and Emergency Surgery, 2018. 44(2): p. 155-162.

7. Amblard, I., et al., Cytoreductive surgery and HIPEC improve survival compared to palliative chemotherapy for biliary carcinoma with peritoneal metastasis: A multi-institutional cohort from PSOGI and BIG RENAPE groups. European Journal of Surgical Oncology, 2018. 44(9): p. 1378-1383.

8. Anagnostopoulos, A., et al., Inadequate perioperative prophylaxis and postsurgical complications after graft implantation are important risk factors for subsequent vascular graft infections – prospective results from the VASGRA Cohort Study. Clinical Infectious Diseases, 2018: p. Epub ahead of print.

9. Ankerst, D.P., et al., A contemporary prostate biopsy risk calculator based on multiple heterogeneous cohorts. European Urology, 2018. 74(2): p. 197-203.

10. Anroedh, S.S., et al., Associations of 26 Circulating Inflammatory and Renal Biomarkers with Near-Infrared Spectroscopy and Long-term Cardiovascular Outcome in Patients Undergoing Coronary Angiography (ATHEROREMO-NIRS Substudy). Current Atherosclerosis Reports, 2018. 20(10): p. 52.

11. Araya, S., et al., Exocrine pancreas glutamate secretion help to sustain enterocyte nutritional needs under protein restriction. American Journal Of Physiology. Gastrointestinal And Liver Physiology, 2018. 314(4): p. G517-G536.

12. Arni, S., et al., A strategy to analyse activity-based profiling of tyrosine kinase substrates in OCT-embedded lung cancer tissue. Analytical Biochemistry, 2018. 547: p. 77-83.

13. Arvaniti, E., et al., Automated Gleason grading of prostate cancer tissue microarrays via deep learning. Scientific Reports, 2018. 8(1): p. 12054.

14. Aziz, M., et al., Mortality prediction after transcatheter treatment of failed bioprosthetic aortic valves utilizing various international scoring systems: Insights from the Valve-in-Valve International Data (VIVID). Catheterization and Cardiovascular Interventions, 2018. 92(6): p. 1163-1170.

15. Bachas, C., et al., Rscreenorm: normalization of CRISPR and siRNA screen data for more reproducible hit selection. BMC Bioinformatics, 2018. 19(1): p. 301.

16. Bächler, T., et al., RYGB increases the satiating effect of intrajejunal lipid infusions in female rats. Appetite, 2018. 131: p. 94-99.

17. Banzola, I., et al., Expression of Indoleamine 2,3-Dioxygenase Induced by IFN-γ and TNF-α as Potential Biomarker of Prostate Cancer Progression. Frontiers in Immunology, 2018: p. 9:1051.

18. Barcic, S., et al., Comparison of preseptal and retroseptal transconjunctival approaches in patients with isolated fractures of the orbital floor. Journal of Cranio-Maxillofacial Surgery, 2018. 46(3): p. 388-390.

19. Bartel, T., et al., Medical Three-Dimensional printing opens up new Opportunities in Cardiology and Cardiac Surgery. European Heart Journal, 2018. 39(15): p. 1246-1254.

20. Barten, M.J., et al., The clinical impact of donor-specific antibodies in heart transplantation. Transplantation Reviews, 2018. 32(4): p. 207-217.

21. Baumgartner, W., et al., Cartilage/bone interface fabricated under perfusion: Spatially organized commitment of adipose-derived stem cells without medium supplementation. Journal of Biomedical Materials Research. Part B, 2018: p. Epub ahead of print.

22. Baumgartner, W., et al., Cyclic uniaxial compression of human stem cells seeded on a bone biomimetic nanocomposite decreases anti-osteogenic commitment evoked by shear stress. Journal of the Mechanical Behavior of Biomedical Materials, 2018. 83: p. 84-93.

23. Becker, A.S., et al., Radiomics of liver MRI predict metastases in mice. European radiology experimental, 2018: p. 2:11.

24. Beckmann, A., et al., A new *in vitro* spine test rig to track multiple vertebral motions under physiological conditions. Biomedizinische Technik. Biomedical engineering, 2018. 63(4): p. 341-347.

25. Ben Ali, W., et al., DuraGraft vascular conduit preservation solution in patients undergoing coronary artery bypass grafting: rationale and design of a within-patient randomised multicentre trial. Open Heart, 2018. 5(1): p. e000780.

26. Benussi, S. and G.E. De Maat, Atrial remodelling and function: implications for atrial fibrillation surgery. European Journal of Cardio-Thoracic Surgery, 2018. 53(Suppl_1): p. i2-i8.

27. Berlth, F., et al., Total minimally invasive esophagectomy for esophageal adenocarcinoma reduces postoperative pain and pneumonia compared to hybrid esophagectomy. Surgical Endoscopy, 2018. 32(12): p. 4957-4965.

28. Besmens, I., T. Giesen, and M. Calcagni, Aufgabestellung in der Orthopedie: Obere Extremität, in Zerebralparese : Diagnose, Therapie und multidisziplinäres Management, T. Baumann and S. Dierauer, Editors. 2018, Georg Thieme Verlag: Stuttgart. p. 30-40.

29. Bieler, D., et al., Optimierung der Kriterien zur Schockraumalarmierung. Der Unfallchirurg, 2018. 121(10): p. 788-793.

30. Blumer, M., et al., Retrospective analysis of 471 surgically treated zygomaticomaxillary complex fractures. Journal of Cranio-Maxillofacial Surgery, 2018. 46(2): p. 269-273.

31. Boecker, A.H., et al., Cell-enrichment with olfactory ensheathing cells has limited local extra beneficial effects on nerve regeneration supported by the nerve guide Perimaix. Journal of Tissue Engineering and Regenerative Medicine, 2018. 12(11): p. 2125-2137.

32. Bombardo, M., et al., Inhibition of Class I Histone Deacetylases Abrogates Tumor Growth FactorβExpression and Development of Fibrosis during Chronic Pancreatitis. Molecular Pharmacology, 2018. 94(2): p. 793-801.

33. Bombardo, M., et al., Enhanced proliferation of pancreatic acinar cells in MRL/MpJ mice is driven by severe acinar injury but independent of inflammation. Scientific Reports, 2018. 8: p. 9391.

34. Bombardo, M., et al., Ibuprofen and diclofenac treatments reduce proliferation of pancreatic acinar cells upon inflammatory injury and mitogenic stimulation. British Journal of Pharmacology, 2018. 175(2): p. 335-347.

35. Bosch, G., et al., Komplikationen nach oralchirurgischen Eingriffen: Infektionen. Die Quintessenz, 2018. 69(7): p. 788-796.

36. Bosch, G., et al., Hydrophilic implant surfaces – a clinical and scientific update (in German). Swiss Dental Journal, 2018. 128(1): p. 33-39.

37. Bosch, G., et al., Hydrophile Implantatoberflächen. Swiss Dental Journal, 2018. 128(1): p. 33-39.

38. Bosiers, M.J., et al., Incidence and prognostic factors related to major adverse cerebrovascular events in patients with complex aortic diseases treated by the chimney technique. Journal of Vascular Surgery, 2018. 67(5): p. 1372-1379.

39. Bouaicha, S., et al., Impact of vertical and horizontal malrotation on measurements of anteroposterior radiographs of the scapula: need for standardized images in modern omometry. Journal of Shoulder and Elbow Surgery, 2018. 27(4): p. 659-666.

40. Bouchardy, J., et al., Regression of Advanced Liver Fibrosis After Heart Transplantation in a Patient With Prior Fontan Surgery for Complex Congenital Heart Disease. Circulation. Heart Failure, 2018. 11(11): p. e003754.

41. Bredell, M., et al., Denosumab as a Treatment Alternative for Central Giant Cell Granuloma: A Long-Term Retrospective Cohort Study. Journal of Oral and Maxillofacial Surgery, 2018. 76(4): p. 775-784.

42. Brosi, P., et al., Prophylactic Intraperitoneal Onlay Mesh Reinforcement Reduces the Risk of Incisional Hernia, Two-Year Results of a Randomized Clinical Trial. World Journal of Surgery, 2018. 42(6): p. 1687-1694.

43. Brunt, E., et al., cHCC-CCA: Consensus terminology for primary liver carcinomas with both hepatocytic and cholangiocytic differentation. Hepatology, 2018. 68(1): p. 113-126.

44. Brüstle, K., et al., Acute pulmonary embolism and multiple pulmonary nodules mimicking metastatic disease. Thorax, 2018. 73(2): p. 193-194.

45. Budtz-Lilly, J., et al., Editor's Choice - The Impact of Centralisation and Endovascular Aneurysm Repair on Treatment of Ruptured Abdominal Aortic Aneurysms Based on International Registries. European Journal of Vascular and Endovascular Surgery, 2018. 56(2): p. 181-188.

46. Bueno, R., I. Opitz, and IASLC Mesothelioma Taskforce, Surgery in Malignant Pleural Mesothelioma. Journal of Thoracic Oncology, 2018. 13(11): p. 1638-1654.

47. Burger, I.A., et al., 18F-Choline PET/MR Can Detect and Delineate Local Recurrence After High-Intensity Focused Ultrasound Therapy of Prostate Cancer. Clinical Nuclear Medicine, 2018. 43(4): p. e111-e112.

48. Burgio, F., et al., Characterization and vascularization of a 3D-printed hydroxyapatite scaffold with different extracellular matrix coatings under perfusion culture. Biology Open, 2018. 7(12): p. 1-11.

49. Buschmann, J., Tissue Engineering of Tendons, in Tissue Regeneration, H. Abdelhay Essayed Kaoud, Editor. 2018, IntechOpen: London. p. 161-181.

50. Bushati, M., et al., The current practice of cytoreductive surgery and HIPEC for colorectal peritoneal metastases: Results of a worldwide web-based survey of the Peritoneal Surface Oncology Group International (PSOGI). European Journal of Surgical Oncology, 2018. 44(12): p. 1942-1948.

51. Bustamante-Munguira, J., et al., Surgery for acute infective endocarditis: epidemiological data from a Spanish nationwide hospital-based registry. Interactive Cardiovascular and Thoracic Surgery, 2018. 27(4): p. 498-504.

52. Calcagni, M., The Federation of the European Societies for Surgery of the Hand: old new challenges. Journal of Hand Surgery, European Volume, 2018. 43(3): p. 339-340.

53. Calcagni, M., et al., Intramedullary screw fixation of metacarpals and phalanges, in Fractures of the Hand and Carpus: FESSH 2018 Instructional Course Book, M. Boeckstyns and M. Richter, Editors. 2018, Georg Thieme Verlag: Stuttgart. p. 1-10.

54. Calcagni, M., et al., The novel treatment of SVF-enriched fat grafting for painful end-neuromas of superficial radial nerve. Microsurgery, 2018. 38(3): p. 264-269.

55. Caliskan, E., et al., Surgical device-enabled epicardial LAA closure to achieve safe, complete, and durable LAA occlusion. Nature Reviews. Cardiology, 2018. 15(3): p. 191.

56. Caliskan, E. and M.Y. Emmert, Surgical occlusion of the left atrial appendage: it is time to adopt newer techniques! European Heart Journal, 2018. 39(45): p. 3987-3998.

57. Caliskan, E., et al., Epicardial left atrial appendage AtriClip occlusion reduces the incidence of stroke in patients with atrial fibrillation undergoing cardiac surgery. Europace, 2018. 20(7): p. e105-e114.

58. Caliskan, E., S.P. Salzberg, and M.Y. Emmert, Impact of Left Atrial Appendage Exclusion on Cardiovascular Outcomes in Patients With Atrial Fibrillation Undergoing Coronary Artery Bypass Grafting-The Surgeon's Comment. American Journal of Cardiology, 2018. 121(1): p. 142.

59. Canal, C., et al., Is There an Influence of Surgeon's Experience on the Clinical Course in Patients With a Proximal Femoral Fracture? Journal of Surgical Education, 2018. 75(6): p. 1566-1574.

60. Candrian, G., et al., Longitudinal study of a NoGo-P3 event-related potential component following mild traumatic brain injury in adults. Annals of Physical and Rehabilitation Medicine, 2018. 61(1): p. 18-26.

61. Carow, J., et al., Response to "Comments on mortality and cardiorespiratory complications in trochanteric femoral fractures: a ten year retrospective analysis". International orthopaedics, 2018. 42(4): p. 967-968.

62. Carow, J.B., et al., Soft tissue micro-circulation in the healthy hindfoot: a cross-sectional study with focus on lateral surgical approaches to the calcaneus. International orthopaedics, 2018. 42(11): p. 2705-2713.

63. Castro-Ferreira, R., et al., Simplified hybrid repair with true lumen recycling for retrograde renovisceral perfusion in a complex chronic aortic dissection. Journal of Vascular Surgery Cases and Innovative Techniques, 2018. 4(3): p. 226-230.

64. Cathomas, R., et al., Questioning the Value of Fluorodeoxyglucose Positron Emission Tomography for Residual Lesions After Chemotherapy for Metastatic Seminoma: Results of an International Global Germ Cell Cancer Group Registry. Journal of Clinical Oncology, 2018. 36(34): p. 3381-3387.

65. Caviezel, C., et al., Lung volume reduction surgery in selected patients with emphysema and pulmonary hypertension. European Journal of Cardio-Thoracic Surgery, 2018. 54(3): p. 565-571.

66. Caviezel, C., D. Franzen, and W. Weder, Chirurgische Lungenvolumenreduktion. Pneumologie, 2018. 72(1): p. 64-78.

67. Caviezel, C., et al., Outcome After Lung Volume Reduction Surgery in Patients With Severely Impaired Diffusion Capacity. Annals of Thoracic Surgery, 2018. 105(2): p. 379-385.

68. Caviezel, C., et al., Lung volume reduction surgery beyond the NETT selection criteria. Journal of Thoracic Disease, 2018. 10(Suppl 23): p. S2748-S2753.

69. Caviezel, C., et al., Improved postoperative lung function after sublobar resection of non-small-cell lung cancer combined with lung volume reduction surgery in patients with advanced emphysema. Journal of Thoracic Disease, 2018. 10(Suppl 23): p. S2704-S2710.

70. Cavigelli-Brunner, A., et al., Prevention of Low Cardiac Output Syndrome After Pediatric Cardiac Surgery: A Double-Blind Randomized Clinical Pilot Study Comparing Dobutamine and Milrinone. Pediatric Critical Care Medicine, 2018. 19(7): p. 619-625.

71. Cesarovic, N., et al., Left ventricular blood flow patterns at rest and under dobutamine stress in healthy pigs. NMR Biomed, 2019. 32(1): p. e4022.

72. Chen, T.-H., et al., Lattice Microarchitecture for Bone Tissue Engineering from Calcium Phosphate Compared to Titanium. Tissue Engineering. Part A, 2018. 24(19-20): p. 1554-1561.

73. Chiarito, M., et al., Outcome after percutaneous Edge-to-Edge Mitral Repair for functional and degenerative Mitral Regurgitation a systematic Review and Meta-Analysis. Heart, 2018. 104(4): p. 306-312.

74. Christmann, M., et al., Prognostic value of troponin in infants with hypoplastic left heart syndrome between Stage I and II of palliation. Annals of Pediatric Cardiology, 2018. 11(1): p. 56-59.

75. Christmann, M., et al., Risk factor analysis for a complicated postoperative course after neonatal arterial switch operation: The role of troponin T. Congenital Heart Disease, 2018. 13(4): p. 594-601.

76. Cillo, U., et al., Identifying risk profiles in liver transplant candidates and implications for induction immunosuppression. Transplantation Reviews, 2018. 32(3): p. 142-150.

77. Cinelli, P., et al., Translational research: what is the value of experimental studies in comparison with clinical studies to help understand clinical problems? European Journal of Trauma and Emergency Surgery, 2018. 44(5): p. 645-647.

78. Collet, C., et al., Coronary computed tomography angiography for heart team decision-making in multivessel coronary artery disease. European Heart Journal, 2018. 39(41): p. 3689-3698.

79. Cosgun, T., et al., Single-center experience with intraoperative extracorporeal membrane oxygenation use in lung transplantation. The International Journal of Artificial Organs, 2018. 41(2): p. 89-93.

80. Cottini, S.R., et al., Pulmonary hypertension is not a risk factor for grade 3 primary graft dysfunction after lung transplantation. Clinical Transplantation, 2018. 32(5): p. e13251.

81. Crijns, T.J., et al., Reliability of the classification of proximal femur fractures: Does clinical experience matter? Injury, 2018. 49(4): p. 819-823.

82. Cuevas, O., V. Savic, and C.A. Mestres, Our Heritage: A compact history of Cardiac Surgery by Arkalgud Sampath Kumar and Gerald Rainer. Asian Cardiovascular and Thoracic Annals, 2018. 26(5): p. 423-423.

83. Cuevas, O., et al., The grandparent and the grandchild separated by 50 years sharing the left ventricular outflow tract. European Heart Journal, 2018. 39(5): p. 410-410.

84. Davidovic, L., et al., Late Complication after Thoracic Endovascular Aortic Repair what is the Role of an Open Surgical Conversion. Annals of Vascular Surgery, 2018. 47: p. 238-246.

85. De Backer, O., et al., Usefulness of Transcatheter Aortic Valve Implantation for Treatment of Pure Native Aortic Valve Regurgitation. American Journal of Cardiology, 2018. 122(6): p. 1028-1035.

86. de Boer, S.P.M., et al., The European Collaborative Project on inflammation and vascular wall remodeling in Atherosclerosis - Intravascular Ultrasound (ATHEROREMO-IVUS) study. EuroIntervention, 2018. 14(2): p. 194-203.

87. De Carlo, C., U.F. Settimio, and F. Maisano, Mitral valve repair versus MitraClip. Journal of Cardiovascular Medicine, 2018. 19 Suppl: p. e80-e83.

88. De Coninck, V., et al., Ho:YAG laser lithotripsy in non-contact mode: optimization of fiber to stone working distance to improve ablation efficiency. World Journal of Urology, 2018: p. Epub ahead of print.

89. De Coninck, V., et al., Evaluation of a Portable Urinary pH Meter and Reagent Strips. Journal of Endourology, 2018. 32(7): p. 647-652.

90. De Maat, G.E., et al., Impact of Thoracoscopic Pulmonary Vein Isolation on Right Ventricular Function: A Pilot Study. BioMed Research International, 2018. 2018: p. 7392435.

91. de Rougemont, O., et al., Acute Rejection of a Duodenal Graft. American Journal of Gastroenterology, 2018. 113: p. 937.

92. De Silvestro, A., et al., Postoperative imaging of orthopaedic hardware in the hand and wrist: is there an added value for tomosynthesis? Clinical Radiology, 2018. 73(2): p. 214.e1-214.e9.

93. Del Forno, B., et al., Recent advances in managing tricuspid regurgitation. F1000Research, 2018. 7: p. 355.

94. Denegri, A., et al., Real-world procedural and 30 day outcome using the portico transcatheter aortic valve prosthesis A large single center cohort. International Journal of Cardiology, 2018. 253: p. 40-44.

95. Diehl, P., et al., The effect of oxygen in Sirt3-mediated myocardial protection: a proof-of-concept study in cultured cardiomyoblasts. Journal of Thrombosis and Thrombolysis, 2018. 46(1): p. 102-112.

96. Döbelin, Q., et al., Foudroyant wachsende orale Metastase. Die Quintessenz, 2018. 69(8): p. 922-926.

97. Dutkowski, P. and P.-A. Clavien, Uploading cellular batteries: Caring for mitochondria is key. Liver Transplantation, 2018. 24(4): p. 462-464.

98. Eberli, D., et al., Increased autophagy contributes to impaired smooth muscle function in neurogenic lower urinary tract dysfunction. Neurourology and Urodynamics, 2018. 37(8): p. 2414-2424.

99. Eisenberger, U., et al., Histological findings to five years after early conversion of kidney transplant patients from cyclosporine to everolimus: an analysis from the randomized ZEUS study. BMC Nephrology, 2018. 19(1): p. 154.

100. Elmer, A., et al., Extended-criteria donors in lung transplantation in Switzerland: an evaluation of two adapted lung donor scores. Swiss Medical Weekly, 2018. 148: p. w14614.

101. Emmert, M.Y., Christiaan Barnard-The Surgeon Who Dared. European Heart Journal, 2018. 39(23): p. 2133-2134.

102. Emmert, M.Y., et al., Computational modeling guides tissue-engineered heart valve design for long-term *in vivo* performance in a translational sheep model. Science Translational Medicine, 2018. 10(440): p. eaan4587.

103. Enz, N., et al., Carcinoembryonic antigen-positive pleural effusion in early stage non-small cell lung cancer without pleural infiltration. Journal of Thoracic Disease, 2018. 10(5): p. E340-E343.

104. Erichsen, L., et al., Aberrant methylated key genes of methyl group metabolism within the molecular etiology of urothelial carcinogenesis. Scientific Reports, 2018. 8(1): p. 3477.

105. Eschbach, D., et al., Hypothermia does not influence liver damage and function in a porcine polytrauma model. Technology and Health Care, 2018. 26(2): p. 209-221.

106. Eshmuminov, D., et al., Reply to "*Ex situ* normothermic machine perfusion of donor livers using a haemoglobin-based oxygen carrier: a viable alternative to red blood cells". Transplant International, 2018. 31(11): p. 1283-1284.

107. Eshmuminov, D., et al., Perfusion settings and additives in liver normothermic machine perfusion with red blood cells as oxygen carrier. A systematic review of human and porcine perfusion protocols. Transplant International, 2018. 31(9): p. 956-969.

108. Eshmuminov, D., et al., Systematic review and meta-analysis of postoperative pancreatic fistula rates using the updated 2016 International Study Group Pancreatic Fistula definition in patients undergoing pancreatic resection with soft and hard pancreatic texture. HPB, 2018. 20(11): p. 992-1003.

109. Evangelista Vaz, R., et al., Preliminary pharmacokinetics of tramadol hydrochloride after administration via different routes in male and female B6 mice. Vet Anaesth Analg, 2018. 45(1): p. 111-122.

110. Evangelista-Vaz, R., et al., Analgesic Efficacy of Subcutaneous–Oral Dosage of Tramadol after Surgery in C57BL/6J Mice. Journal of the American Association for Laboratory Animal Science (Jaalas), 2018. 57(4): p. 368-375.

111. Evangelista-Vaz, R., et al., Analgesic Efficacy of Subcutaneous-Oral Dosage of Tramadol after Surgery in C57BL/6J Mice. J Am Assoc Lab Anim Sci, 2018. 57(4): p. 368-375.

112. Faletra, F.F., et al., Echocardiographic-fluoroscopic fusion imaging for transcatheter mitral valve repair guidance. European Heart Journal. Cardiovascular Imaging, 2018. 19(7): p. 715-726.

113. Fankhauser, C.D., et al., Re: Sophia C. Kamran, Thomas Seisen, Sarah C. Markt, et al. Contemporary treatment patterns and outcomes for clinical stage IS testicular cancer. Eur Urol. In press. http://dx.doi.org/10.1016/j.eururo.2017.06.013. European Urology, 2018. 73(4): p. e94-e95.

114. Fankhauser, C.D., et al., Extracorporeal shock wave lithotripsy versus flexible ureterorenoscopy in the treatment of untreated renal calculi. Clinical Kidney Journal, 2018: p. sfx151.

115. Fankhauser, C.D., et al., Prevalence of hypertension and diabetes after exposure to extracorporeal shock-wave lithotripsy in patients with renal calculi: a retrospective non-randomized data analysis. International urology and nephrology, 2018. 50(7): p. 1227-1233.

116. Fankhauser, C.D. and H. Mostafid, Prevention of bladder cancer incidence and recurrence: nutrition and lifestyle. Current Opinion in Urology,

2018. 28(1): p. 88-92.

117. Fankhauser, C.D., et al., Improved survival in metastatic germ-cell cancer. Annals of Oncology, 2018. 29(2): p. 347-351.

118. Fankhauser, C.D., et al., Systemic inflammatory markers have independent prognostic value in patients with metastatic testicular germ cell tumours undergoing first-line chemotherapy. British Journal of Cancer, 2018. 118(6): p. 825-830.

119. Fankhauser, C.D., et al., Comprehensive immunohistochemical analysis of PD-L1 shows scarce expression in castration-resistant prostate cancer. OncoTarget, 2018. 9(12): p. 10284-10293.

120. Felley-Bosco, E., Special Issue on Mechanisms of Mesothelioma Heterogeneity: Highlights and Open Questions. International Journal of Molecular Sciences, 2018. 19(11): p. E3560-E3560.

121. Felley-Bosco, E. and M. MacFarlane, Asbestos: Modern Insights for Toxicology in the Era of Engineered Nanomaterials. Chemical Research in Toxicology, 2018. 31(10): p. 994-1008.

122. Felley-Bosco, E. and H. Rehrauer, Non-Coding Transcript Heterogeneity in Mesothelioma: Insights from Asbestos-Exposed Mice. International Journal of Molecular Sciences, 2018. 19(4): p. 1163.

123. Ferrari, E., et al., Suitability of 3D-Printed Root Models for the Development of Transcatheter Aortic Root Repair Technologies. ASAIO Journal, 2018: p. Epub ahead of print.

124. Ferrari, E., et al., Clinical Experience in Minimally Invasive Cardiac Surgery With Virtually Wall-Less Venous Cannulas. Innovations : Technology And Techniques In Cardiothoracic And Vascular Surgery, 2018. 13(2): p. 104-107.

125. Ferrari, R., et al., Complication rate in mandibular angle fractures-one vs. two plates: a 12-year retrospective analysis. Oral and Maxillofacial Surgery, 2018. 22(4): p. 435-441.

126. Ferrero Guadagnoli, A., et al., Cardioband system as a treatment for functional mitral regurgitation. Expert Review of Medical Devices, 2018. 15(6): p. 415-421.

127. Feturi, F.G., et al., Mycophenolic Acid for Topical Immunosuppression in Vascularized Composite Allotransplantation: Optimizing Formulation and Preliminary Evaluation of Bioavailability and Pharmacokinetics. Frontiers in Surgery, 2018. 5: p. 20.

128. Fioretta, E.S., et al., The future of heart valve replacement: recent developments and translational challenges for heart valve tissue engineering. Journal of Tissue Engineering and Regenerative Medicine, 2018. 12(1): p. e323-e335.

129. Fischer, Q., et al., Impact of Preexisting Left Bundle Branch Block in Transcatheter Aortic Valve Replacement Recipients. Circulation. Cardiovascular Interventions, 2018. 11(11): p. e006927.

130. Franke, A., et al., Notfallmanagement bei Beckenverletzungen: Blutstillung, in Schwerverletztenversorgung : Diagnostik und Therapie der ersten 24 Stunden, S. Flohé and et al., Editors. 2018, Georg Thieme Verlag: Stuttgart. p. 165-173.

131. Fransen, L., et al., FA01.02: The effect of postoperative complications after mie on long-term survival: a retrospective, multi-center cohort study. Diseases of the Esophagus, 2018. 31(13): p. 1.

132. Franzen, D.P. and W. Weder, Lung volume reduction-a great chance for emphysema patients! Journal of Thoracic Disease, 2018. 10(Suppl 23): p. S2696-S2697.

133. Frueh, F.S., et al., Prevascularization of dermal substitutes with adipose tissue-derived microvascular fragments enhances early skin grafting. Scientific Reports, 2018. 8: p. 10977.

134. Fuetterer, M., et al., Quantitative myocardial first-pass cardiovascular magnetic resonance perfusion imaging using hyperpolarized [1-(13)C] pyruvate. J Cardiovasc Magn Reson, 2018. 20(1): p. 73.

135. Gachabayov, M., et al., Resection with primary anastomosis vs nonrestorative resection for perforated diverticulitis with peritonitis: a systematic review and meta-analysis. Colorectal Disease, 2018. 20(9): p. 753-770.

136. Galata, C., et al., Clinical and histopathologic features of colorectal adenocarcinoma in crohn's disease. Journal of Clinical Gastroenterology, 2018. 52(7): p. 635-640.

137. Galata, C., et al., Impact of adjuvant chemotherapy on patients with ypT0–2 ypN0 rectal cancer after neoadjuvant chemoradiation: a cohort study from a tertiary referral hospital. World Journal of Surgical Oncology, 2018. 16(1): p. 156.

138. Galata, C., et al., Risk factors for early postoperative complications and length of hospital stay in ileocecal resection and right hemicolectomy for Crohn's disease: a single-center experience. International journal of colorectal disease, 2018. 33(7): p. 937-945.

139. Gander, T., et al., Intraoperative 3-dimensional cone beam computed tomographic imaging during reconstruction of the zygoma and orbit. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology, 2018. 126(2): p. 192-197.

140. George, J., et al., Integrative genomic profiling of large-cell neuroendocrine carcinomas reveals distinct subtypes of high-grade neuroendocrine lung tumors. Nature Communications, 2018. 9(1): p. 1048.

141. Gerber, P.A., et al., Islet transplantation as safe and efficacious method to restore glycemic control and to avoid severe hypoglycemia after donor organ failure in pancreas transplantation. Clinical Transplantation, 2018. 32(1): p. e13153.

142. Gero, D., B. Hulesch, and M. Bueter, Mindset and Communication Barriers in the Diffusion of Bariatric Surgery. Current Atherosclerosis Reports, 2018. 20(8): p. 38.

143. Gero, D., et al., Appetite, Glycemia, and Entero-Insular Hormone Responses Differ Between Oral, Gastric-Remnant, and Duodenal Administration of a Mixed-Meal Test After Roux-en-Y Gastric Bypass. Diabetes Care, 2018. 41(6): p. 1295-1298.

144. Ghayor, C. and F.E. Weber, Osteoconductive Microarchitecture of Bone Substitutes for Bone Regeneration Revisited. Frontiers in Physiology, 2018. 9: p. 960.

145. Giesen, T., O. Politiku, and M. Calcagni, Strategies in compound hand injuries, in Fractures of the Hand and Carpus: FESSH 2018 Instructional Course Book, M. Boeckstyns and M. Richter, Editors. 2018, Georg Thieme Verlag: Stuttgart. p. 20-29.

146. Giesen, T., et al., Flexor tendon repair in the hand with the M-Tang technique (without peripheral sutures), pulley division, and early active motion. Journal of Hand Surgery, European Volume, 2018. 43(5): p. 474-479.

147. Godino, C., et al., Observed versus predicted mortality after MitraClip treatment in patients with symptomatic heart failure and significant functional mitral regurgitation. European Journal of Heart Failure, 2018. 20(10): p. 1495-1496.

148. Godino, C., et al., Two-year cardiac mortality after MitraClip treatment of functional mitral regurgitation in ischemic and non-ischemic dilated cardiomyopathy. International Journal of Cardiology, 2018. 269: p. 33-39.

149. Gorecka, A., et al., Autologous transplantation of adipose-derived stem cells improves functional recovery of skeletal muscle without direct participation in new myofiber formation. Stem Cell Research & Therapy, 2018. 9(1): p. 195.

150. Greven, J., et al., Update on the role of endothelial cells in trauma. European Journal of Trauma and Emergency Surgery, 2018. 44(5): p. 667-677.

151. Griessenauer, C., et al., Image-guided, Minimally Invasive Evacuation of Intracerebral Hematoma: A Matched Cohort Study Comparing the Endoscopic and Tubular Exoscopic Systems. Cureus, 2018. 10(11): p. e3569.

152. Group, E.S.o.C.C., et al., The impact of stapling technique and surgeon specialism on anastomotic failure after right-sided colorectal resection: an international multicentre, prospective audit. Colorectal Disease, 2018. 20(11): p. 1028-1040.

153. Grünherz, L., et al., Early computed tomography or focused assessment with sonography in abdominal trauma: what are the leading opinions? European Journal of Trauma and Emergency Surgery, 2018. 44(1): p. 3-8.

154. Gubler, C., et al., Preemptive endoluminal vacuum therapy to reduce anastomotic leakage after esophagectomy: a game-changing approach? Diseases of the Esophagus, 2018: p. Epub ahead of print.

155. Guidi, M., et al., Modified Suzuki Technique With Cable-Ties for Unstable Fracture-Dislocations of the Proximal Interphalangeal Joint. Techniques in Hand & Upper Extremity Surgery, 2018. 22(1): p. 34-35.

156. Gulati, P., et al., Aberrant Lck Signal via CD28 Costimulation Augments Antigen-Specific Functionality and Tumor Control by Redirected T Cells with PD-1 Blockade in Humanized Mice. Clinical Cancer Research, 2018. 24(16): p. 3981-3993.

157. Guo, T., et al., Multi-region proteome analysis quantifies spatial heterogeneity of prostate tissue biomarkers. Life Science Alliance, 2018. 1(2): p. e201800042.

158. Gutschow, C.A., Aktuelle Entwicklungen der Chirurgischen Therapie des Oesophagus- und Magenkarzinoms. Schweizer Krebs-Bulletin = Bulletin Suisse du Cancer, 2018: p. 345-349.

159. Gutschow, C.A., Response to: “Letter to editor: ‘Defining Benchmarks for Transthoracic Esophagectomy: A Multicenter Analysis of Total Minimally Invasive Esophagectomy in Low-risk Patients”’. Annals of Surgery, 2018: p. Epub ahead of print.

160. Gutschow, C.A. and H. Schmidt, Speiseröhrendivertikel (ohne krikopharyngeale Divertikel). Der Chirurg, 2018. 89(5): p. 401-412.

161. Haime, M., et al., Relationship between intra-operative vein graft treatment with DuraGraft® or saline and clinical outcomes after coronary artery bypass grafting. Expert Review of Cardiovascular Therapy, 2018. 16(12): p. 963-970.

162. Halvachizadeh, S. and H.-C. Pape, Indications and Decision Making in Lower Extremity Amputations: Has Anything Changed in the Era of Microvascular Soft Tissue and Bone Regeneration Techniques?, in Current Trauma Reports, G.G. Velmahos, Editor. 2018, Springer: Switzerland. p. 241-246.

163. Hammerle, D., et al., Comparison of intraoperative 2D vs. 3D imaging in open reduction and fixation of distal radius fractures. European Journal of Trauma and Emergency Surgery, 2018: p. Epub ahead of print.

164. Haralampieva, D., et al., Injected Human Muscle Precursor Cells Overexpressing PGC-1a Enhance Functional Muscle Regeneration after Trauma. Stem Cells International, 2018. 2018: p. 1-11.

165. Hauer, T., et al., Abdominaltrauma, in Schwerverletztenversorgung : Diagnostik und Therapie der ersten 24 Stunden, S. Flohé and et al., Editors. 2018, Georg Thieme Verlag: Stuttgart. p. 133-164.

166. Hausleiter, J., et al., Patient selection, echocardiographic screening and treatment strategies for interventional tricuspid repair using the edge-to-edge repair technique. EuroIntervention, 2018. 14(6): p. 645-653.

167. Heining, S., Skidaumen operativ, in Nachbehandlungsempfehlungen, U. Deutsche Gesellschaft für Orthopädie und and J. Schmidt, Editors. 2018, DGOU: Berlin. p. 112.

168. Heining, S., Humeruskopf- und proximale Humerusfraktur, konservativ, in Nachbehandlungsempfehlungen, U. Deutsche Gesellschaft für Orthopädie und and J. Schmidt, Editors. 2018, DGOU: Berlin. p. 32-33.

169. Heining, S., Kyphoplastie bei osteoporotischer Sinterung/WK-Fraktur, in Nachbehandlungsempfehlungen, U. Deutsche Gesellschaft für Orthopädie und and J. Schmidt, Editors. 2018, DGOU: Berlin. p. 96-98.

170. Heining, S., Femurfraktur distal, operativ, in Nachbehandlungsempfehlungen, U. Deutsche Gesellschaft für Orthopädie und and J. Schmidt, Editors. 2018, DGOU: Berlin. p. 62-63.

171. Heining, S., Achillessehnenruptur, konservative Therapie, in Nachbehandlungsempfehlungen, U. Deutsche Gesellschaft für Orthopädie und

and J. Schmidt, Editors. 2018, DGOU: Berlin. p. 114-115.

172. Heining, S.M., et al., The initial trauma associated hemorrhagic shock in the multiply injured patient has pro-inflammatory effects. A retrospective single center cohort study. Trauma and Emergency Care, 2018. 3(4): p. 1-5.

173. Herbold, T., et al., Endoscopic Treatment of Transesophageal Echocardiography-Induced Esophageal Perforation. Journal of laparoendoscopic & advanced surgical techniques. Part A, 2018. 28(4): p. 422-428.

174. Hierholzer, C., et al., Entwicklung und Prinzipien der Verriegelungsmarknagelung. Der Unfallchirurg, 2018. 121(3): p. 239-255.

175. Hingsammer, L., et al., Biomechanical testing of zirconium dioxide osteosynthesis system for Le Fort I advancement osteotomy fixation. Journal of the Mechanical Behavior of Biomedical Materials, 2018. 77: p. 34-39.

176. Hingsammer, L., et al., Single tooth implants in the esthetic zone following a two-stage all flapless approach: A retrospective Analysis. Clinical Implant Dentistry and Related Research, 2018. 20(6): p. 929-936.

177. Hirsch, D., et al., Dynamics of Genome Alterations in Crohn's Disease–Associated Colorectal Carcinogenesis. Clinical Cancer Research, 2018. 24(20): p. 4997-5011.

178. Hodel, L., et al., Urokinase application for hemothorax in pulmonary mucormycosis. Journal of Thoracic Disease, 2018. 10(3): p. E175-E178.

179. Hofmann, M., et al., Early outcomes with a single-sided access endovascular stent. Journal of Vascular Surgery, 2018. 68(1): p. 83-90.e2.

180. Horisberger, K., et al., and European Society of Coloproctology collaborating group, Risk factors for unfavourable postoperative outcome in patients with Crohn's disease undergoing right hemicolectomy or ileocaecal resection an international audit by ESCP and S-ECCO. Colorectal Disease, 2018. 20(3): p. 219-227.

181. Hosseinpour, A.-R., et al., Age is not a good predictor of irreversibility of pulmonary hypertension in congenital cardiac malformations with left-to-right shunt. Congenital Heart Disease, 2018. 13(2): p. 210-216.

182. Huber, G.F., et al., Benefit of 18F-fluorocholine PET imaging in parathyroid surgery. European Radiology, 2018. 28(6): p. 2700-2707.

183. Husmann, L., et al., The role of FDG PET/CT in therapy control of aortic graft infection. European Journal of Nuclear Medicine and Molecular Imaging, 2018. 45(11): p. 1987-1997.

184. Inci, I., et al., Lung Transplantation with Controlled Donation after Circulatory Death Donors. Annals of thoracic and cardiovascular surgery : official journal of the Association of Thoracic and Cardiovascular Surgeons of Asia, 2018. 24(6): p. 296-302.

185. Inci, I., et al., Previous lung volume reduction surgery does not negatively affect survival after lung transplantation. European Journal of Cardio-Thoracic Surgery, 2018. 53(3): p. 596-602.

186. Iskender, I., et al., Cytokine filtration modulates pulmonary metabolism and edema formation during *ex vivo* lung perfusion. Journal of Heart and Lung Transplantation, 2018. 37(2): p. 283-291.

187. Jacky, A., et al., Comparison of Levosimendan and Milrinone for ECLS Weaning in Patients After Cardiac Surgery-A Retrospective Before-and-After Study. Journal of Cardiothoracic and Vascular Anesthesia, 2018. 32(5): p. 2112-2119.

188. Jahren, S.E., et al., Transvalvular Pressure Gradients for different Methods of Mitral Valve Repair only Neochordoplasty achieves native Valve Gradients. Interactive Cardiovascular and Thoracic Surgery, 2018. 26(2): p. 248-255.

189. Janker, F., et al., Preclinical, non-genetic models of lung adenocarcinoma: a comparative survey. OncoTarget, 2018. 9(55): p. 30527-30538.

190. Jann, D., et al., Retrograde fixation of metacarpal fractures with intramedullary cannulated headless compression screws. Hand Surgery and Rehabilitation, 2018. 37(2): p. 99-103.

191. Jentzsch, T., et al., Is rivaroxaban associated with higher morbidity and mortality in patients with traumatic head injuries? A retrospective cohort study comparing rivaroxaban, no anticoagulation, and phenprocoumon. Clinical Neurology and Neurosurgery, 2018. 169: p. 116-120.

192. Jentzsch, T., et al., Predictors for shorter and longer length of hospital stay outliers: a retrospective case-control study of 8247 patients at a university hospital trauma department. Swiss Medical Weekly, 2018. 148: p. w14650.

193. Jirkof, P., M. Arras, and N. Cesarovic, Tramadol:Paracetamol in drinking water for treatment of post-surgical pain in laboratory mice. Applied Animal Behaviour Science, 2018. 198: p. 95-100.

194. Johnson, T.G., et al., Dysregulated Expression of the MicroRNA miR-137 and Its Target YBX1 Contribute to the Invasive Characteristics of Malignant Pleural Mesothelioma. Journal of Thoracic Oncology, 2018. 13(2): p. 258-272.

195. Jukema, G.N., et al., Posttraumatische Osteomyelitis: bessere Behandlungsergebnisse durch innovative Vakuumversiege-lungstechnik mit Instillationstherapie. Praxis, 2018. 107(19): p. 1015-1020.

196. Jungraithmayr, W., Lung segmentectomy—an underappreciated procedure in thoracic surgery. Shanghai Chest, 2018: p. 12.

197. Jungraithmayr, W. and N. Enz, CD26 - The emerging role of a costimulatory molecule in allograft rejection. Cellular & Molecular Immunology, 2018: p. Epub ahead of print.

198. Kalbas, Y., et al., Early local microcirculation is improved after intramedullary nailing in comparison to external fixation in a porcine model with a femur fracture. European Journal of Trauma and Emergency Surgery, 2018. 44(5): p. 689-696.

199. Kambakamba, P., et al., Novel Benefits of Remote Ischemic Preconditioning Through VEGF-dependent Protection From Resection-induced Liver Failure in the Mouse. Annals of Surgery, 2018. 268(5): p. 885-893.

200. Kambakamba, P., et al., Impact of associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) on growth of colorectal

liver metastases. Surgery, 2018. 163(2): p. 311-317.

201. Kaserer, A., et al., Comparison of two different coagulation algorithms on the use of allogenic blood products and coagulation factors in severely injured trauma patients: a retrospective, multicentre, observational study. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 2018: p. 26:4.

202. Keller, E.X., et al., Prognostic value of unifocal and multifocal positive surgical margins in a large series of robot-assisted radical prostatectomy for prostate cancer. World Journal of Urology, 2018: p. Epub ahead of print.

203. Kenkel, D., et al., Magnetisation transfer as a biomarker for chronic airway fibrosis in a mouse lung transplantation model. European radiology experimental, 2018. 2(1): p. 3.

204. Kerr, K.M., et al., Prevalence and clinical association of gene mutations through Multiplex Mutation Testing in patients with NSCLC: Results from the ETOP Lungscape Project. Annals of Oncology, 2018. 29(1): p. 200-208.

205. Kim, T.-H., et al., The comprehensive complication index (CCI) is a more sensitive complication index than the conventional Clavien-Dindo classification in radical gastric cancer surgery. Gastric Cancer, 2018. 21(1): p. 171-181.

206. Klein, H.J., The International Fellowship Program in Microsurgery at Uppsala University Hospital: A Paragon Throughout Europe. Annals of Plastic Surgery, 2018. 81(2): p. 137-139.

207. Klein, H.J., et al., Screening of HLA sensitization during acute burn care. Burns, 2018. 44(5): p. 1330-1335.

208. Klos, K., et al., Soft tissue microcirculation around the healthy Achilles tendon: a cross-sectional study focusing on the Achilles tendon and dorsal surgical approaches to the hindfoot. Journal of Orthopaedic Surgery and Research, 2018. 13(1): p. 142.

209. Knobe, M., et al., Evaluation of a simple screening tool for ambulant fall prevention. Der Unfallchirurg, 2018. 121(11): p. 901-910.

210. Kobe, A., et al., Primary Endovascular Elective Repair and Repair of Ruptured Isolated Iliac Artery Aneurysms Is Durable-Results of 72 Consecutive Patients. Journal of Vascular and Interventional Radiology, 2018. 29(12): p. 1725-1732.

211. Kochman, J., et al., First serial optical Coherence Tomography Assessment at baseline, 12 and 24 months in STEMI patients treated with the second generation ABSORB™ Bioresorbable Vascular Scaffold. EuroIntervention, 2018. 13(18): p. 2201-2209.

212. König, M.A., et al., In-screw cement augmentation for iliosacral screw fixation in posterior ring pathologies with insufficient bone stock. European Journal of Trauma and Emergency Surgery, 2018. 44(2): p. 203-210.

213. Kotecha, D., et al., Integrating new approaches to atrial fibrillation management: the 6th AFNET/EHRA Consensus Conference. Europace, 2018. 20(3): p. 395-407.

214. Kozomara, M., et al., Detrusor contraction during rapid bladder filling: Caused by cold or warm water? A randomized controlled double-blind trial. Journal of Urology, 2018. 199(1): p. 223-228.

215. Kranzbühler, B., et al., Clinical performance of (68)Ga-PSMA-11 PET/MRI for the detection of recurrent prostate cancer following radical prostatectomy. European Journal of Nuclear Medicine and Molecular Imaging, 2018. 45(1): p. 20-30.

216. Kranzbühler, B., et al., Pharmacological upregulation of prostate-specific membrane antigen (PSMA) expression in prostate cancer cells. The Prostate, 2018. 78(10): p. 758-765.

217. Kresoja-Rakic, J. and E. Felley-Bosco, Desthiobiotin-Streptavidin-Affinity Mediated Purification of RNA-Interacting Proteins in Mesothelioma Cells. Journal of Visualized Experiments (Jove), 2018(134): p. online.

218. Kron, P., et al., Hypothermic oxygenated perfusion (HOPE) for fatty liver grafts in rats and humans. Journal of Hepatology, 2018. 68(1): p. 82-91.

219. Kuemmerli, C., et al., When Shunts Erode—Duodenal Perforation by a Mesocaval Gore-Tex Shunt. Journal of Gastrointestinal Surgery, 2018. 22(12): p. 2179-2181.

220. Kumar, T.R., Fshb Knockout Mouse Model, Two Decades Later and Into the Future. Endocrinology, 2018. 159(5): p. 1941-1949.

221. Kuwata, S., et al., Left atrial appendage closure for primary primary prevention during percutaneous closure of septal defects in patients with large Atria but no Atrial Fibrillation. Cardiology Journal, 2018. 25(2): p. 179-187.

222. Kuwata, S., et al., Transcatheter mitral annuloplasty in Barlow's mitral regurgitation with deep cleft. JACC. Cardiovascular interventions, 2018. 11(12): p. e97-e98.

223. Labgaa, I., et al., Liver resection for metastases not of colorectal, neuroendocrine, sarcomatous, or ovarian (NCNSO) origin: A multicentric study. American Journal of Surgery, 2018. 215(1): p. 125-130.

224. Lacour, M., et al., Postoperative complications and management after lung volume reduction surgery. Journal of Thoracic Disease, 2018. 10(Suppl 23): p. S2775-S2779.

225. Laffon, E., et al., Comparison of three-parameter kinetic model analysis to standard Patlak's analysis in F-FDG PET imaging of lung cancer patients. EJNMMI Research, 2018. 8: p. 24.

226. Lang, B.M., et al., Genetic polymorphisms associated with smoking behaviour predict the risk of surgery in patients with Crohn's disease. Alimentary Pharmacology & Therapeutics, 2018. 47(1): p. 55-66.

227. Langiewicz, M., et al., JNK1 induces hedgehog signaling from stellate cells to accelerate liver regeneration in mice. Journal of Hepatology, 2018. 69(3): p. 666-675.

228. Lauk, O. and I. Opitz, Patient selection for radical surgery for mesothelioma—prognostic factors in a multimodality approach. Shanghai Chest, 2018: p. 2:73.

229. Lautenbach, N., et al., Prevalence and causes of abnormal PSA recovery. Clinical Chemistry and Laboratory Medicine, 2018. 56(2): p. 341-349.

230. Lee, D.D., et al., DNA hypermethylation within TERT promoter upregulates TERT expression in cancer. Journal of Clinical Investigation, 2018. 129(1): p. 1801.

231. Letovanec, I., et al., Evaluation of NGS and RT-PCR methods for ALK rearrangement in European NSCLC patients: results from the ETOP Lungscape Project. Journal of Thoracic Oncology, 2018. 13(3): p. 413-425.

232. Limani, P., H. Petrowsky, and C. Gubler, Pankreas-Karzinom – Was Der Hausarzt Wissen Muss. Der informierte @rzt, 2018(11): p. 27-31.

233. Linecker, M., et al., Exercise Improves Outcomes of Surgery on Fatty Liver in Mice. Annals of Surgery, 2018: p. Epub ahead of print.

234. Linecker, M., et al., Potentially inappropriate liver transplantation in the era of the “sickest first” policy – A search for the upper limits. Journal of Hepatology, 2018. 68(4): p. 798-813.

235. Lintas, V., et al., Development of a Novel Human Cell-Derived Tissue-Engineered Heart Valve for Transcatheter Aortic Valve Replacement: an *In Vitro* and *In Vivo* Feasibility Study. J Cardiovasc Transl Res, 2018. 11(6): p. 470-482.

236. Lipiski, M.F., T.; Sauer, M.; Cesarovic, N., Fluoroscopy-guided removal of a bitten endotracheal tube in an adult sheep. Vet Rec Case Rep 2018(6): p. e000614.

237. Liu, T., et al., Patients with abdominal-based free flap breast reconstruction a decade after surgery: A comprehensive long-term follow-up study. Journal of Plastic, Reconstructive & Aesthetic Surgery, 2018. 71(9): p. 1301-1309.

238. Liungman, K., et al., Safety and Functionality of a Guidewire Fixator: Clinical Investigation of a New Endovascular Tool. Innovations : Technology And Techniques In Cardiothoracic And Vascular Surgery, 2018. 13(1): p. 51-53.

239. Luz, J., et al., 3D-evaluation of the maxillary sinus in cone-beam computed tomography. International Journal of Implant Dentistry, 2018. 4: p. 17.

240. Luz, J., et al., Komplikationen nach oralchirurgischen Eingriffen: Blutungen. Die Quintessenz, 2018. 69(4): p. 414-424.

241. Luz, J., et al., Oral manifestation of Langerhans cell histiocytosis: a case report. BMC Oral Health, 2018. 18(1): p. 106.

242. Maeder, M.T., et al., Pulmonary hypertension in aortic and mitral valve disease. Frontiers in cardiovascular medicine, 2018. 5: p. 40.

243. Maisano, F. and F. Ruschitzka, Mitral Interventions in Heart Failure time to deliver on the promise. European Journal of Heart Failure, 2018. 20(3): p. 609-611.

244. Maisano, F. and M. Taramasso, Transcatheter tricuspid valve therapies: exploring the dark side of the moon. European Journal of Heart Failure, 2018. 20(6): p. 1063-1065.

245. Maisano, F., et al., Early commercial experience from transcatheter aortic valve implantation using the Portico™ bioprosthetic valve: 30-day outcomes in the multicentre PORTICO-1 study. EuroIntervention, 2018. 14(8): p. 886-893.

246. Mandelli, F., et al., Medial Acetabular Wall Breach in Total Hip Arthroplasty - Is Full-Weight Bearing Possible? Orthopaedics & Traumatology, Surgery & Research (OTSR), 2018. 104(5): p. 675-679.

247. Mannil, M., et al., Prediction of successful shock wave lithotripsy with CT: a phantom study using texture analysis. Abdominal Radiology, 2018. 43(6): p. 1432-1438.

248. Mannil, M., et al., Three dimensional texture analysis with machine learning provides incremental predictive information for successful shock wave lithotripsy in patients with kidney stones. Journal of Urology, 2018. 200(4): p. 829-836.

249. Marino, B.C.A., et al., Adiponectin in Relation to Coronary Plaque Characteristics on Radiofrequency Intravascular Ultrasound and Cardiovascular Outcome. Arquivos Brasileiros de Cardiologia, 2018. 111(3): p. 345-353.

250. Massari, L., et al., Can Clinical and Surgical Parameters Be Combined to Predict How Long It Will Take a Tibia Fracture to Heal? A Prospective Multicentre Observational Study: The FRACTING Study. BioMed Research International, 2018: p. 1809091.

251. Mauron, S., et al., Anesthetic Management for Concomitant Correction of Congenital Cardiac Defects and Long “O” Ring Tracheal Stenosis: A Role for Heliox?: Report of 2 Cases. A & A Practice, 2018. 10(6): p. 154-156.

252. McPherson, D., et al., The Effect of Human-Immunodeficiency Virus Status on Outcomes in Penetrating Abdominal Trauma: An Interim Analysis. World Journal of Surgery, 2018. 42(8): p. 2412-2420.

253. Meerwein, C.M., et al., Contrast-enhanced 18F-FDG-PET/CT for differentiating tumour and radionecrosis in head and neck cancer: our experience in 37 patients. Clinical Otolaryngology, 2018. 43(6): p. 1594-1599.

254. Mehta, S., et al., Is there an oncological interest in the combination of CRS/HIPEC for peritoneal carcinomatosis of HCC? Results of a multicenter international study. European Journal of Surgical Oncology, 2018. 44(11): p. 1786-1792.

255. Mestres, C.A., Resolución quirúrgica de enfermedad renovascular. Cirugía Cardiovascular, 2018. 25(1): p. 51.

256. Mestres, C.A., et al., Hypertrophic obstructive cardiomyopathy: what, when, why, for whom? European Journal of Cardio-Thoracic Surgery, 2018. 53(4): p. 700-707.

257. Mestres, C.A. and A. Weber, How do we follow up our Patients? Reporting Outcomes without complete Follow-up Data renders us on the weak Side. Journal of Thoracic and Cardiovascular Surgery, 2018. 155(2): p. 586-587.

258. Miclau, T., et al., Current Status of Musculoskeletal Trauma Care Systems Worldwide. Journal of Orthopaedic Trauma, 2018. 32(Suppl 7): p. S64-S70.

259. Miura, M., et al., Early recurrent mitral regurgitation due to MitraClip migration. European Heart Journal, 2018: p. Epub ahead of print.

260. Mortezavi, A., et al., Diagnostic accuracy of mpMRI and fusion-guided targeted biopsy evaluated by transperineal template saturation prostate biopsy for the detection and characterization of prostate cancer. Journal of Urology, 2018. 200(2): p. 309-318.

261. Motta, S.E., et al., Development of an Off-the-Shelf Tissue-Engineered Sinus Valve for Transcatheter Pulmonary Valve Replacement: a Proof-of-Concept Study. Journal of Cardiovascular Translational Research, 2018. 11(3): p. 182-191.

262. Motta, S.E., et al., Off-the-shelf tissue engineered heart valves for *in situ* regeneration: current state, challenges and future directions. Expert Review of Medical Devices, 2018. 15(1): p. 35-45.

263. Muehlematter, U.J., et al., 68Ga-PSMA PET/MR-positive, histopathology-proven prostate cancer in a patient with negative multiparametric prostate MRI. Clinical Nuclear Medicine, 2018. 43(8): p. e282-e284.

264. Muller, X., et al., Defining Benchmarks in Liver Transplantation: A Multicenter Outcome Analysis Determining Best Achievable Results. Annals of Surgery, 2018. 267(3): p. 419-425.

265. Myers, P., et al., Rotation of the outflow tracts for complex transposition of the great arteries. Multimedia Manual Cardio-Thoracic Surgery, 2018: p. online.

266. Nardi, M., et al., Association between Caregiver Role and Short- and Long-Term Functional Recovery after Hip Fracture: A Prospective Study. Journal of the American Medical Directors Association, 2018. 19(2): p. 122-129.

267. Niclauss, L., et al., Sarcoma of the heart: survival after surgery. Interactive Cardiovascular and Thoracic Surgery, 2018. 27(2): p. 198-201.

268. Noser, J., et al., Mid-term follow-up after surgical treatment of fragility fractures of the pelvis. Injury, 2018. 49(11): p. 2032-2035.

269. Nugraha, B., M.F. Buono, and M.Y. Emmert, Modelling human cardiac diseases with 3D organoid. European Heart Journal, 2018. 39(48): p. 4234-4237.

270. Nwiloh, J., et al., Challenges to Providing Open Heart Surgery for 186 Million Nigerians. Nigerian Journal of Cardiovascular and Thoracic Surgery, 2018. 3(1): p. 8-13.

271. Oberkofler, C.E., et al., Hepatic artery occlusion in liver transplantation: What counts more, the type of reconstruction or the severity of the recipient's disease? Liver Transplantation, 2018. 24(6): p. 790-802.

272. Oechslin, P., et al., Established and potential predictors of blood loss during lung transplant surgery. Journal of Thoracic Disease, 2018. 10(6): p. 3845-3848.

273. Oehl, K., et al., Live-Cell Mesothelioma Biobank to Explore Mechanisms of Tumor Progression. Frontiers in Oncology, 2018. 8: p. 40.

274. Oehl, K., et al., Heterogeneity in Malignant Pleural Mesothelioma. International Journal of Molecular Sciences, 2018. 19(6): p. E1603.

275. Oikonomou, K., et al., Indikationen für den Einsatz von Endoanchors: State of the Art. Zentralblatt für Chirurgie, 2018. 143(5): p. 503-509.

276. Omlin, A., et al., Behandlung des fortgeschrittenen Prostatakarzinoms – eine interdisziplinäre Empfehlung. Praxis, 2018. 107(19): p. 1043-1051.

277. Opitz, I., Anatomy of the Pleura, in Shield's General Thoracic Surgery, 8th edition, J. LoCicero, et al., Editors. 2018, Wolters Kluwer: Philadelphia. p. 706-711.

278. Opitz, I. and D. Schneiter, Moderne Aspekte der Lungenkrebschirurgie. Praxis, 2018. 107: p. 1383-1391.

279. Opitz, I. and S. Ulrich, Pulmonary hypertension in chronic obstructive pulmonary disease and emphysema patients: prevalence, therapeutic options and pulmonary circulatory effects of lung volume reduction surgery. Journal of Thoracic Disease, 2018. 10(S23): p. S2763-S2774.

280. Opitz, I. and W. Weder, Pleural mesothelioma: is the surgeon still there? Annals of Oncology, 2018. 29(8): p. 1710-1717.

281. Osterhoff, G., K. Sprengel, and P. Kobbe, Notfalloperationen: Wirbelsäule, in Schwerverletztenversorgung : Diagnostik und Therapie der ersten 24 Stunden, S. Flohé and et al., Editors. 2018, Georg Thieme Verlag: Stuttgart. p. 223-237.

282. Pallua, N., J. Grasys, and B.-S. Kim, Enhancement of Progenitor Cells by Two-Step Centrifugation of Emulsified Lipoaspirates. Plastic and Reconstructive Surgery, 2018. 142(1): p. 99-109.

283. Pape, H.-C., CORR Insights®: severe hemorrhagic shock leads to a delayed fracture healing and decreased bone callus strength in a mouse model. Clinical Orthopaedics and Related Research, 2018. 476(4): p. 902-903.

284. Pape, H.-C., F. Hildebrand, and S. Ruchholtz, Management des Schwerverletzten, H.-C. Pape, F. Hildebrand, and S. Ruchholtz, Editors. 2018, University of Zurich: Deutschland.

285. Pape, H.-C. and S. Tiziani, Technical Errors and Bail-Out Strategies in Orthopedic Trauma Surgery, in Surgical Patient Safety : A Case-Based Approach, P.F. Stahel, Editor. 2018, McGraw-Hill Education: USA. p. 121-126.

286. Pasic, P., et al., Komplikationen nach oralchirurgischen Eingriffen: Medikamentenassoziierte Kiefernekrosen. Die Quintessenz, 2018. 69(10): p. 1172-1181.

287. Patriki, D., et al., Approximation of the Incidence of Myocarditis by Systematic Screening With Cardiac Magnetic Resonance Imaging. JACC: Heart Failure, 2018. 6(7): p. 573-579.

288. Pavic, M., et al., Influence of inter-observer delineation variability on radiomics stability in different tumor sites. Acta Oncologica, 2018. 57(8): p. 1070-1074.

289. Payne, B., et al., Randomized controlled clinical trial on the antiseptic efficacy of polihexanide 0.04% on acute traumatic wounds. Journal of Hospital Infection, 2018. 98(4): p. 429-432.

290. Pecoraro, F., et al., Mortality Rates and Risk Factors for emergent open Repair of abdominal Aortic Aneurysms in the endovascular Era. Updates in surgery, 2018. 70(1): p. 129-136.

291. Pericàs, J.M., et al., Correction: Outcome of Enterococcus faecalis infective endocarditis according to the length of antibiotic therapy: Preliminary data from a cohort of 78 patients. PLoS ONE, 2018. 13(4): p. e0196317.

292. Pericàs, J.M., et al., Outcome of Enterococcus faecalis infective endocarditis according to the length of antibiotic therapy: Preliminary data from a cohort of 78 patients. PLoS ONE, 2018. 13(2): p. e0192387.

293. Pericàs, J.M., et al., Efficacy and safety of fosfomycin plus imipenem versus vancomycin for complicated bacteraemia and endocarditis due to methicillin-resistant Staphylococcus aureus: a randomized clinical trial. Clinical Microbiology and Infection, 2018. 24(6): p. 673-676.

294. Peterli, R., B.K. Wölnerhanssen, and M. Bueter, Response To “Are Guidelines Tor Standardized Outcome Reporting In Bariatric Surgery Responsible For Missing The Big Picture In Bariatric Surgery Related Major Complications? Annals of Surgery, 2018. 268(1): p. e13-e14.

295. Peterli, R., et al., Effect of Laparoscopic Sleeve Gastrectomy vs Laparoscopic Roux-en-Y Gastric Bypass on Weight Loss in Patients With Morbid Obesity. JAMA : the Journal of the American Medical Association, 2018. 319(3): p. 255-265.

296. Pfister, R., et al., HeartMate 3 implantation via left antero-lateral thoracotomy to avoid resternotomy in high risk patients. Multimedia Manual Cardio-Thoracic Surgery, 2018: p. online.

297. Pieróg, J., et al., Bone marrow stem cells modified with human interleukin 10 attenuate acute rejection in rat lung allotransplantation. European Journal of Cardio-Thoracic Surgery, 2018. 53(1): p. 194-200.

298. Pishnamaz, M., et al., In reply to Mengis et al. Clinical Biomechanics, 2018. 59: p. 212-213.

299. Pishnamaz, M., et al., The quantity of bone cement influences the anchorage of augmented pedicle screws in the osteoporotic spine: A biomechanical human cadaveric study. Clinical Biomechanics, 2018. 52: p. 14-19.

300. Pishnamaz, M., et al., Limitations in clinical outcome after posterior stabilization of thoracolumbar fractures do not correlate with dynamic trunk muscle dysfunction: an ultrasound controlled prospective cohort study. European Journal of Medical Research, 2018: p. 23:26.

301. Pishnamaz, M., et al., Muscular changes after minimally invasive versus open spinal stabilization of thoracolumbar fractures: A literature review. Journal of Musculoskeletal and Neuronal Interactions, 2018. 18(1): p. 62-70.

302. Pizzuto, D.A., et al., The central zone has increased Ga-PSMA-11 uptake: “Mickey Mouse ears” can be hot on Ga-PSMA-11 PET. European Journal of Nuclear Medicine and Molecular Imaging, 2018. 45(8): p. 1335-1343.

303. Plate, A., et al., Aortic endograft infection with Mycobacterium chimaera and Granulicatella adiacens, Switzerland, 2014. Emerging Infectious Diseases, 2018. 24(9): p. 1700-1704.

304. Poggetti, A., et al., Percutaneous Intramedullary Headless Screw Fixation and Anesthesia to Treat Metacarpal Fractures: Early Results in 25 Patients. Journal of Hand and Microsurgery, 2018. 10(1): p. 16-21.

305. Pothmann, C.E.M., et al., Assessment of polytraumatized patients according to the Berlin Definition: Does the addition of physiological data really improve interobserver reliability? PLoS ONE, 2018. 13: p. e0201818.

306. Pothmann, C.E.M., et al., Abdominalverletzungen des polytraumatisierten Erwachsenen. Der Unfallchirurg, 2018. 121(2): p. 159-173.

307. Pozzoli, A., et al., Echo-Fluoro Fusion imaging Guidance for no Contrast transfemoral Aortic Valve Implantation. European Heart Journal. Cardiovascular Imaging, 2018. 19(6): p. 710-711.

308. Pozzoli, A., et al., Echo-navigation to guide challenging transseptal puncture during transfemoral repair of mitral and tricuspid valve. Journal of Cardiovascular Medicine, 2018. 19(2): p. 73-74.

309. Pozzoli, A., et al., Application of cryoenergy to improve septal exposure during transaortic septal myectomy in hypertrophic obstructive cardiomyopathy. General Thoracic and Cardiovascular Surgery, 2018. 66(4): p. 243-245.

310. Pozzoli, A., et al., Comparative anatomy of mitral and tricuspid valve: what can the interventionist learn from the surgeon. Frontiers in cardiovascular medicine, 2018. 5: p. 80.

311. Pozzoli, A., et al., 3D echo-fluoro fusion imaging to guide Cardioband transcatheter mitral annuloplasty. European Heart Journal. Cardiovascular Imaging, 2018. 19(7): p. 827.

312. Prêtre, R., et al., Muscle-sparing extrapleural repair of neonatal aortic coarctation. Multimedia Manual Cardio-Thoracic Surgery, 2018: p. online.

313. Puippe, G.D., et al., Safety of percutaneous axillary artery access with a suture-mediated closing device for parallel endograft aortic procedures - a retrospective pilot study. Vasa, 2018. 47(4): p. 311-317.

314. Qiao, Z., et al., Fracture healing and the underexposed role of extracellular vesicle-based crosstalk. Shock, 2018. 49(5): p. 486-496.

315. Qiao, Z., et al., Analysis of skeletal muscle microcirculation in a porcine polytrauma model with haemorrhagic shock. Journal of Orthopaedic Research, 2018. 36(5): p. 1377-1382.

316. Räber, L., et al., Clinical use of intracoronary imaging. Part 1: guidance and optimization of coronary interventions. An expert consensus document of the European Association of Percutaneous Cardiovascular Interventions. EuroIntervention, 2018. 14(6): p. 656-677.

317. Räber, L., et al., Clinical use of intracoronary imaging. Part 1: guidance and optimization of coronary interventions. An expert consensus document of the European Association of Percutaneous Cardiovascular Interventions. European Heart Journal, 2018. 39(35): p. 3281-3300.

318. Radic, J., et al., Do we need CBCTs for sufficient diagnostics?-dentist-related factors. International Journal of Implant Dentistry, 2018. 4: p. 37.

319. Radu, R.R., et al., Prevalence and in-hospital outcome of aspiration in out-of-hospital intubated trauma patients. European Journal of Emergency Medicine, 2018. 25(5): p. 362-367.

320. Rauer, T., U. Caspar, and M. Zünd, Riesige zystische Raumforderung. Der Gynäkologe, 2018. 51(4): p. 350-352.

321. Rauer, T., et al., Avulsion Fracture of the Calcaneal Tuberosity: Case Report and Literature Review. Journal of Foot and Ankle Surgery, 2018. 57(1): p. 191-195.

322. Rehrauer, H., et al., How asbestos drives the tissue towards tumors: YAP activation, macrophage and mesothelial precursor recruitment, RNA editing, and somatic mutations. Oncogene, 2018. 37(20): p. 2645-2659.

323. Reissner, L., et al., Sonographic study of repair, gapping and tendon bowstringing after primary flexor digitorum profundus repair in zone 2.

Journal of Hand Surgery, European Volume, 2018. 43(5): p. 480-486.

324. Reser, D., M. Kolbe, and J.L. Pomar, How to make a “Heart Team” a “real” Team to ensure optimal patient care. E Journal of Cardiovascular Medicine, 2018. 6(2): p. 32-35.

325. Rickenbacher, A., et al., Sequential endoscopic and surgical removal of giant rectal adenomas extending to the dentate line. Techniques in Coloproctology, 2018. 22(5): p. 379-381.

326. Rivoisy, C., et al., Prosthetic Valve Candida spp. Endocarditis: New Insights Into Long-term Prognosis-The ESCAPE Study. Clinical Infectious Diseases, 2018. 66(6): p. 825-832.

327. Robinson, C.A., et al., Extracorporeal photopheresis as second-line treatment therapy in life-threatening primary graft dysfunction following lung transplantation. Pediatric Transplantation, 2018. 22(3): p. e13145.

328. Robotti, F., et al., A micron-scale surface topography design reducing cell adhesion to implanted materials. Scientific Reports, 2018. 8: p. 10887.

329. Rocco, G. and W. Weder, What’s happening next. Journal of Thoracic and Cardiovascular Surgery, 2018. 155(4): p. 1781-1782.

330. Rodriguez Cetina Biefer, H., et al., Mast cells regulate CD4 T-cell differentiation in the absence of antigen presentation. Journal of Allergy and Clinical Immunology, 2018. 142(6): p. 1894-1908.e7.

331. Rodriguez Cetina Biefer, H., et al., Sternal anomalies in asymptomatic patients after median sternotomy and potential influencing factors. Thoracic and Cardiovascular Surgeon, 2018. 66(06): p. 517-522.

332. Rodriguez Cetina Biefer, H., et al., Optimizing Echo guidance during MitraClip using Fluoroscopy how to see better. Cardiovascular Intervention and Therapeutics, 2018. 33(4): p. 398-399.

333. Rodriguez Cetina Biefer, H., et al., Leaflet perforation by cor-knot automated fasteners more usual than you think. Annals of Thoracic Surgery, 2018. 105(2): p. 664-665.

334. Ross, J.P., et al., Association study of essential tremor genetic loci in Parkinson’s disease. Neurobiology of Aging, 2018. 66: p. 178.e13-178.e15.

335. Rostetter, C., et al., Therapeutic options to manage bleeding in a dentist’s office. Swiss Dental Journal, 2018. 128(6): p. 498-499.

336. Rostetter, C., et al., Cone Beam Computed Tomography Evaluation of the Artery in the Lateral Wall of the Maxillary Sinus: Retrospective Analysis of 602 Sinuses. Implant Dentistry, 2018. 27(4): p. 434-438.

337. Rostetter, C. and J.S. Schenkel, Multiple Sklerose - eine chronisch-degenerative Erkrankung des zentralen Nervensystems. Die Quintessenz, 2018. 69(6): p. 702-708.

338. Rothermundt, C., et al., Baseline characteristics and patterns of care in testicular cancer patients: first data from the Swiss Austrian German Testicular Cancer Cohort Study (SAG TCCS). Swiss Medical Weekly, 2018. 148: p. w14640.

339. Rudiger, A., et al., Heart rate elevations during early sepsis predict death in fluid-resuscitated rats with fecal peritonitis. Intensive Care Med Exp, 2018. 6(1): p. 28.

340. Ruhl, T., B.-S. Kim, and J.P. Beier, Cannabidiol restores differentiation capacity of LPS exposed adipose tissue mesenchymal stromal cells. Experimental Cell Research, 2018. 370(2): p. 653-662.

341. Ruiz, C.E., et al., Clinical trial principles and endpoint definitions for paravalvular leaks in surgical prosthesis. European Heart Journal, 2018. 39(15): p. 1224-1245.

342. Rulle, U., et al., Computer-based intensity measurement assists pathologists in scoring PTEN immunohistochemistry - Clinical associations in NSCLC patients of the ETOP Lungscape cohort. Journal of Thoracic Oncology, 2018. 13(12): p. 1851-1863.

343. Ruppert, R., et al., Oncological outcome after MRI-based selection for neoadjuvant chemoradiotherapy in the OCUM Rectal Cancer Trial. The British Journal of Surgery, 2018. 105(11): p. 1519-1529.

344. Russo, M., et al., Early Clinical Experience with Double Ring Implantation for Aortic and Mitral Valve Repair. Thoracic and Cardiovascular Surgeon, 2018: p. Epub ahead of print.

345. Russo, M., et al., Bicuspid aortic valve repair with “self-made” radio-opaque rigid annuloplasty ring implantation. Journal of Cardiac Surgery, 2018. 33(10): p. 649-650.

346. Rylski, B., et al., How does descending Aorta Geometry change when it Dissects. European Journal of Cardio-Thoracic Surgery, 2018. 53(4): p. 815-821.

347. Saccocci, M., M. Taramasso, and F. Maisano, Mitral valve interventions in structural heart disease. Current Cardiology Reports, 2018. 20(6): p. 49.

348. Saccocci, M., M. Taramasso, and F. Maisano, Percutaneous mitral valvuloplasty in the modern era. Kardiologia Polska, 2018. 76(5): p. 819-820.

349. Sánchez-Velázquez, P., et al., Postoperative intra-abdominal infection is an independent prognostic factor of disease-free survival and disease-specific survival in patients with stage II colon cancer. Clinical & Translational Oncology, 2018. 20(10): p. 1321-1328.

350. Sandu, K., et al., Temporary tracheal stenting using endovascular prosthesis in the management of severe refractory stenosis following slide tracheoplasty. European Archives of Oto-Rhino-Laryngology, 2018. 275(1): p. 275-280.

351. Saponara, E., et al., Serotonin uptake is required for Rac1 activation in Kras-induced acinar-to-ductal metaplasia in the pancreas. Journal of Pathology, 2018. 246(3): p. 352-365.

352. Saran, U., et al., Anti-tumoral effects of exercise on hepatocellular carcinoma growth. Hepatology Communications, 2018. 2(5): p. 607-620.

353. Savic, V., et al., Transcatheter mitral valve chord repair. Annals of Cardiothoracic Surgery, 2018. 7(6): p. 731-740.

354. Scaglioni, M.F., M. Eder, and P. Giovanoli, The use of inverted-L posteromedial thigh (L-PMT) flap for autologous breast reconstruction: a

case report. Microsurgery, 2018. 38(5): p. 558-562.

355. Scaglioni, M.F., A. Franchi, and P. Giovanoli, Pedicled chimeric sensitive fasciocutaneous anterolateral thigh (ALT) and vastus lateralis muscle (VLM) flap for groin defect reconstruction: a case report. Microsurgery, 2018. 38(4): p. 423-426.

356. Scaglioni, M.F., A. Franchi, and P. Giovanoli, Pedicled posteromedial thigh (pPMT) perforator flap and its application in loco-regional soft tissue reconstructions. Journal of Plastic, Reconstructive & Aesthetic Surgery, 2018. 71(2): p. 217-223.

357. Scaglioni, M.F., et al., The bipedicled medial plantar flap: vascular enhancement of a reverse flow Y-V medial plantar flap by the inclusion of a metatarsal artery perforator for the reconstruction of a forefoot defect - A case report. Microsurgery, 2018. 38(6): p. 698-701.

358. Scaglioni, M.F., D. Rittirsch, and P. Giovanoli, Reconstruction of the heel, middle foot sole and plantar forefoot with the medial plantar artery perforator (MPAP) flap: clinical experience with 28 cases. Plastic and Reconstructive Surgery, 2018. 141(1): p. 200-208.

359. Scali, S.T., et al., Identification of optimal device combinations for the chimney endovascular aneurysm repair technique within the PERICLES registry. Journal of Vascular Surgery, 2018. 68(1): p. 24-35.

360. Schawkat, K., et al., Preoperative Evaluation of Pancreatic Fibrosis and Lipomatosis: Correlation of Magnetic Resonance Findings With Histology Using Magnetization Transfer Imaging and Multigradient Echo Magnetic Resonance Imaging. Investigative Radiology, 2018. 53(12): p. 720-727.

361. Schelch, K., et al., A link between the fibroblast growth factor axis and the miR-16 family reveals potential new treatment combinations in mesothelioma. Molecular Oncology, 2018. 12(1): p. 58-73.

362. Schenkel, J.S., I. Bopp-Kistler, and C. Rostetter, Demenz - Epidemiologie, Erscheinungsformen, Diagnostik, Therapie und Prognose. Die Quintessenz, 2018. 69(4): p. 426-442.

363. Schenkel, J.S., S. Schippling, and C. Rostetter, Zerebrovaskuläre Ereignisse - Epidemiologie, Symptomatik, Ätiologie, Diagnostik, Prognose und Prophylaxe. Die Quintessenz, 2018. 69(7): p. 806-814.

364. Scherer, J., et al., Subcutaneous internal anterior fixation of pelvis fractures-which configuration of the InFix is clinically optimal?-a retrospective study. International orthopaedics, 2018: p. Epub ahead of print.

365. Schlegel, A., et al., Reply to: “Redefining futility in DCD liver transplantation in the era of novel perfusion technologies”. Journal of Hepatology, 2018. 68(6): p. 1328-1330.

366. Schlegel, A., et al., The UK DCD Risk Score: A new proposal to define futility in donation-after-circulatory-death liver transplantation. Journal of Hepatology, 2018. 68(3): p. 456-464.

367. Schlegel, A., X. Muller, and P. Dutkowski, Hypothermic Machine Preservation of the Liver: State of the Art. Current Transplantation Reports, 2018. 5(1): p. 93-102.

368. Schmack, B., et al., Successful support of biventricular heart failure patients by new EXCOR® Adult pumps with bileaflet valves: a prospective study. Clinical Research in Cardiology, 2018. 107(5): p. 413-420.

369. Schmiady, M.O., et al., Recurrent pulmonary artery intimal sarcoma with infiltration of the left coronary artery. Journal of Cardiac Surgery, 2018. 33(10): p. 638-639.

370. Schmitt-Opitz, I. and S. Ulrich, Chronic thromboembolic pulmonary hypertension. Swiss Medical Weekly, 2018. 148: p. w14702.

371. Schneider, M.A., et al., Mutations of RAS/RAF Proto-oncogenes Impair Survival After Cytoreductive Surgery and HIPEC for Peritoneal Metastasis of Colorectal Origin. Annals of Surgery, 2018. 268(5): p. 845-853.

372. Schneider, M.A., et al., Insurance status does not affect short-term outcomes after oncological colorectal surgery in Europe, but influences the use of minimally invasive techniques: a propensity score-matched analysis. Langenbeck’s Archives of Surgery, 2018. 403(7): p. 863-872.

373. Schneider, P.M., et al., 18FDG-PET-CT identifies histopathological non-responders after neoadjuvant chemotherapy in locally advanced gastric and cardia cancer: cohort study. BMC Cancer, 2018. 18: p. 548.

374. Schnitzbauer, A.A., et al., Indicating ALPPS for Colorectal Liver Metastases: A Critical Analysis of Patients in the International ALPPS Registry. Surgery, 2018. 164(3): p. 387-394.

375. Scholz, M., et al., Empfehlungen zur Diagnostik und Therapie oberer Halswirbelsäulenverletzungen: Axisringfrakturen. Zeitschrift für Orthopädie und Unfallchirurgie, 2018. 156(06): p. 662-671.

376. Schönenberg, D., et al., CT-based evaluation of volumetric bone density in fragility fractures of the pelvis-a matched case-control analysis. Osteoporosis International, 2018. 29(2): p. 459-465.

377. Schramm, J., A. Rickenbacher, and D.I. Keller, Eighty-nine-year-old woman with abdominal pain and vomiting. Emergency Medicine Journal, 2018. 35(9): p. 576-576.

378. Schürner, A.M., et al., Perioperative surgery- and anaesthesia-related risks of laparoscopic Roux-en-Y gastric bypass - a single centre, retrospective data analysis. BMC Anesthesiology, 2018. 18: p. 190.

379. Schuurman, A.-S., et al., Near-infrared spectroscopy-derived lipid core burden index predicts adverse cardiovascular outcome in patients with coronary artery disease during long-term follow-up. European Heart Journal, 2018. 39(4): p. 295-302.

380. Schuurman, A.-S., et al., Prognostic Value of Intravascular Ultrasound in Patients With Coronary Artery Disease. Journal of the American College of Cardiology, 2018. 72(17): p. 2003-2011.

381. Schweiger, M., et al., Cerebral strokes in children on intracorporeal ventricular assist devices: analysis of the EUROMACS Registry. European Journal of Cardio-Thoracic Surgery, 2018. 53(2): p. 416-421.

382. Schweiger, M., et al., A Review of Induction with Rabbit Antithymocyte Globulin in Pediatric Heart Transplant Recipients. Annals of transplantation : quarterly of the Polish Transplantation Society, 2018. 23: p. 322-333.

383. Seleznik, G.M., et al., Development of autoimmune pancreatitis is independent of CDKN1A/p21-mediated pancreatic inflammation. Gut, 2018. 67(9): p. 1663-1673.

384. Serve, R., et al., Comparative Analysis of the Regulatory T Cells Dynamics in Peripheral Blood in Human and Porcine Polytrauma. Frontiers in Immunology, 2018. 9: p. 435.

385. Siebenhüner, A.R., et al., Adjuvant treatment of resectable biliary tract cancer with cisplatin plus gemcitabine: A prospective single center phase II study. BMC Cancer, 2018. 18(1): p. 72.

386. Siegenthaler, B., et al., The Bromodomain Inhibitor N-Methyl pyrrolidone Prevents Osteoporosis and BMP-Triggered Sclerostin Expression in Osteocytes. International Journal of Molecular Sciences, 2018. 19(11): p. 3332.

387. Silvestri, E., et al., The kinetics of F-FDG in lung cancer: compartmental models and voxel analysis. EJNMMI Research, 2018. 8: p. 88.

388. Smolar, J., et al., Bladder regeneration through stem cell therapy. Expert Opinion on Biological Therapy, 2018. 18(5): p. 525-544.

389. Sologashvili, T., et al., Rotation of the outflow tracts. Interactive Cardiovascular and Thoracic Surgery, 2018. 27(3): p. 463-464.

390. Sologashvili, T. and R. Prêtre, The place of the Ozaki procedure in the treatment of aortic valve disease. Swiss Medical Weekly, 2018. 148: p. w14612.

391. Sologashvili, T., et al., Two-stage arterial switch for late-presenting transposition of the great arteries. Interactive Cardiovascular and Thoracic Surgery, 2018. 27(4): p. 581-585.

392. Sommerstein, R., et al., Global Health Estimate of Invasive Mycobacterium chimaera Infections Associated with Heater-Cooler Devices in Cardiac Surgery. Emerging Infectious Diseases, 2018. 24(3): p. 576-578.

393. Søndergaard, L., et al., One-Year Outcomes with a Self-Expanding, Repositionable Transcatheter Heart Valve in Severe Aortic Stenosis Patients: PORTICO-I. Journal of the American College of Cardiology, 2018. 72(23): p. 2859-2867.

394. Song, Z., et al., Exogenous melatonin protects small-for-size liver grafts by promoting monocyte infiltration and releases interleukin-6. Journal of Pineal Research, 2018. 65: p. e12486.

395. Sprague, S., et al., Factors associated with health-related quality of life, hip function, and health utility after operative management of femoral neck fractures. The Bone & Joint Journal, 2018. 100-B(3): p. 361-369.

396. Sprague, S., et al., Factors Associated With Revision Surgery After Internal Fixation of Hip Fractures. Journal of Orthopaedic Trauma, 2018. 32(5): p. 223-230.

397. Sprengel, K., Indikationen für lebensrettende Sofortoperationen, in Management des Schwerverletzten, H.-C. Pape, F. Hildebrand, and S. Ruchholtz, Editors. 2018, Springer: Berlin. p. 111-114.

398. Staiger, R.D., et al., The Comprehensive Complication Index (CCI®) is a Novel Cost Assessment Tool for Surgical Procedures. Annals of Surgery, 2018. 268(5): p. 784-791.

399. Staiger, R.D., M.A. Puhan, and P.-A. Clavien, Editorial comment: different perspectives on severity of postoperative morbidity. Langenbeck's Archives of Surgery, 2018. 403(8): p. 1029-1030.

400. Stettler, R., et al., Neointima and neoatherosclerotic characteristics in bare metal and first and second generation drug eluting stents in patients admitted with cardiovascular events attributed to stent failure: an optical coherence tomography study. EuroIntervention, 2018. 13(15): p. e1831-e1840.

401. Stichling, N., et al., Lung macrophage scavenger receptor SR-A6 (MARCO) is an adenovirus type-specific virus entry receptor. PLoS Pathogens, 2018. 14(3): p. e1006914.

402. Stoeck, C.T., et al., Direct comparison of *in vivo* versus postmortem second-order motion-compensated cardiac diffusion tensor imaging. Magn Reson Med, 2018. 79(4): p. 2265-2276.

403. Stojanovic, A., Postoperative Komplikationen nach operativer Versorgung von Unterkieferfrakturen. 2018: Zürich.

404. Stortecky, S., et al., Temporal Trends in Adoption and Outcomes of Transcatheter Aortic Valve Implantation: A Swisstavi Registry Analysis. European Heart Journal - Quality of Care and Clinical Outcomes, 2018: p. Epub ahead of print.

405. Straub, G., et al., Successful lung volume reduction surgery in combined pulmonary emphysema and fibrosis without body-plethysmographic hyperinflation-a case report. Journal of Thoracic Disease, 2018. 10(Suppl 23): p. S2830-S2834.

406. Sulser, P., et al., Early and late abdominal surgeries after lung transplantation: incidence and outcome. Interactive Cardiovascular and Thoracic Surgery, 2018. 27(5): p. 727-732.

407. Tallon de Lara, P., et al., Gemcitabine synergizes with immune checkpoint inhibitors and overcomes resistance in a preclinical model and mesothelioma patients. Clinical Cancer Research, 2018. 24(24): p. 6345-6354.

408. Tanaskovic, S., et al., Scoring system to predict early carotid restenosis after eversion endarterectomy by analysis of inflammatory markers. Journal of Vascular Surgery, 2018. 68(1): p. 118-127.

409. Taramasso, M., et al., Feasibility and safety of transfemoral sheathless portico aortic valve implantation preliminary results in a single center experience. Catheterization and Cardiovascular Interventions, 2018. 91(3): p. 533-539.

410. Taramasso, M., T. Feldman, and F. Maisano, Transcatheter mitral valve repair: review of the clinical evidence. EuroIntervention, 2018. 14(AB): p. AB91-AB100.

411. Taramasso, M., et al., Compare and contrast tricuspid and mitral valve anatomy: interventional perspectives for transcatheter tricuspid valve therapies. EuroIntervention, 2018. 13(16): p. 1889-1898.

412. Teuben, M.P.J., et al., Safety of selective nonoperative management for blunt splenic trauma: the impact of concomitant injuries. Patient Safety in Surgery, 2018. 12(1): p. 0-9999.

413. Teuber, H., et al., Single-level vertebral kyphoplasty is not associated with an increased risk of symptomatic secondary adjacent osteoporotic vertebral compression fractures: a matched case-control analysis. Archives of Osteoporosis, 2018. 13(1): p. 82.

414. Tiziani, S., et al., Standards for external fixation application: national survey under the auspices of the German Trauma Society. International orthopaedics, 2018: p. Epub ahead of print.

415. Tiziani, S. and H.-C. Pape, Korrekturosteosynthese mittels intramedullären Kraftträgers. Swiss Medical Forum, 2018. 18(2829): p. 594-597.

416. Tiziani, S. and H.-C. Pape, Medical Writing: Systematic Reviews and Meta-analyses, in Medical Writing and Research Methodology for the Orthopaedic Surgeon, C. Mauffrey and M. Scarlat, Editors. 2018, Springer: Schweiz. p. 29-34.

417. Torii, R., et al., Implications of the local hemodynamic forces on the formation and destabilization of neoatherosclerotic lesions. International Journal of Cardiology, 2018. 272: p. 7-12.

418. Tschuor, A., et al., Yes-associated protein promotes early hepatocyte cell cycle progression in regenerating liver after tissue loss. FASEB BioAdvances, 2018. 1(1): p. 51-61.

419. Turagam, M.K., et al., Epicardial Left Atrial Appendage Exclusion Reduces Blood Pressure in Patients With Atrial Fibrillation and Hypertension. Journal of the American College of Cardiology, 2018. 72(12): p. 1346-1353.

420. Unger, P., et al., Multiple and Mixed Valvular Heart Diseases. Circulation. Cardiovascular Imaging, 2018. 11(8): p. e007862.

421. Uyulmaz, S., et al., Nanofat Grafting for Scar Treatment and Skin Quality Improvement. Aesthetic Surgery Journal, 2018. 38(4): p. 421-428.

422. Valdec, S., et al., Sensibilitätsstörung des Nervus mandibularis. Die Quintessenz, 2018. 69(2): p. 204-210.

423. Valli, P.V., et al., Stent-over-sponge (SOS): a novel technique complementing endosponge therapy for foregut leaks and perforations. Endoscopy, 2018. 50(02): p. 148-153.

424. van den Berg, V.J., et al., IgM anti-malondialdehyde low density lipoprotein antibody levels indicate coronary heart disease and necrotic core characteristics in the Nordic Diltiazem (NORDIL) study and the Integrated Imaging and Biomarker Study 3 (IBIS-3). EBioMedicine, 2018. 36: p. 63-72.

425. Van Hemelrijck, M., et al., Recent advances in understanding and managing Aortic Atenosis. F1000Research, 2018. 7: p. 58.

426. Velizheva, N.P., et al., Targeted next-generation-sequencing for reliable detection of targetable rearrangements in lung adenocarcinoma-a single center retrospective study. Pathology, Research and Practice, 2018. 214(4): p. 572-578.

427. Vetter, D., et al., Quality Assessment of Information on Bariatric Surgery Websites. Obesity Surgery, 2018. 28(5): p. 1240-1247.

428. Villiger, M., et al., Repeatability Assessment of Intravascular Polarimetry in Patients. IEEE Transactions on Medical Imaging, 2018. 37(7): p. 1618-1625.

429. Villiger, M., et al., Coronary Plaque Microstructure and Composition Modify Optical Polarization a new Endogenous Contrast Mechanism for Optical Frequency Domain Imaging. JACC. Cardiovascular Imaging, 2018. 11(11): p. 1666-1676.

430. Visser, E., et al., A structured training program for minimally invasive esophagectomy for esophageal cancer— a Delphi consensus study in Europe. Diseases of the Esophagus, 2018. 31(3): p. dox124.

431. von Segesser, L.K., et al., New, optimized, dual-lumen cannula for veno-venous ECMO. Perfusion, 2018. 33(1_suppl): p. 18-23.

432. Vonlanthen, R., et al., Toward a Consensus on Centralization in Surgery. Annals of Surgery, 2018. 268(5): p. 712-724.

433. Voskuilen, C.S., et al., Urothelial Carcinoma in Bladder Diverticula: A Multicenter Analysis of Characteristics and Clinical Outcomes. European Urology Focus, 2018: p. Epub ahead of print.

434. Wagner, M.E.H., et al., Rekonstruktive Orbitachirurgie. HNO, 2018. 66(11): p. 827-833.

435. Waldner, M., et al., Occurrence of Occult Malignancies in Reduction Mammoplasties. Frontiers in Surgery, 2018. 5: p. 17.

436. Waldner, M., et al., Characteristics and Immunomodulating Functions of Adipose-Derived and Bone Marrow-Derived Mesenchymal Stem Cells Across Defined Human Leukocyte Antigen Barriers. Frontiers in Immunology, 2018. 9: p. 1642-1645.

437. Wang, C., et al., Suitability of the porcine aortic model for transcatheter aortic root repair. Interactive Cardiovascular and Thoracic Surgery, 2018. 26(6): p. 1002-1008.

438. Wang, C., et al., Endovascular treatment of non-dissected ascending Aorta disease: a systematic review. European Journal of Cardio-Thoracic Surgery, 2018. 53(2): p. 317-324.

439. Waydhas, C., et al., A consensus-based criterion standard for the requirement of a trauma team. World Journal of Surgery, 2018. 42(9): p. 2800-2809.

440. Weber, C., et al., Blunt Cerebrovascular Artery Injury and Stroke in Severely Injured Patients: An International Multicenter Analysis: Reply. World Journal of Surgery, 2018. 42(10): p. 3452-3453.

441. Weber, C.D., et al., Evaluation of severe and fatal injuries in extreme and contact sports: an international multicenter analysis. Archives of Orthopaedic and Trauma Surgery, 2018. 138(7): p. 963-970.

442. Weber, C.D., et al., Blunt Cerebrovascular Artery Injury and Stroke in Severely Injured Patients: An International Multicenter Analysis. World Journal of Surgery, 2018. 42(7): p. 2043-2053.

443. Weber, C.D., et al., The alcohol-intoxicated trauma patient: impact on imaging and radiation exposure. European Journal of Trauma and Emergency Surgery, 2018: p. Epub ahead of print.

444. Weber, L., et al., Haemodynamic mechanisms and long-term prognostic impact of pulmonary hypertension in patients with severe aortic stenosis undergoing valve replacement. European Journal of Heart Failure, 2018. 21(2): p. 172-181.

445. Weder, W., et al., The great debate flashes: Surgery versus stereotactic body radiotherapy as the primary treatment of early-stage lung cancer. European Journal of Cardio-Thoracic Surgery, 2018. 53(2): p. 295-305.

446. Winkler, F., et al., Long-Term Outcome of Epicardial Implantable Cardioverter-Defibrillator Systems in Children Results Justify its Preference in Paediatric Patients. Europace, 2018. 20(9): p. 1484-1490.

447. Wipf, A., et al., Aortopulmonary collaterals in neonates with d-transposition of the great arteries - Clinical significance early after arterial switch operation. International Journal of Cardiology, 2018. 258: p. 237-242.

448. Wirthmann, A.E., et al., Reduction mammoplasty in adolescents and elderly: A ten year case series analyzing age related outcome with focus on safety and complications. Journal of Plastic, Reconstructive & Aesthetic Surgery, 2018. 71(3): p. 377-383.

449. Wu, L., et al., Putative cancer stem cells may be the key target to inhibit cancer cell repopulation between the intervals of chemoradiation in murine mesothelioma. BMC Cancer, 2018. 18(1): p. 471.

450. Xia, D., et al., Computationally-Guided Development of a Stromal Inflammation Histologic Biomarker in Lung Squamous Cell Carcinoma. Scientific Reports, 2018. 8(1): p. 3941.

451. Yamada, Y., et al., Impact of human leukocyte antigen mismatch on lung transplant outcome. Interactive Cardiovascular and Thoracic Surgery, 2018. 26(5): p. 859-864.

452. Yamada, Y., et al., Chronic airway fibrosis in orthotopic mouse lung transplantation models: an experimental reappraisal. Transplantation, 2018. 102(2): p. e49-e58.

453. Yin, L., et al., Dose-dependent effects of peroxisome proliferator-activated receptors β/δ agonist on systemic inflammation after haemorrhagic shock. Cytokine, 2018. 103: p. 127-132.

454. Zhang, B.C., et al., Association of stent-induced changes in coronary geometry with late stent failure: Insights from three-dimensional quantitative coronary angiographic analysis. Catheterization and Cardiovascular Interventions, 2018. 92(6): p. 1040-1048.

455. Zhang, B.-C., et al., Qualitative and quantitative evaluation of dynamic changes in non-culprit coronary atherosclerotic Léesion Morphology A longitudinal OCT study. EuroIntervention, 2018. 13(18): p. 2190-2200.

456. Zientara, A., et al., Skeletonized internal thoracic artery harvesting: a low thermal damage electrosurgical device provides improved endothelial layer and tendency to better integrity of the vessel wall compared to conventional electrosurgery. Journal of Cardiothoracic Surgery, 2018. 13(1): p. 105.

457. Zientara, A., et al., Fast-Track Management in Off-Pump Coronary Artery Bypass Grafting: Dexmedetomidine Provides Rapid Extubation and Effective Pain Modulation. Thoracic and Cardiovascular Surgeon, 2018: p. Epub ahead of print.

458. Zientara, A., et al., Anomaly of Haughton type D left cervical aortic arch in combination with type B dissection: case report and literature review. Journal of Cardiothoracic Surgery, 2018. 13(1): p. 79.

459. Zimmermann, C., et al., Mid-term Outcome of 100 Consecutive Ross Procedures: Excellent Survival, But Yet to Be a Cure. Pediatric Cardiology, 2018. 39(3): p. 595-603.

460. Zimmermann, S., et al., Outcome of Stromal Vascular Fraction-Enriched Fat Grafting Compared to Intramuscular Transposition in Painful End-Neuromas of Superficial Radial Nerve: Preliminary Results. Frontiers in Surgery, 2018. 5: p. 10.

461. Zweifel, D., et al., Total virtual workflow in CAD-CAM bony reconstruction with a single step free fibular graft and immediate dental implants. British Journal of Oral & Maxillofacial Surgery, 2018. 56(9): p. 859-863.

462. Zwolak, P., et al., Local effect of zoledronic acid on new bone formation in posterolateral spinal fusion with demineralized bone matrix in a murine model. Archives of Orthopaedic and Trauma Surgery, 2018. 138(1): p. 13-18.

Editorial
Division of Surgical Research
University of Zurich
www.chir.uzh.ch

Responsible Editor
PD Dr. sc.nat. Paolo Cinelli
Prof. Margarete Arras, DVM

Layout, Photo
Nico Wick
Christoph Stulz

Printed by KDMZ, Zurich