Editorial

Jens Dingemann and Peter P. Schmittenbecher

Basic research in pediatric surgery

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With greatest pleasure we present the first special issue of *Innovative Surgical Sciences* on pediatric surgery. Pediatric surgery as one of the surgical subspecialties is dedicated to the treatment of specific surgical diseases of preterm babies, newborns, children and adolescents. These may be congenital as *Hirschsprung's disease* and *bladder exstrophy* or clearly acquired as *pediatric fractures*. In some cases, the origin is not clear, but the onset of the disease is solely in the newborn period or early infancy as in *necrotizing enterocolitis* or *biliary atresia*.

Pediatric surgeons around the globe are facing challenges that are different from the ones known from adult surgery. One of the main principles in pediatric surgery is to “create solutions in infancy that should last for a lifetime”. In the light of the broad spectrum of our subspecialty and the fact that most diseases dealt with are rare entities, not much evidence can be gained from clinical trials. Additionally, all pediatric surgical procedures must always take into account the growing organism.

For these different reasons, it is of particular interest for pediatric surgeons to bring forward basic research in order to understand the underlying disease and to find surgical solutions for the sake of our small patients. Therefore, we have chosen to gather renowned international researchers from different fields in pediatric surgery and to give the reader an overview of recent scientific development.

Adrienne Sulistyo and co-workers from Augusto Zani's laboratory at the Hospital for Sick Children (Toronto, Canada) report on the different animal models for *Necrotizing enterocolitis (NEC)* which remains the leading cause of gastrointestinal surgical emergency in preterm neonates.

The most prominent developmental disorder of the enteric nervous system is *Hirschsprung's disease*. It is characterized by a complete loss of neural crest derived neurons and glial cells in parts of the colon, that results in chronic constipation, ileus, enterocolitis and failure to thrive. Obermayr and Seitz from Marburg present a brief

but comprehensive review article on recent developments in cell-based regeneration of the enteric nervous system.

The pathogenesis of *biliary atresia* is still poorly understood. Even though it is a rare disease (1:19,000 live births), it represents the most frequent indication for pediatric liver failure and consecutive liver transplantation. Petersen and Madadi-Sanjani from Hannover focus on connecting recent findings in animal based research and the situation in human biliary atresia. Their review highlights the need of translational research in order to gradually shed more light on the etiology of this enigmatic disease.

Another most exciting topic is covered by the review of Schäfer and Stehr from Nürnberg. Tissue Engineering has been a topic of major interest in *pediatric urology* in the last decades with the aim of being able to replace bladder or urethra at some stage. It has raised high hopes and equally incurred clinical failures. The lessons learned in this field have set the scope of research for years to come. The recent portfolio is reviewed in a critical and credible scientific manner.

Last but not least, Weinberg and co-authors from Graz, Austria give a most valuable review on current status and outlook on resorbable osteosynthesis materials for bone fractures in children and adolescents. Unlike in many other countries around the world, in Germany, Austria and Switzerland, *pediatric traumatology* represents an important field of our subspecialty. Techniques for pediatric osteosynthesis have developed significantly over the last 20 years, resulting in reduced medical and economic burden, including long and expensive hospitalization. The authors summarize specific modern operative techniques and materials and give an important overview on the future of resorbable implants for this indication.

In summary, we hope the esteemed reader of this special issue on pediatric surgery will enjoy reading about recent developments in basic research and future impact on clinical developments in our subspecialty. We thank the invited authors for their extraordinary work

and also all of the invited reviewers for their critical and valuable comments that have helped to further improve the articles.

We are most grateful having been given the opportunity to edit this issue and to present the broad scientific and clinical spectrum of research related to pediatric surgical diseases. In our eyes, *Innovative Surgical Sciences* represents a platform enabling surgical and scientific exchange between the different surgical subspecialties. With our contribution, we hope to have opened some doors to cooperative scientific projects together with our colleagues from the different subspecialties in adult surgery.

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Corresponding author: Priv.-Doz. Dr. Jens Dingemann, Advisory Council of the German Society for Pediatric Surgery, Co-Editor Innovative Surgical Sciences, Attending Pediatric Surgeon, Center of Pediatric Surgery, Hannover Medical School, Carl-Neuberg-Str. 1, 30625 Hannover, Germany, E-mail: Dingemann.Jens@mh-hannover.de

Peter P. Schmittenbecher: President of the German Society for Pediatric Surgery, Director Department of Pediatric Surgery, Karlsruhe City Hospital, Moltkestraße 90, 76133 Karlsruhe, Germany