both lucifer yellow assay \( (p = 0.005) \) and transepithelial electrical resistance \( (p = 0.004) \). Western blot showed increased expression of tight junction proteins occludin in RI treated enteroids compared with controls \( (p = 0.009) \). Claudin-1 and 4 were increased in RI treated enteroids although this did not reach significance \( (p > 0.05) \).

**CONCLUSION:** RI treated enteroids showed significantly decreased permeability and increased tight junction protein expression compared with control enteroids. Therefore, RI might be a novel therapeutic or preventative strategy against NEC.

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**Schwann Cell Precursors in the Aganglionic Segment of Hirschsprung Disease Have a Capacity to Generate Neurons in the Gut**

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**INTRODUCTION:** Cell therapy offers the potential to replace missing neurons in the distal bowel of Hirschsprung disease (HSCR) by transplanting neural progenitor cells to restore gut function. Schwann cell precursors (SCPs) have recently been shown to possess a capacity to generate neurons in the intestine. However, it is unknown whether SCPs can be isolated from the aganglionic segment of HSCR and whether they can be used for cell-based therapy.

**METHODS:** Aganglionic bowel was obtained from human HSCR and Endrb-/- mice. SCPs were isolated from the hypertrophic nerve bundles in the aganglionic segment. SCPs were transplanted into the aganglionic mouse colon ex vivo and in vivo. Immunohistochemistry was used to demonstrate engraftment, survival, and neuroglial differentiation of SCPs after transplantation. Live cell imaging was used to determine neuronal calcium activity.

**RESULTS:** Hypertrophic nerve bundle-derived SCPs are capable of forming neurompheres in culture and possess neurogenic potential. In differentiation conditions, SCPs give rise to Tuj1 expressing neurons that exhibit spontaneous and electrically stimulated calcium activity. After transplantation into aganglionic mouse colon, SCPs engraft, migrate extensively, and differentiate into enteric neurons and glia.

**CONCLUSION:** SCPs from the aganglionic segment of HSCR demonstrate the capacity to regenerate functioning neurons in vitro. They can be transplanted into the aganglionic colon where they survive, migrate, and differentiate into appropriate phenotypes. SCPs, therefore, represent a potential autologous source of neural progenitor cells. Current studies are aimed at determining whether these cells restore colorectal function, an essential step in establishing cell-based therapies as a viable treatment for HSCR.

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**Serine-Threonine Kinase Receptor Associated Protein Confers Aggressive Phenotype in Neuroblastoma Via Regulation of Focal Adhesion Kinase Signaling**

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**INTRODUCTION:** Serine-threonine kinase receptor associated protein (STRAP) is a scaffolding protein implicated in tumorigenicity, and we have demonstrated that the knockout (KO) of STRAP decreased while the overexpression (OE) of STRAP increased the neuroblastoma malignant phenotype. Focal adhesion kinase (FAK) prevents anoikis and supports neuroblastoma tumorigenesis. Because FAK activation in cancer has been found to be regulated by other scaffolding proteins, we hypothesized that STRAP can affect FAK activation in neuroblastoma.

**METHODS:** SK-N-AS neuroblastoma cell line was used. CRISPR-Cas9 technology was used to establish STRAP KO cells, and STRAP OE was accomplished with stable plasmid transfection. Wild-type (WT) and empty vector (EV) transfected cells served as controls for KO and OE cells, respectively. Immunoblotting detected protein expression. PamChip kinomic peptide microarray was used to determine the mean kinase statistics (KSTAT) and phosphorylation curves to evaluate the effects of STRAP OE on the kinome.

**RESULTS:** There was a decrease in phosphorylated FAK \( (Y397) \) in STRAP KO cells compared with WT, indicating that STRAP can function to regulate FAK phosphorylation. In kinome assays, FAK1 (KSTAT of -0.473) and FAK2 (KSTAT of -0.475) were increased in OE vs EV cells with downstream FAK targets also demonstrating higher phosphorylation activity in OE vs EV cells.

**CONCLUSION:** STRAP KO led to decreased FAK phosphorylation while STRAP OE resulted in increased kinomic activity of FAK and its downstream targets. These findings suggest a potential pathway that allows STRAP to confer a more malignant phenotype in neuroblastoma and warrants further investigation as a potential therapeutic target.

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**Spontaneous Portosystemic Shunt Ligation During Pediatric Liver Transplantation**

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**INTRODUCTION:** The aim of this study was to describe the incidence and outcome of intraoperative ligation of spontaneous portosystemic shunts (SPSS) during pediatric liver transplants.

**METHODS:** Liver transplants performed at our pediatric hospital between January 1, 2017 and December 31, 2020 were retrospectively reviewed. Recipients were categorized as no SPSS present or
present but not ligated and SPSS present and ligated during transplant.

RESULTS: Fifteen (28%) of the 54 pediatric liver transplant recipients had a SPSS, and 11 were ligated intraoperatively due to low portal vein flow (PVF). A median increase in PVF of 142 mL/min (interquartile range 0 to 600 mL/min) was observed after ligation. The left renal vein was ligated in 6 cases (55%) (Fig. 1). Graft survival was 96% during a median follow-up of 1.5 years (interquartile range 0.1 to 3.3 years), with no deaths or retransplantations occurring in the SPSS ligation group. A significantly greater incidence of portal vein thrombosis or stenosis was observed in the ligation group (45% vs 2%; p < 0.001). Post-transplantation reoperation was also more common in the ligation group (36% vs 12%; p = 0.049).

CONCLUSION: SPSS ligation at time of liver transplantation can help achieve excellent graft survival by augmenting portal vein flow to the graft in children but can be a risk factor for portal vein thrombosis and reoperative complications.

METHODS: Female juvenile mini-Yucatan pigs underwent laparotomy where gelatin-encapsulated compressed nitinol springs of 10-, 11-, or 12-mm diameter springs were inserted and plicated into the ileal lumen. Control segments distal to the spring were marked with sutures. Pigs were placed on a liquid diet postoperatively and euthanized on postoperative day (POD) 7. The length of spring and control segments were measured. Histologic sections were stained with hematoxylin and eosin.

RESULTS: All pigs (n = 13) survived to POD 7 with no adverse effects and an mean ± SD weight gain of 50.5 ± 89.1 g/d. Compared with their respective control segments, 10-mm, 11-mm, and 12-mm diameter springs exhibited significant lengthening (p < 0.001; p < 0.05; Fig. 1A). All spring segments had thickened muscularis propria (p = 0.008; Fig. 1B). Increased crypt height was noted in some ileal segments containing the springs compared with control segments (p = 0.036; p = 0.007; Fig. 1C). When compared across the different diameter groups, spring segments were not significantly different in terms of lengthening, crypt height, or muscularis propria (Fig. 1D, 1E).

CONCLUSION: Spring-mediated distraction enterogenesis is successful in porcine ileum with springs of varying diameters resulting in comparable structural changes within the intestine. A smaller-diameter spring is as effective as a larger-diameter spring in lengthening ileum.

The Effect of Spring Diameter on Porcine Distraction Enterogenesis
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INTRODUCTION: Morbidity and mortality for short gut syndrome continues to be high in part due to complications from treatment. Spring-mediated distraction enterogenesis has proven to be a successful method of lengthening porcine intestine. We aim to evaluate the effect of varying spring diameters on intestinal growth.

METHODS: Female juvenile mini-Yucatan pigs underwent laparotomy where gelatin-encapsulated compressed nitinol springs of 10-, 11-, or 12-mm diameter springs were inserted and plicated into the ileal lumen. Control segments distal to the spring were marked with sutures. Pigs were placed on a liquid diet postoperatively and euthanized on postoperative day (POD) 7. The length of spring and control segments were measured. Histologic sections were stained with hematoxylin and eosin.

RESULTS: All pigs (n = 13) survived to POD 7 with no adverse effects and an mean ± SD weight gain of 50.5 ± 89.1 g/d. Compared with their respective control segments, 10-mm, 11-mm, and 12-mm diameter springs exhibited significant lengthening (p < 0.001; p < 0.05; Fig. 1A). All spring segments had thickened muscularis propria (p = 0.008; Fig. 1B). Increased crypt height was noted in some ileal segments containing the springs compared with control segments (p = 0.036; p = 0.007; Fig. 1C). When compared across the different diameter groups, spring segments were not significantly different in terms of lengthening, crypt height, or muscularis propria (Fig. 1D, 1E).

CONCLUSION: Spring-mediated distraction enterogenesis is successful in porcine ileum with springs of varying diameters resulting in comparable structural changes within the intestine. A smaller-diameter spring is as effective as a larger-diameter spring in lengthening ileum.