

*Intestinal Failure and
Regeneration, Nutritional
Disorders and Support,
Surgically Modified Gut, and
Transplantation*

Chair: Barbara L. Bass, MD

Vice Chair: Margaret Heitkemper, PhD, RN

Research Goal 1

Define mechanisms of intestinal growth and differentiation.

Research Goal 1

Objectives

- Isolate, characterize, manipulate, and expand human intestinal stem cells *in vitro*.
- Define optimal factors—growth factors, nutrients, extracellular matrix or milieu—to enhance post-resectional adaptation in human patients.

Research Goal 1

Objectives (continued)

- Develop an optimal bioartificial scaffold for neomucosal growth.
- Develop artificial intestinal constructs for replacement of diseased bowel.
- Conduct a clinical trial of exogenous factors to optimize post-resectional adaptation.

Research Goal 2

Develop new strategies to treat short bowel syndrome and intestinal failure.

Research Goal 2

Objectives

- Evaluate the effect of specific micronutrients and diet on postoperative intestinal adaptation.
- Develop and validate non-invasive markers of intestinal growth and adaptation in short gut models.
- Develop reliable non-invasive methods to measure intestinal growth and adaptation in patients.

Research Goal 2

Objectives (continued)

- Develop more effective techniques and strategies to reduce septic, metabolic, and hepatic complications of parenteral nutrition and intestinal failure.
- Define the molecular basis of radiation enteritis and prevent and treat radiation enteritis and proctitis.
- Conduct a clinical trial of optimal growth factor (or synergistic combination) therapy following massive intestinal resection.

Research Goal 2

Objectives (continued)

- Reduce the thrombotic, infective, hepatic and metabolic complication of PN to prevent PN-failure.
- Develop prognostic indicators for PN failure to guide the timing of intestinal transplant evaluation in optimal candidates.

Research Goal 3

Improve the success of intestinal transplantation.

Research Goal 3

Objectives

- Determine the role of exogenous growth factors and micronutrients post-transplantation.
- Improve methods for donor bowel preservation pre-transplant.
- Identify new targeted pathways for novel immunosuppressive therapies.

Research Goal 3

Objectives (continued)

- Develop artificial intestinal conduits from native tissues and cells for autotransplantation.
- Identify biomarkers for non-invasive diagnosis of intestinal transplant rejection.
- Identify factors that diminish long-term post transplant survival and appropriate countermeasures.

Research Goal 4

Understand and treat the metabolic and nutritional consequences of bariatric procedures and other surgical modifications of the gut.

Research Goal 4

Objectives

- Identify pre-operative biomarkers to predict weight loss and metabolic correction.
- Characterize the neuroendocrine, hormonal, cytokine, proteomic response to bariatric procedures in animal models and humans.

Research Goal 4

Objectives (continued)

- Characterize the long-term metabolic (vitamins, calcium, minerals, other) sequelae and changes in anorexigenic and orexigenic hormones in bariatric surgical patients.
- Develop non-surgical therapy that “mimics” neurohumoral sequelae of bariatric procedures.

Research Goal 5

Optimize nutritional support of patients with gastrointestinal disorders.

Research Goal 5

Objectives

- Develop and validate quality-of-life measures for patients with chronic GI dysfunction to allow assessment of efficacy of different treatments.
- Evaluate the effect of specific micronutrients and diet on GI absorption, motility and immunity.
- Investigate the importance of the gut microbiome in the prevention and causation of GI diseases. (Overlap with importance in nutrient metabolism and regeneration)

Research Goal 5

Objectives (continued)

- Assess the safety and potential efficacy of probiotics, prebiotics, and symbiotics in the prevention of necrotizing enterocolitis and catheter-related sepsis.
- Design and test diet formulations to prevent neonatal feeding intolerance and necrotizing enterocolitis.

Major Challenges/Steps To Achieve Goals

- National research resources
- Standardized clinical definitions
- Advanced technologies

Major Challenges/Steps To Achieve Goals

National Research Resources

- Multi-center clinical and basic research networks to foster collaboration and sharing of resources
- A national registry for intestinal failure/short bowel syndrome patients and for those with small intestine allografts
- Centralized tissue banks of biosamples from patients with different gastrointestinal disorders or who are undergoing bariatric surgery and follow-up

Major Challenges/Steps To Achieve Goals

Standardized Clinical Definitions

- Standardized system to characterize short gut and intestinal failure in terms of anatomy, nutritional support, and complications
- Consensus on data points, definitions, and outcome measures to understand the relative effectiveness of medical, nutritional, and surgical intervention strategies
- ICD-9 codes to assist in the tracking of afflicted patients
- A health outcomes research consortium to promote standardization

Major Challenges/Steps To Achieve Goals

Advanced Technologies

- Novel, less invasive technologies to access the intestinal lumen
- Identification of serum or other surveillance markers to enhance the ability to care for patients with small intestinal disorders, including short gut syndrome, intestinal failure and other with intestinal transplants