



# Biliopancreatic Diversion in mice

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## Summary:

This is the protocol for the biliopancreatic diversion procedure in the mouse. This procedure is historically thought to be a malabsorptive procedure and has several variations in the human. In brief, the biliary and pancreatic secretions are physically separated from gastrointestinal chyme flow until a point near the terminal small bowel. In theory this leads to significant malabsorption, though when this procedure is done clinically many times a gastric restriction component is also added.

## Reagents and Materials:

Reagent/Material	Vendor	Stock Number
6-0 monocryl suture	Ethicon	Y432H
7-0 prolene	Ethicon	8648G
7-0 PDS II	Ethicon	H206Z1551R
Cotton swabs	Fisher Scientific	19-072333
10 ml 22G syringe	BD	Ref 309640
Gauze 3X3	Kendall	Ref 2346
0.9% Saline	Baxter	2B1322
Gloves	Ansell	PK20782
8-0 Nylon	Arosurgical	TK-081438

The remaining materials that are necessary for any surgical procedure in mice are sterile, high quality surgical instruments for microsurgery. A dissecting microscope (at least 10x magnification) is also highly recommended, however, surgical loupes or other magnification aid could be substituted. The individual performing the operations should be well-trained in small animal surgical and mouse anatomy.

## Protocol:

### Preoperative Care

1. All animals must be singly-housed, given Ensure 12 hours before surgery and have all bedding removed.
2. Preoperative pain medications should be administered:
  - a. Ketoprofen (5 mg/kg)
  - b. Saline is given at the end of surgery and a second dose is given 24 hours later.
3. Ensure adequacy of anesthesia.
4. Place mouse on surgical board/surgical field over a warm water circulating blanket and immobilize gently.
5. Prep and drape animal sterilely.

## **Operation**

1. Begin the procedure by making a midline laparotomy incision with sharp surgical scissors. Be sure to stay on the linea alba and away from the rectus abdominus muscles.
2. Using cotton swabs, gently sweep the intestinal contents until the stomach is located.
3. Ligate the stomach at the level of the pylorus with a 6-0 silk suture to impede flow, but not to strangulate the tissue.
4. Identify a portion of jejunum approximately 4cm distal to the Ligament of Treitz and transect this bowel using 8-0 nylon suture. Divide the mesentery as necessary to allow for sufficient mobilization of the bowel to prevent torsion.
5. Close the proximal and distal ends of small bowel with 8-0 nylon suture.
6. Next, measure out 12cm distally from the distal sutured end of the small bowel.
7. With extreme care, on the proximal end of the small bowel limb create a running-continuous, side to side gastroenterostomy that is at least 1.5cm in length on the anterior surface of the stomach just proximal to the greater curvature using 7-0 PDS II.

*IMPORTANT: All anastomoses should be on the antimesenteric surfaces of the small bowel to avoid compromising the vasculature of the anastomosis.*

8. Place ligatures on all stomach or mesenteric vessels using 7-0 PDS II as needed for hemostasis, though take caution not to disrupt the blood supply to the anastomosis.
9. Once the proximal end of the procedure is completed and hemostasis adequate, create a side to side enteroenterostomy between the native jejunum and the gastric limb of the transposed bowel.

*IMPORTANT: When juxtaposing small bowel and stomach for both the gastroenterostomy and enteroenterostomy be careful not to torse the bowel and compromise blood supply.*

- This will restore continuity of the biliopancreatic secretions with alimentary flow.
10. As necessary, irrigate the abdominal cavity to wash away any small bowel contamination or blood clots.
  11. Finally, close the abdomen in a simple, two-layer, interrupted fashion. The first interrupted layer should be a simple, interrupted muscle layer with 6-0 monocryl suture. Using good technique suture the connective tissue and not the muscle proper. The second layer is a skin layer also done in a simple, interrupted fashion with 7-0 Prolene suture.

## **Postoperative Care**

1. All mice receive 1.0 ml of warmed, sterile saline following the procedure before being placed in the recovery cages.
2. All mouse cages are kept partially on a veterinary-approved heating pad for 5 to 7 days postoperatively.
3. Mice will remain on an Ensure diet for 24 hours post-surgery no bedding in the cage.
4. Mice are monitored until recovered from the procedure, which typically takes 7-14 days depending on the procedure. General behavior (i.e. bright/alert/responsive vs. depressed/obtunded) is monitored.
5. Pain medication is administered per protocol: ketoprofen 5 mg/kg post-op and again at 24 hours postoperative.
6. Additional pain medication may be needed depending on postoperative recovery.