Supplementary Materials and Methods

Morphology and pathology

Intestinal tissue was fixed in 4% paraformaldehyde and then cut into 4 μm thick paraffin sections for H&E and immunofluorescence staining. Slides were stained with Rb-anti-CD3 (Dako, 1:100); Rb-anti-CD4 (ab133616 1:500), Rb-anti-CD20 (ab27093 1:300), Rb-anti-Claudin3 (ab15102 1:100), and goat anti-rabbit IgG H&L (FITC) (ab97050 1:200). Mounting medium containing DAPI was used to adhere a coverslip to the microscope slide. Experimental results were observed via fluorescence microscopy.

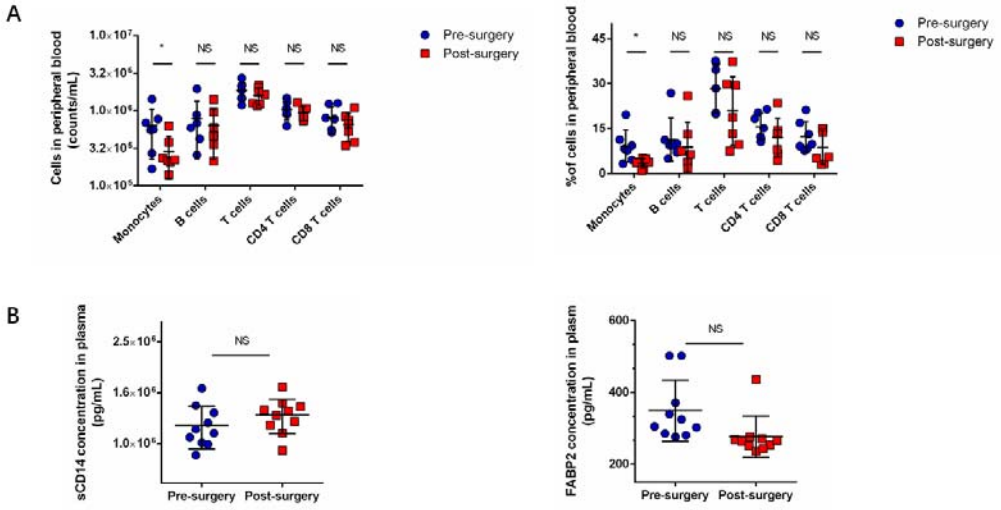
Flow cytometric analysis

Isolated intestinal cells were stained for immunophenotyping with the following fluorescently conjugated monoclonal antibodies: anti-CD45-PE (clone D058-1283); anti-CD3-APC-Cy7 (clone SP34-2); anti-CD4-PerCP-Cy5.5 (clone OKT4); and anti-CD8a-PE-Cy7 (clone RPA-T8). Whole blood cell counts were stained with: anti-CD3-APC-Cy7 (clone SP34-2); anti-CD4-PerCP-Cy5.5 (clone OKT4); anti-CD8a-PE-Cy7 (clone RPA-T8); anti-CD14-APC (clone M5E2); and anti-CD20-FITC (clone 2H7), then analyzed on the BD FACSVerse flow cytometer. Data were analyzed with FlowJo7.6 software.

Nutritional conditions

Plasma used for assessment of nutritional indicators was isolated from blood by centrifugation (500 *g*, 10 min, room temperature). Plasma was preserved at －80 °C until detection. Nutritional indicators were tested using KingMed Diagnostics. Plasma total protein, albumin, and transferrin were detected by the biuret, bromocresol green, and immunoturbidimetric methods, respectively. In addition, plasma lipid metabolism and vitamin-related indicators were detected, including triglycerides, total cholesterol, low-density lipoprotein, vitamin A, and vitamin E.

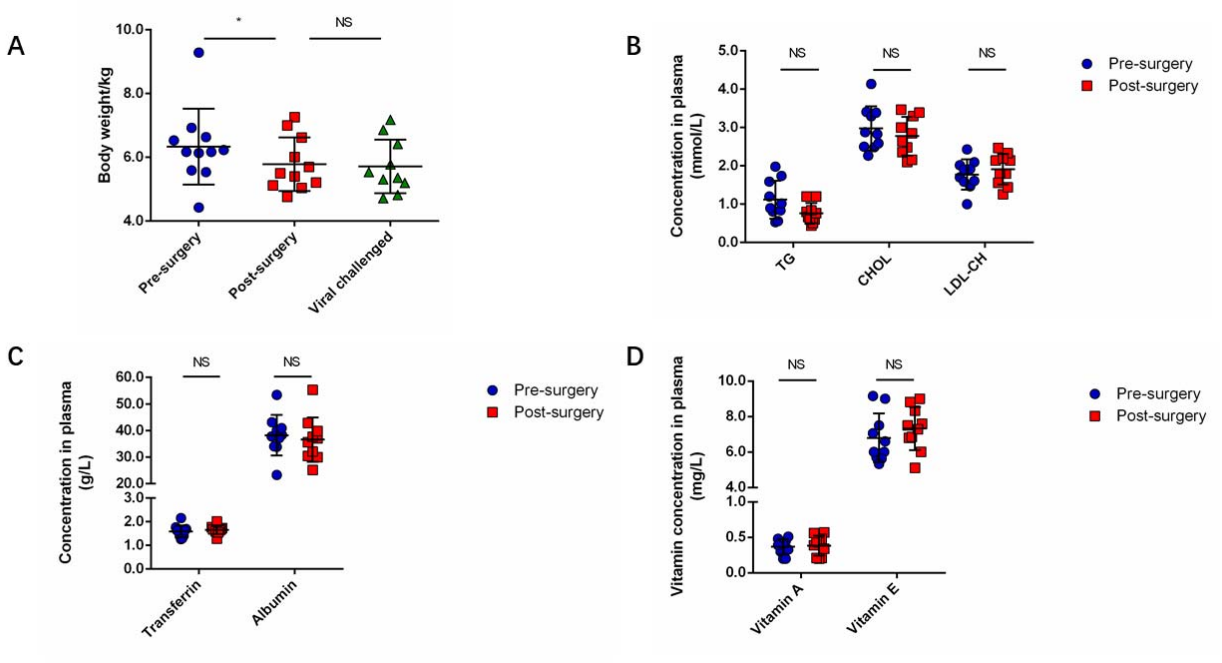
Supplementary Figures



Supplementary Figure S1 Immune status of macaques at four months

post-surgery

A: Absolute number and percentage of immune cells in whole blood (*n*=7). B: sCD14level and FABP2 in plasma (*n*=10). Paired *t*-test was used to compare differences between pre- and post-surgery stages. *: *P*<0.05; NS: No significant difference.



Supplementary Figure S2 Nutritional status of macaques at four months post-surgery

A: Body weight pre-surgery and post-surgery (*n*=11). B: Triglycerides (TG), cholesterol (CHOL), and low-density lipoprotein cholesterol (LDL-CH) levels in plasma (*n*=10). C: Transferrin and albumin levels in plasma (*n*=10). D: Vitamin A and vitamin E levels in plasma (*n*=10). Paired *t*-test was used to compare differences between pre- and post-surgery stages. *: *P*<0.05; NS: No significant difference.

Supplementary Table S1 Characteristics of animals pre- and post-surgery

Macaques	Sex	Weight(kg)	Condition before surgery				Time to defecate after drinking water (h)	Condition after surgery (4 months)			
			Dietary	Diarrhea	Abdominal distension	Vomiting		Dietary	Diarrhea	Abdominal distension	Vomiting
99398	♀	9.29	✓	–	–	–	24	✓	–	_	–
00034	♀	5.99	✓	–	×	–	–	–	–	_	–
00058	♀	6.93	✓	–	–	–	48	✓	–	_	–
00092	♀	6.53	✓	–	–	–	24	✓	–	_	–
01044	♀	6.14	✓	–	–	–	24	✓	–	_	–
02050	♀	4.43	✓	–	–	–	24	✓	–	_	–
08022	♀	6.17	✓	–	–	–	24	✓	–	×	–
08048	♀	6.17	✓	–	–	–	24	✓	–	_	–
08410	♀	5.59	✓	–	–	–	24	✓	–	_	–
09060	♀	6.64	✓	–	–	–	24	✓	–	_	–

09374	♀	5.54	✓	–	–	–	0	✓	–	–	×
10010	♀	6.23	✓	–	–	–	24	✓	–	–	–

"✓" represents monkey showing normal condition; "×" represents monkey showing abnormal condition; " – " represents phenomenon has not been observed.