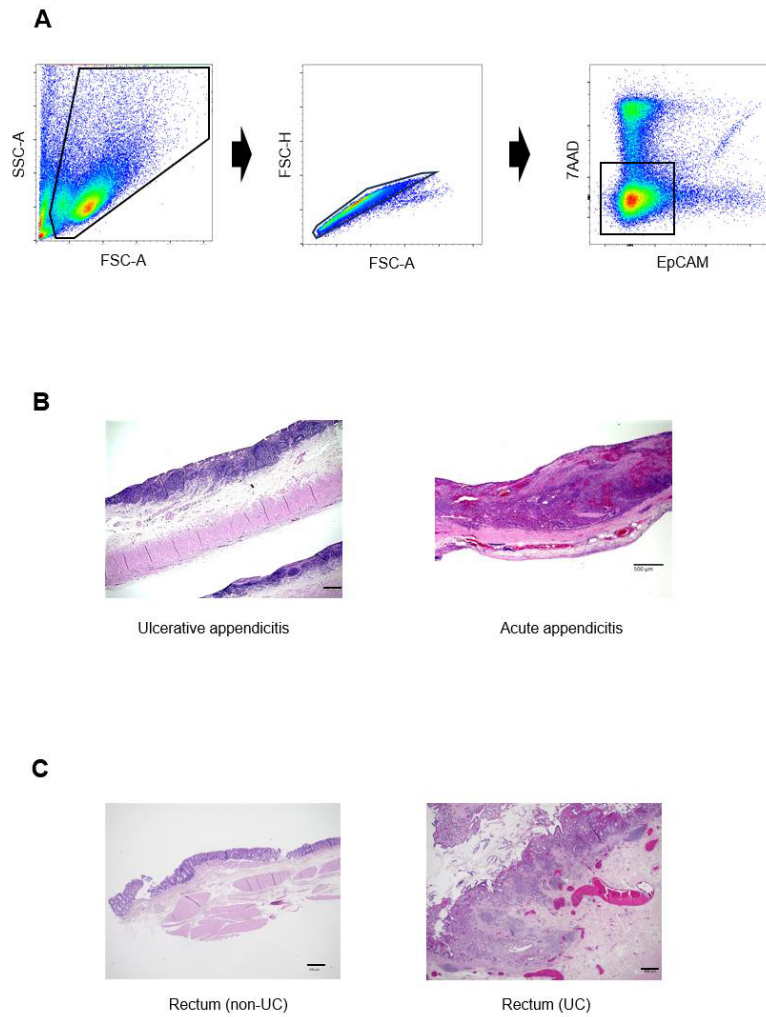
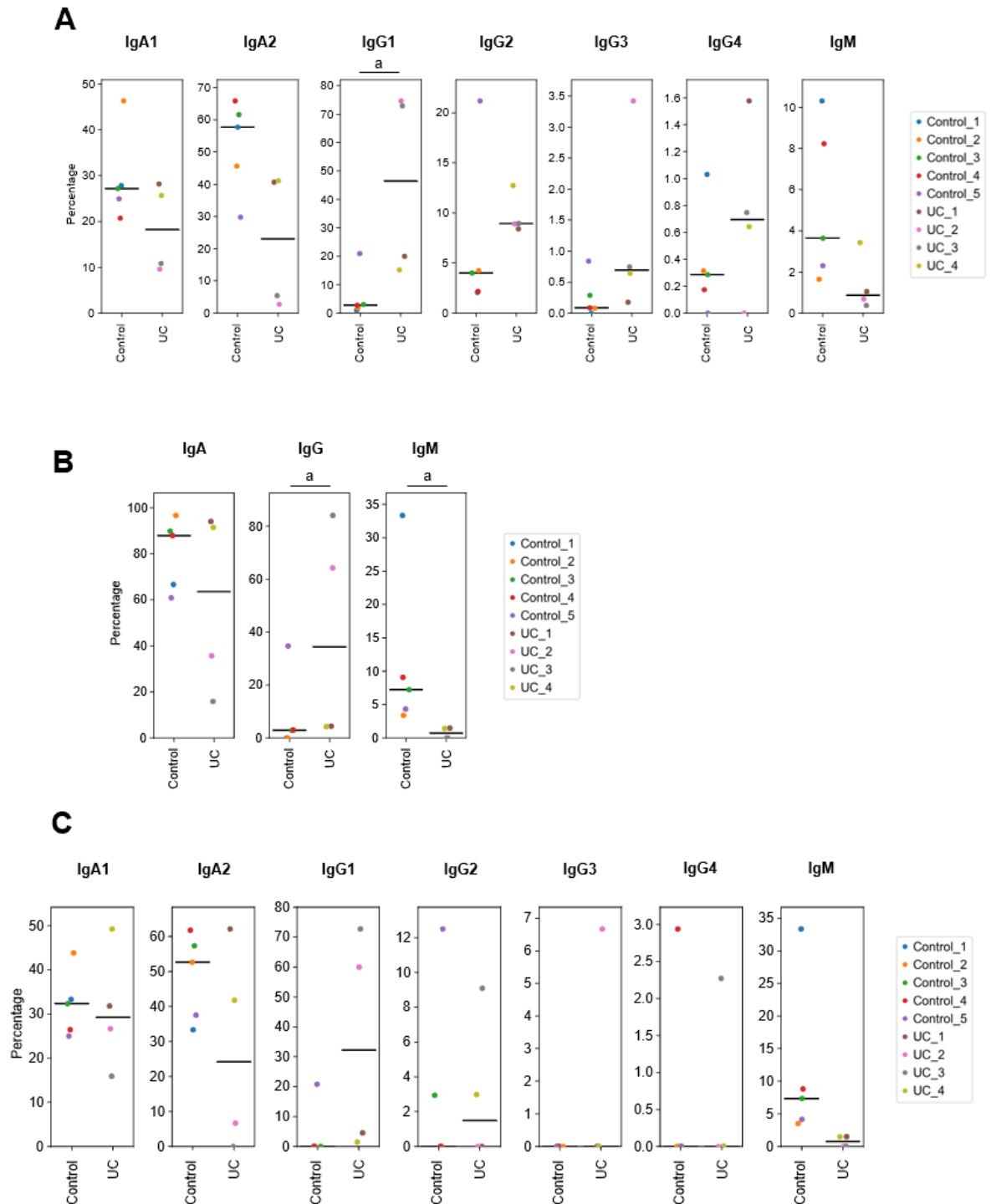


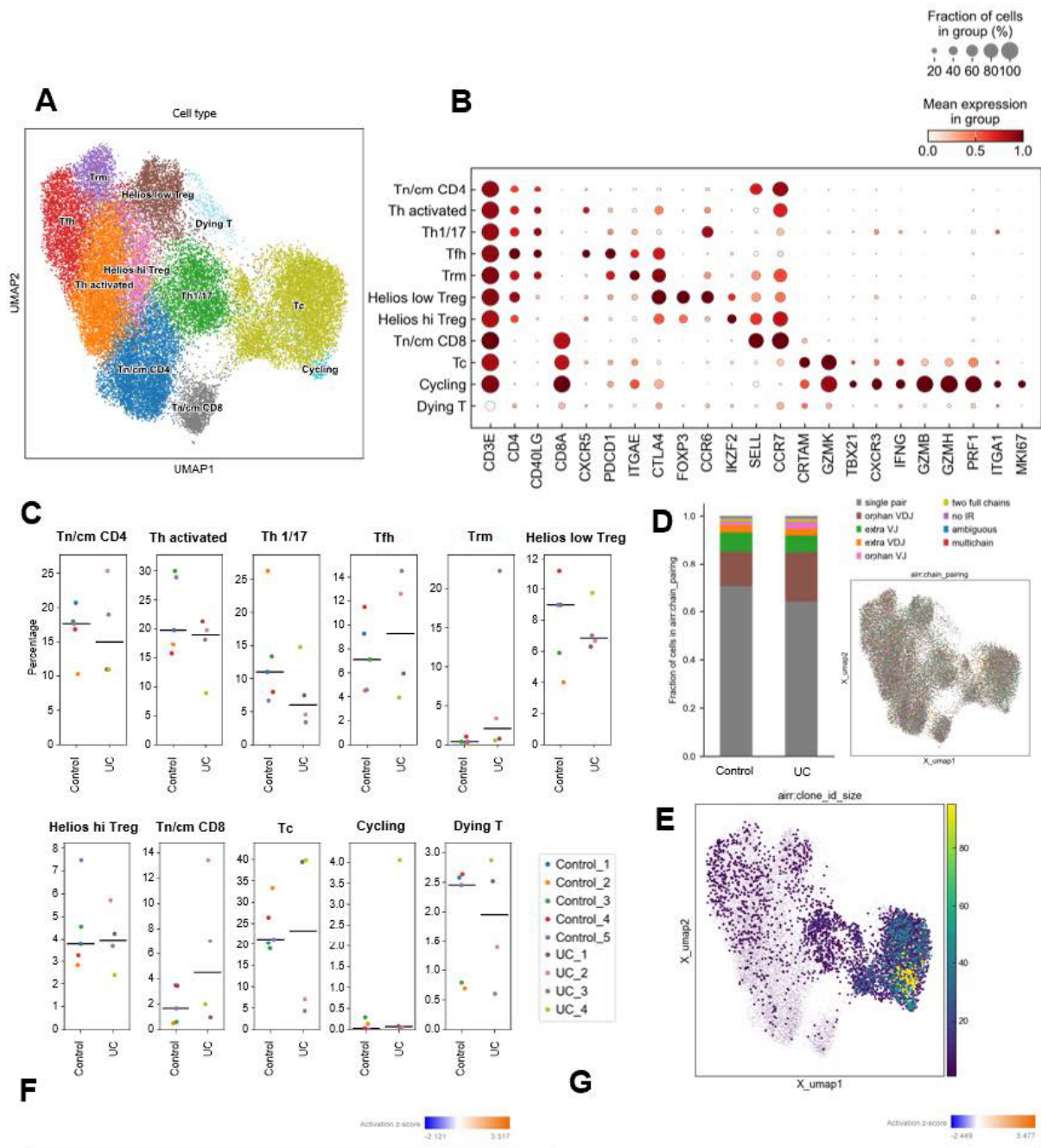


Supplementary Figure 1 Single-cell RNA sequencing and hematoxylin and eosin.

A: Gating strategy for sorting of lamina propria mononuclear cells. Single-cell suspensions of lamina propria mononuclear cells were stained with anti-EpCAM antibody and 7-AAD. EpCAM⁺ 7-AAD⁻ cells were sorted and subjected to single-cell RNA sequencing; B: Hematoxylin and eosin sections of ulcerative appendicitis and acute appendicitis. Representative data are shown. Scale bar = 500 μ m; C: Lymphoid structures in colorectal tissues of controls and patients with ulcerative colitis (UC). Hematoxylin and eosin-stained sections of the rectum of a non-UC patient (left) and a patient with UC (right). Scale bar=500 μ m.



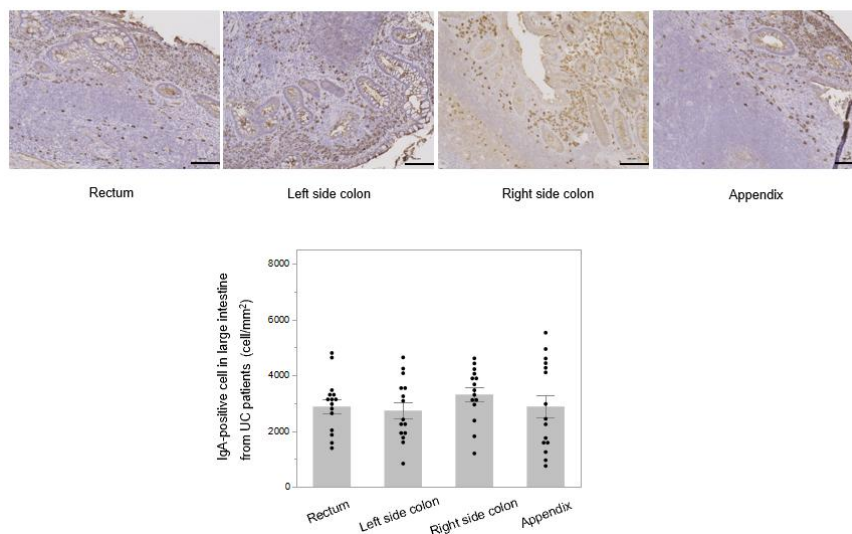
Supplementary Figure 2 Immunoglobulin Isotypes and subclasses expressed by appendiceal plasma cells. A: Immunoglobulin (Ig) subclasses expressed by appendiceal plasma cells from patients with ulcerative colitis (UC) and controls; B: Ig isotypes in C5 from UC and control samples; C: Ig subclasses in C5 from UC ($n = 4$) and control samples ($n = 5$). The scatter plots with median line for each group (A, B and C). $^aP < 0.05$. Ig: Immunoglobulin; UC: Ulcerative colitis.



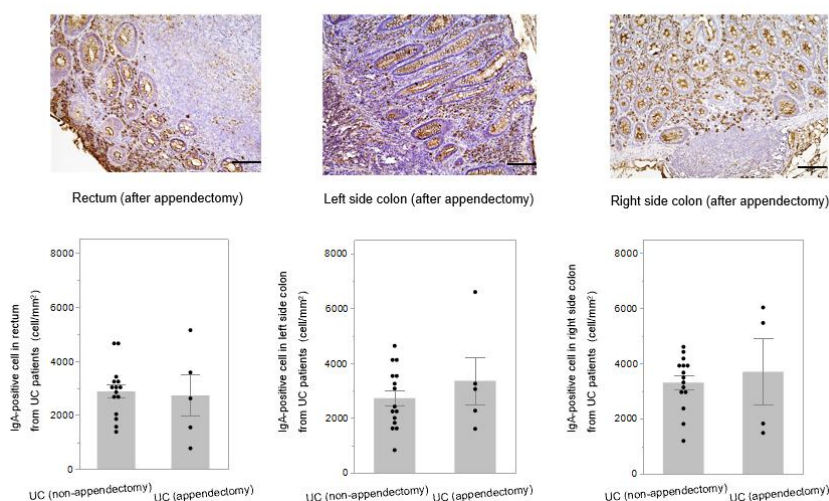
Supplementary Figure 3 Single-cell landscape of the T-cell fraction in the appendices from patients with ulcerative colitis and controls. A: Uniform manifold

approximation and projection plot showing T-cell subsets in the appendix; B: Dot plot showing the expression levels and frequencies of marker genes; C: The scatter plots with median line for each group. ulcerative colitis, $n = 4$; and control, $n = 5$; D: Frequencies of detected T-cell receptor α and β sequences in T cells among donors; E: Distribution of clonally expanded T cells; F: Canonical pathways enhanced in Tc cells; G: Canonical pathways enhanced in Tfh cells. UC: Ulcerative colitis; UMAP: Uniform manifold approximation and projection.

A



B



Supplementary Figure 4 Effect of appendectomy on immunoglobulin A-positive cells in ulcerative colitis. A: Number of immunoglobulin A-positive cells per immunohistochemistry field of each large intestinal region of patients with ulcerative colitis ($n = 15$); B: Number of immunoglobulin A-positive cells per

immunohistochemistry field of ulcerative colitis patients who underwent appendectomy ($n = 5$) or not ($n = 15$). Scale bar = 100 μm (A and B). Bars represent the mean $\pm$ SEM for each group in the scatter plots (A and B). UC: Ulcerative colitis.

Supplementary Table 1 Demographic and clinical characteristics of patients with ulcerative colitis, n (%) / median (range)

	UC with ulcerative appendicitis ($n = 15$)	UC with prior appendectomy ($n = 5$)
Age, years	37 (16-82)	77 (47-92)
Sex	male (73.3)	male (20)
Age at UC diagnosis, years	29 (11-81)	50 (43-91)
Duration of UC, years	4 (1-14)	8 (1-27)
Extension of disease		
Pancolitis	13 (86.7)	5 (100)
Left side	2 (13.3)	0
Proctitis	0	0
Clinical course		
Relapsing-remitting	10 (66.7)	3 (60)
Chronic continuous	4 (26.7)	0
Acute fulminant	1 (6.6)	2 (40)
Single episode	0	0
Mayo Endoscopic Subscore	3 (2-3)	3 (2-3)
Medication history		
Aminosalicylate	14 (93.3)	4 (80)
Systemic steroids	12 (80)	3 (60)
Azathioprine	9 (60)	1 (20)
Tacrolimus	8 (53.3)	0
Cytapheresis	4 (26.7)	1 (20)
Biologics, small molecules	11 (73.3)	0

steroid-dependent	4 (28.6)	0
steroid-refractory	5 (35.7)	1 (20)
Surgical indication	Refractory or Severe	Refractory or Severe
Laboratory data		
Hemoglobin (g/dL)	10.4 (7.8-14.6)	9.7 (8.2-13.5)
White blood cell ($\times 10^2/\mu\text{L}$)	77.6 (42.7-151.8)	56.9 (35-66.7)
Preoperative C-reactive protein (mg/dL)	0.38 (0.02-20.84)	0.1 (0.04-1.81)
Albumin (g/dL)	3.2 (1.2-4.2)	3.1 (2.6-4.1)

UC: Ulcerative colitis.

Supplementary Table 2 Patient Information scRNA-seq analysis of four patients with active ulcerative colitis

	UC1	UC2	UC3	UC4
Age (years)	64	19	16	61
Sex	Male	Male	Male	Male
Extension of disease	Pancolitis	Pancolitis	Pancolitis	Pancolitis
Clinical course	Relapsing-remitting	Relapsing-remitting	Relapsing-remitting	Acute fulminant
Duration of UC (months)	12	24	24	1
Surgical indication	Severe	Refractory	Refractory	Severe
Medication history	Aminosalicylate	Aminosalicylate Systemic	Aminosalicylate Systemic	Aminosalicylate Tacrolimus

		steroids	steroids	
		Azathioprine	Azathioprine	
		Tacrolimus	Tacrolimus	
		Anti-TNF	Anti-TNF	
		Anti-integrins	JAK inhibitor	
		Anti-IL-12/IL-23	Cytapheresis	
		JAK inhibitor		
		Cytapheresis		
Mayo	3	2	2	3
Endoscopic Subscore				

UC: Ulcerative colitis.

Supplementary Table 3 Patient Information scRNA-seq analysis of five controls

	Control 1	Control 2	Control 3	Control 4	Control 5
Age (years)	42	74	83	81	64
Sex	Male	Male	Male	Male	Female
Surgical indication	Transverse colon cancer	Ascending colon cancer	Ascending colon cancer	Ascending colon cancer	Ascending colon cancer