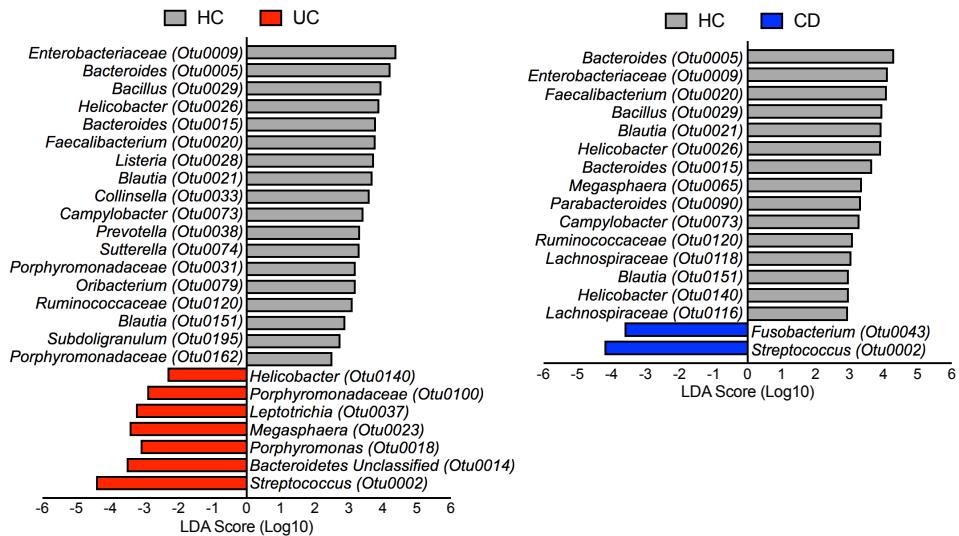
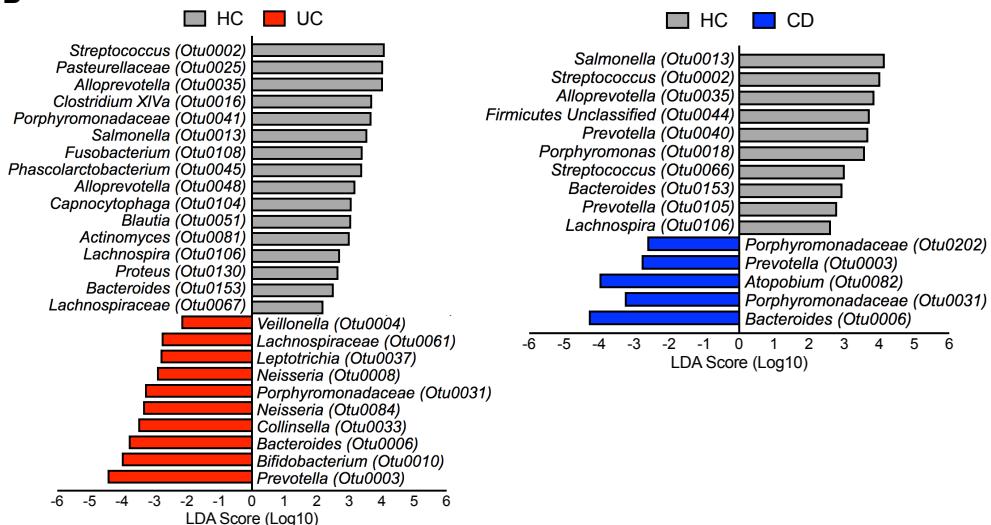
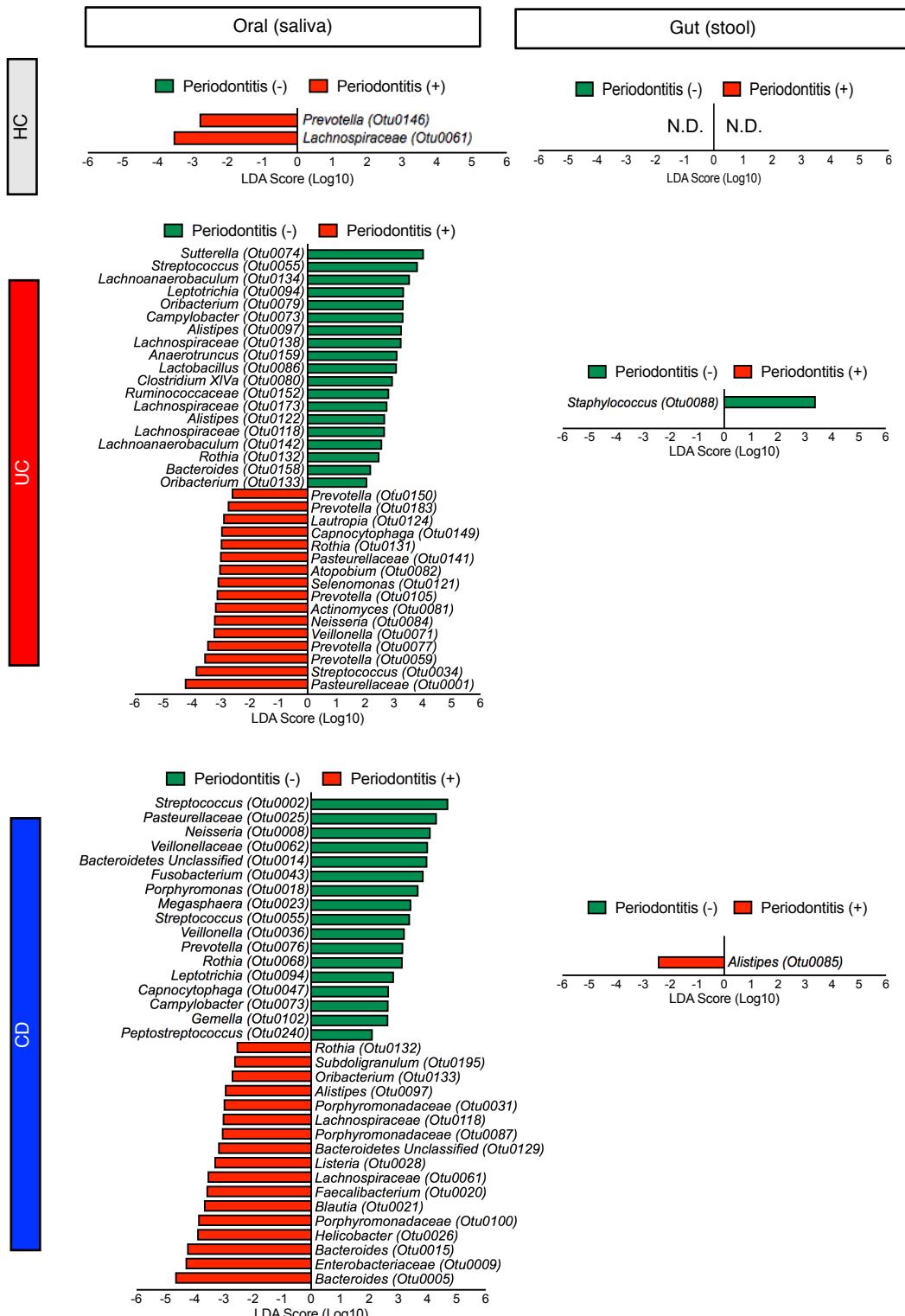


A**B**

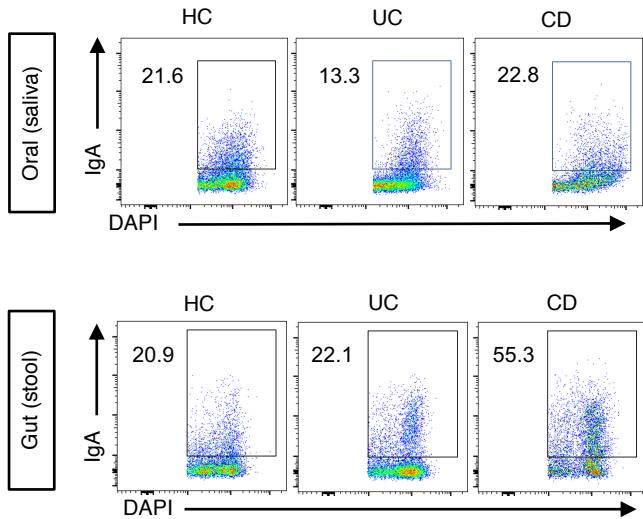
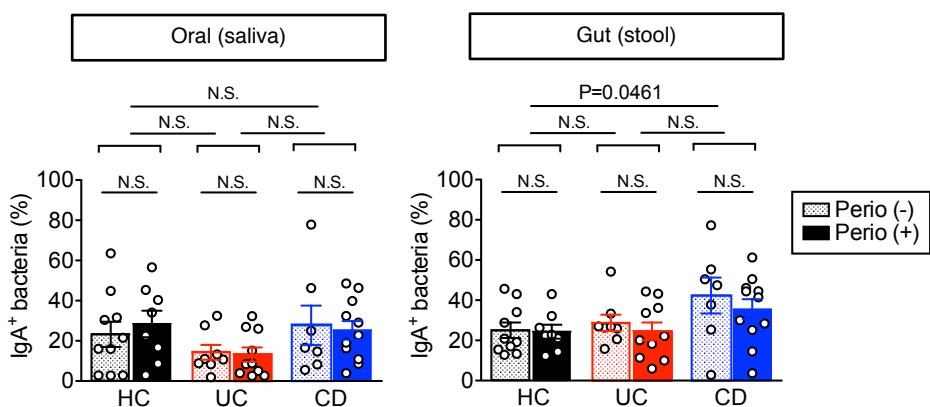
Supplemental Figure 1. Bacterial taxa differentially abundant in IBD.

Bacterial taxa significantly enriched in UC or CD compared to HC were identified by LEfSe. (A) Oral microbiota (saliva). (B) Gut microbiota (stool).



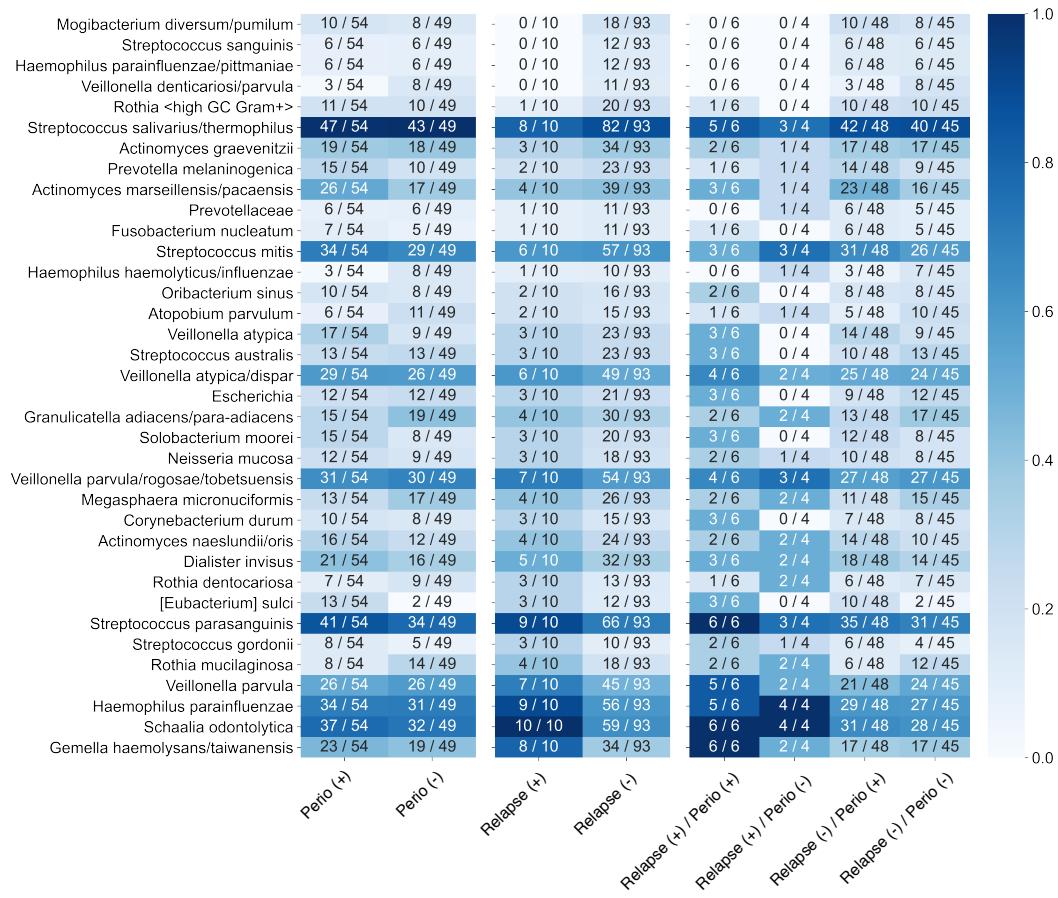
Supplemental Figure 2. Bacterial taxa differentially abundant in incipient periodontitis.

Bacterial taxa significantly different between the presence and absence of incipient periodontitis were identified by LEfSe. (A) Oral microbiota (saliva). (B) Gut microbiota (stool). N.D.; not detected

A**B**

Supplemental Figure 3. IgA-coated bacteria in the saliva and stool.

The abundance of IgA-coated bacteria in the stool. (A) Representative FACS plots. (B) Statistical analysis. Results are shown as mean \pm SD. Dots indicate individual participants (HC = 18, UC = 18, CD = 18). Statistically significant P value by 1-way ANOVA followed by Bonferroni post hoc test is shown. N.S., not significant.



Supplemental Figure 4. Prevalence of bacterial species shared between the oral and gut microbiome.

The prevalence of bacterial species commonly colonized in the oral and gut mucosa is shown.

Supplemental Table 1. Oral characteristics of study participants

		Age	Smoking	Oral characteristics												Periodontal pocket >4mm								Note	
				Bleeding on Probing												Periodontal pocket >4mm									
				Number of teeth	Decayed teeth	Missing teeth	Filled teeth	Retinal teeth	Wisdom teeth	Oral moisture degree	Maxillary Right 4-7	Maxillary 3-3	Maxillary Left 4-7	Mandibular Right 4-7	Mandibular 3-3	Mandibular Left 4-7	Maxillary Right 4-7	Maxillary 3-3	Maxillary Left 4-7	Mandibular Right 4-7	Mandibular 3-3	Mandibular Left 4-7			
HC	Periodontitis (+)	HC-03	29	Current	28	0	0	4	0	0	30.7	4	6	4	6	4	1	0	1	0	0	1			
		HC-05	36	None	28	0	0	3	0	0	31.0	2	0	0	0	0	0	0	0	0	0	0			
		HC-09	24	None	28	4	0	8	4	4	30.0	3	6	4	4	3	3	1	1	1	3	0	2		
		HC-10	22	Current	28	0	0	5	2	2	29.8	2	3	3	2	3	3	0	0	1	1	0	1		
		HC-11	36	None	28	0	0	0	13	0	0	31.0	2	0	0	1	1	1	1	0	1	1	0		
		HC-12	35	None	28	0	0	10	0	0	30.3	4	5	4	2	5	4	0	0	0	2	0	0		
		HC-17	28	None	28	0	0	5	3	4	30.9	1	2	2	0	2	2	0	0	0	1	0	0		
		HC-18	23	None	28	0	0	1	2	4	31.0	1	0	3	0	4	0	2	0	1	0	0	0		
		HC-19	21	None	28	0	0	0	2	4	31.5	3	0	0	0	6	0	1	0	2	1	0	1		
		HC-23	28	1	None	0	6	0	1	1	31.9	0	5	0	3	5	0	0	0	0	1	0	0		
HC	Periodontitis (-)	HC-25	36	None	28	0	0	11	0	1	29.0	4	2	1	3	0	0	1	2	1	1	0	0		
		HC-26	31	None	28	2	0	0	11	0	4	30.9	4	2	1	3	0	0	1	2	1	1	0		
		HC-27	37	Current	28	0	0	0	15	4	4	26.4	0	0	1	1	0	2	0	0	0	1	0		
		HC-28	36	Current	28	3	0	0	8	0	3	29.6	1	1	0	2	0	0	0	0	2	1	2		
		HC-31	35	None	28	0	0	4	2	3	27.0	3	2	3	1	0	1	0	0	0	1	0	0		
		HC-33	31	None	28	0	0	5	0	0	29.3	1	1	2	3	1	2	1	0	1	0	0	0		
		HC-36	29	None	27	7	1*	5	0	2	31.8	5	6	4	2	2	2	0	0	0	1	0	1		
		HC-37	25	None	28	1	0	6	0	1	33.6	2	6	4	4	4	3	2	0	0	1	0	2		
		HC-39	38	None	28	0	0	5	1	3	30.7	2	0	3	2	1	1	0	0	0	1	0	1		
		HC-42	29	None	28	1	0	6	2	4	31.2	4	4	3	1	3	0	0	0	0	1	0	1		
HC	Periodontitis (-)	HC-43	32	None	28	0	0	6	0	0	31.5	4	4	3	3	2	2	0	0	0	1	0	0		
		HC-48	36	Current	28	3	0	0	11	0	0	27.1	1	0	1	2	2	0	0	0	0	1	0		
		HC-01	39	Ex	28	0	0	17	3	4	30.6	0	0	0	0	0	0	0	0	0	0	0	0		
		HC-02	42	None	28	0	0	6	0	0	29.8	2	1	3	1	1	1	0	0	0	0	0	0		
		HC-03	24	None	28	0	0	0	4	4	28.5	0	0	0	0	0	0	0	0	0	0	0	0		
		HC-07	37	None	28	0	0	2	0	0	25.6	0	0	2	1	0	0	0	0	0	0	0	0		
		HC-08	27	None	28	0	0	0	10	0	0	22.5	3	6	3	4	4	4	0	0	0	0	0		
		HC-14	32	None	28	0	0	0	4	0	30.1	0	0	0	0	0	0	0	0	0	0	0	0		
		HC-16	30	None	28	0	0	0	10	0	0	31.3	1	1	3	2	1	0	0	0	0	0	0		
		HC-20	23	None	28	0	0	0	3	3	29.4	0	0	4	3	4	4	0	0	0	0	0	0		
UC	Periodontitis (+)	HC-21	33	None	28	0	0	0	14	0	0	28.1	1	0	2	1	0	0	0	0	0	0	0		
		HC-22	24	None	28	0	0	0	0	0	30.2	3	2	0	2	1	0	0	0	0	0	0	0		
		HC-24	36	None	28	0	0	4	0	0	33.4	2	2	4	3	2	3	0	0	0	0	0	0		
		HC-29	34	Ex	28	1	0	8	0	0	27.6	3	1	2	1	2	2	0	0	0	0	0	0		
		HC-30	36	None	28	0	0	0	10	0	0	32.4	0	0	0	0	0	0	0	0	0	0	0		
		HC-32	36	None	28	0	0	0	13	0	0	31.4	3	2	2	1	3	1	0	0	0	0	0		
		HC-34	32	Ex	28	0	0	5	2	2	33.0	0	0	0	0	0	0	0	0	0	0	0	0		
		HC-35	28	None	28	0	0	0	5	2	4	31.0	0	0	0	0	0	0	0	0	0	0	0		
		HC-36	24	None	28	0	0	0	0	0	22.5	0	0	0	0	0	0	0	0	0	0	0	0		
		HC-39	38	None	28	0	0	0	14	0	0	30.5	1	0	2	1	1	0	0	0	1	0	1		
UC	Periodontitis (-)	HC-40	20	None	28	0	0	0	20	0	0	30.3	4	4	1	0	1	3	0	2	1	0	2		
		HC-21	37	None	28	0	0	0	7	1	4	31.7	0	0	0	0	0	0	0	0	1	0	0		
		HC-23	23	None	28	0	0	0	3	4	19.8	0	0	0	3	1	0	0	0	0	0	0	0		
		HC-24	35	None	28	0	0	0	8	2	30.0	2	0	1	0	0	0	2	0	1	0	0	0		
		HC-26	28	None	28	0	0	0	5	0	0	31.4	1	6	2	0	0	0	0	1	0	0	0		
		HC-28	19	None	28	0	0	0	4	4	31.9	3	2	3	3	3	0	0	0	1	0	0	0		
		HC-29	25	None	28	0	0	0	5	0	0	25.2	0	0	0	0	0	0	0	0	1	0	0		
		HC-30	32	None	28	0	0	0	5	0	0	30.5	1	0	0	0	0	0	0	0	1	0	1		
		HC-31	40	None	28	1	0	0	2	0	0	26.6	0	0	0	1	0	0	0	1	0	0	2		
		HC-34	39	None	28	0	0	0	5	0	0	31.4	0	6	3	1	0	0	0	0	1	0	1		
UC	Periodontitis (-)	HC-35	40	None	28	2	0	0	1	0	0	30.1	4	3	1	2	2	3	0	0	0	1	0		
		HC-36	32	None	28	10	0	3	2	4	29.8	0	0	1	4	0	0	0	0	0	1	0	0		
		HC-39	27	None	28	0	0	10	0	0	28.2	0	0	3	1	0	0	0	0	0	1	0	0		
		HC-41	26	None	28	0	0	9	0	0	28.5	1	0	3	5	4	2	0	0	0	1	0	0		
		HC-42	29	None	28	1	0	0	2	0	0	30.4	0	0	0	2	1	0	0	0	0	0	1		
		HC-43	35	None	27	2	1*	9	0	3	32.9	4	2	4	1	6	1	1	0	0	0	0	0		
		HC-44	20	None	28	1	0	0	1	4	27.2	0	0	2	0	0	0	0	0	0	0	0	0		
		HC-45	26	None	28	0	0	6	2	4	27.9	4	6	4	4	6	4	0	0	1	2	0	1		
		HC-02	35	None	28	1	0	0	10	2	3	32.8	0	0	0	1	0	0	0	0	0	0	0		
		HC-03	30	None	28	0	0	4	4	4	31.0	0	1	0	1	1	1	0	0	0	0	0	0		
CD	Periodontitis (+)	HC-04	22	None	28	0	0	0	1	3	32.2	2	0	1	2	0	0	0	0	0	0	0	0		
		CD-05	25	None	28	0	0	0	12	0	0	28.8	0	0	3	2	0	0	0	0	0				

Supplemental Table 2. Clinical features of patients with inflammatory bowel disease

		No.	Mayo score	Disease duration (years)	Disease extent	Steroid	Relapse	Extraintestinal complications (EIM)							Treatment history				First diagnosis
								PBC	PSC	Gallstone	Spondyloarthritis	Arthritis	Aphthous	Erythema nodosum	5-ASA	Thioprine	αTNF	PSL	
UC	Periodontitis (+)	UC-01	4	7.6	E3	SR									○	○	○		2010-12
		UC-11	1	4.3	E1	SF									○				2014-03
		UC-12	1	5.8	E3	SD	○								○	○		○	2012-08
		UC-14	2	6.2	E3	SF									○				2012-05
		UC-15	0	4.7	E3	SF									○				2013-11
		UC-16	5	2	E3	SF							○		○				2016-07
		UC-20	1	3.3	E3	SF									○				2015-04
		UC-21	1	8.9	E3	SF									○				2009-10
		UC-23	3	6.6	E3	SD									○	○		○	2011-11
		UC-24	3	0.4	E3	SD									○				2018-03
		UC-26	0	12.7	E3	SF									○				2005-11
		UC-27	1	2.1	E2	SF	○								○				2016-06
		UC-29	0	4.2	E3	SF									○				2014-06
		UC-31	1	2.1	E3	SF									○				2016-09
		UC-34	1	8.6	E1	SF									○				2010-01
		UC-35	2	16.6	E2	SF									○				2002-02
		UC-36	2	11.5	E3	SF			○						○				2007-02
		UC-39	5	9.7	E2	SD	○								○	○		○	2009-07
		UC-41	2	7.4	E2	SF									○				2011-05
		UC-42	4	5	E3	SF									○	○	○		2013-09
		UC-43	1	15.1	E3	SF									○				2003-08
		UC-44	0	0.3	E3	SF													2018-05
		UC-45	0	9.2	E1	SF									○				2009-11
	Periodontitis (-)	UC-02	3	19.9	E3	SD							○		○	○		○	1998-07
		UC-03	2	1.4	E3	SD	○						○		○	○			2017-02
		UC-04	3	4	E3	SD							○		○	○		○	2014-06
		UC-05	2	8.8	E3	SF							○						2009-10
		UC-06	4	4.7	E3	SF							○						2013-11
		UC-08	0	2.6	E2	SF							○						2015-11
		UC-09	1	1.1	E3	SF	○						○						2017-04
		UC-10	2	1.6	E1	SF							○						2016-11
		UC-13	0	11.4	E3	SF							○						2007-02
		UC-17	0	4.1	E3	SD							○		○	○			2014-05
		UC-18	2	8.3	E3	SD							○		○	○			2010-03
		UC-19	5	0.5	E3	SD							○		○	○			2017-12
		UC-22	1	2.4	E3	SF							○						2016-03
		UC-30	1	1.7	E2	SF							○						2016-11
		UC-32	3	9.2	E2	SF							○						2009-06
		UC-33	0	4.4	E3	SF	○						○						2014-04
		UC-37	0	5.4	E3	SF				○					○				2013-03
		UC-38	2	13.9	E2	SF	○						○		○				2004-11
		UC-40	0	6.3	E3	SF			○					○	○				2012-06

Extent: E1; Ulcerative proctitis, E2; Left-side UC, E3; Extensive

Steroid: Steroid refractory (SR), Steroid dependent (SD), Steroid free (SF)

CD		No.	Simple CDAI	Disease duration (years)	Disease location	Disease behavior	Resistance to Biologics (RE)	Relapse	Extraintestinal complications (EIM)							Treatment history				First diagnosis
									PSC	Pancreatitis	Gallstone	Spondyloarthritis	Arthritis	Aphthous	Erythema nodosum	5-ASA	Thioprine	αTNF	PSL	
CD	Periodontitis (+)	CD-01	1	15.1	L1	B1										○	○	○		2003-06
		CD-02	1	2.3	L3	B2			○							○		○		2016-04
		CD-03	0	1.9	L3	B2			○										○	2016-08
		CD-07	0	2.1	L1	B1								○						2016-07
		CD-10	0	6	L3	B2									○					2012-08
		CD-12	0	1.9	L3	B2									○					2016-08
		CD-13	3	17.1	L1	B2									○					2001-06
		CD-16	2	3.5	L1	B2									○					2015-02
		CD-17	0	3.2	L3	B1									○					2015-06
		CD-19	0	4.6	L3	B2			○						○	○	○			2014-01
		CD-22	1	1.1	L3	B2			○						○	○			○	2017-07
	Periodontitis (-)	CD-06	7	6.7	L3	B3									○					2011-09
		CD-08	0	7.3	L2	B1									○					2011-05
		CD-14	0	6.4	L3	B2									○	○	○			2012-02
		CD-18	0	14.6	L3	B1									○					2004-02
		CD-20	6	8.8	L1	B2									○					2009-11
		CD-24	1	17.5	L3	B1									○					2001-05
		CD-25	0	4	L3	B2									○					2015-01

Location (L): L1; Terminal ileum, L2; Colon, L3; Ileocolon, L4; Upper GI

Behaviour (B): B1; Non-stricture, non-penetrating, B2; Stricture, B3; Penetrating

Supplemental Table 3. Clinical course of patients with inflammatory bowel disease

		Initial (day 0)		Follo-up visit (1st)					Follo-up visit (2nd)					Follo-up visit (3rd)					Composite
		Dental check (mm/dd/yy)	pMayo	Visit date (mm/dd/yy)	Interval (days from initial)	pMayo	Add drug	Relapse	Visit date (mm/dd/yy)	Interval (days from initial)	pMayo	Add drug	Relapse	Visit date (mm/dd/yy)	Interval (days from initial)	pMayo	Add drug	Relapse	
UC	Periodontitis (+)	UC-01	07/09/18	4	09/29/18	82	2		12/04/18	148	1			02/03/19	209	1			+
		UC-11	07/09/18	1	09/03/18	56	1		10/15/18	98	0			11/12/18	126	0			+
		UC-12	06/19/18	1	07/03/18	14	0		08/14/18	56	0			10/09/18	112	4	PSL+	+	+
		UC-14	07/24/18	2	09/18/18	56	2		11/20/18	119	2			01/08/19	168	2			
		UC-15	07/31/18	0	10/02/18	63	3		12/18/18	140	0			02/25/19	209	0			+
		UC-16	07/30/18	5	09/24/18	56	3		11/04/18	97	2			01/12/19	166	1			
		UC-20	08/02/18	1	09/20/18	49	0		11/15/18	105	0			01/17/19	168	0			+
		UC-21	08/27/18	1	10/29/18	63	0		12/20/18	115	0			02/21/19	178	0			+
		UC-23	06/30/18	3	09/04/18	66	1		12/03/18	156	1			02/05/19	220	1			+
		UC-24	08/25/18	3	11/04/18	71	1		01/12/19	140	1			03/22/19	209	1			+
		UC-26	07/17/18	0	08/14/18	28	0		09/11/18	56	6			09/18/18	63	2			+
		UC-27	07/17/18	1	09/10/18	55	3	5-ASA up	11/02/18	108	2			02/03/19	201	1	+		+
		UC-29	08/21/18	0	10/16/18	56	0		12/11/18	112	0			02/05/19	168	0			+
		UC-31	10/11/18	1	12/06/18	56	1		02/03/19	115	1			04/26/19	197	0			+
		UC-34	09/04/18	1	11/13/18	70	0		01/29/19	147	0			03/12/19	189	0			+
		UC-35	09/04/18	2	11/06/18	63	2		01/22/19	140	2			03/26/19	203	2			
		UC-36	09/08/18	2	11/15/18	68	2		01/26/19	140	2			04/13/19	217	2			
		UC-39	03/20/19	5	05/14/19	55	0		07/09/19	111	0			07/22/19	124	4	rectum 5-ASA	+	+
		UC-41	09/22/18	2	11/24/18	63	2		01/26/19	126	2			03/30/19	189	2			
		UC-42	10/02/18	4	11/27/18	56	0		01/22/19	112	0			03/19/19	168	0			
		UC-43	09/06/18	1	10/18/18	42	0		11/15/18	70	0			01/10/19	126	3			+
		UC-44	09/18/18	0	12/22/18	95	0		02/04/19	139	0			04/27/19	221	0			+
		UC-45	01/21/19	0	03/18/19	56	0		05/27/19	126	0			07/22/19	182	0			+
	Periodontitis (-)	UC-02	05/31/18	3	07/22/18	52	2		09/24/18	116	0			12/13/18	196	0			
		UC-03	07/10/18	2	09/04/18	56	3	SASP+	11/26/18	139	1			02/03/19	208	0			+
		UC-04	06/12/18	3	09/03/18	83	2		11/20/18	161	1			02/03/19	236	0			
		UC-05	07/28/18	2	10/03/18	67	1		12/11/18	136	0			02/06/19	193	0			+
		UC-06	07/28/18	4	09/29/18	63	2		10/27/18	91	2			11/27/18	122	4			
		UC-08	07/13/18	0	08/06/18	24	0		09/04/18	53	0			10/29/18	108	1			+
		UC-09	06/04/18	1	07/03/18	29	4	5-ASA up	08/25/18	82	2			10/04/18	122	1			+
		UC-10	06/26/18	2	09/03/18	69	0		12/04/18	161	0			02/06/19	225	0			
		UC-13	07/30/18	0	10/01/18	63	0		12/03/18	126	0			01/21/19	175	0			+
		UC-17	07/02/18	0	08/20/18	49	0		10/01/18	91	0			12/17/18	168	0			+
		UC-18	06/30/18	2	08/21/18	52	0		10/16/18	108	0			11/20/18	143	1			
		UC-19	06/11/18	5	07/08/18	27	3		10/03/18	114	2			12/26/18	198	1			
		UC-22	08/30/18	1	10/25/18	56	0		11/29/18	91	0			02/14/19	168	1			+
		UC-30	07/17/18	1	09/11/18	56	0		10/30/18	105	0			12/17/18	153	0			+
		UC-32	08/28/18	3															
		UC-33	09/10/18	0	11/19/18	70	0		01/21/19	133	5	rectum 5-ASA	+	02/25/19	168	3	+		+
		UC-37	08/14/18	0	09/22/18	39	2		11/22/18	100	1			01/15/19	154	1			+
		UC-38	09/25/18	2	11/27/18	63	6	PSL up	02/19/19	153	0								+
		UC-40	09/19/18	0	12/05/18	77	0		02/19/19	153	0								+

		Initial (day 0)		Follo-up visit (1st)					Follo-up visit (2nd)					Follo-up visit (3rd)					Composite
		Dental check (mm/dd/yy)	pMayo	Visit date (mm/dd/yy)	Interval (days from initial)	pMayo	Add drug	Relapse	Visit date (mm/dd/yy)	Interval (days from initial)	pMayo	Add drug	Relapse	Visit date (mm/dd/yy)	Interval (days from initial)	pMayo	Add drug	Relapse	
CD	Periodontitis (+)	CD-01	07/04/18	1	08/29/18	56	0		10/24/18	112	0			12/19/18	168	0			
		CD-02	07/30/18	1	08/13/18	14	6	aTNF up	09/15/18	47	5			11/04/18	97	4			+
		CD-03	07/10/18	0	09/04/18	56	0		11/06/18	119	5	PSL +	+	12/16/18	159	3			+
		CD-07	08/13/18	0	10/09/18	57	0		12/04/18	113	0			02/05/19	176	0			
		CD-10	08/14/18	0	10/09/18	56	0		12/18/18	126	0			01/18/19	157	0			
		CD-12	07/31/18	0	09/18/18	49	0		10/23/18	84	0			01/13/19	166	1			+
		CD-13	08/08/18	3	09/25/18	48	0		11/14/18	98	0			01/09/19	154	1			+
		CD-16	08/28/18	2	10/23/18	56	2		12/18/18	112	0			02/12/19	168	2			+
		CD-17	08/21/18	0	10/16/18	56	0		12/04/18	105	0			01/29/19	161	0			
		CD-19	08/29/18	0	10/31/18	63	0		12/26/18	119	0			02/08/19	163	0			
		CD-22	08/25/18	1	09/29/18	35	3		11/01/18	68	5	PSL +	+	02/18/19	177	2			+
	Periodontitis (-)	CD-06	06/12/18	7	09/12/18	92	4		11/15/18	156	3			01/25/19	227	1			
		CD-08	09/08/18	0	12/08/18	91	0		03/09/19	182	0			05/30/19	264	0			
		CD-14	07/28/18	0	10/13/18	77	0		12/08/18	133	0			02/03/19	190	0			
		CD-18	09/22/18	0	10/27/18	35	0		12/22/18	91	0			03/09/19	168	0			
		CD-20	08/22/18	6	11/02/18	72	0		02/14/19	176	0			05/25/19	276	1			+
		CD-24	11/05/18	1	01/28/19	84	0		04/22/19	168	0			07/23/19	260	0			
		CD-25	01/08/19	0	03/05/19	56	2		06/18/19	161	0			08/13/19	217	0			+