

Supplementary information

**Immune regulation by fungal strain diversity
in inflammatory bowel disease**

In the format provided by the
authors and unedited

Table 1. Fungal genera abundance detected abundance detected in non-IBD and UC individuals

Genus	n (nonIBD)	Abundance (nonIBD)	n (UC)	Abundance (UC)	p.adj
Candida	37	0.659022921	40	0.817827815	0.0089
Saccharomyces	37	0.147829019	40	0.09426436	0.012
Rhodotorula	37	0.055491583	40	0.002174929	0.068
Galactomyces	37	0.031875586	40	0.000334147	0.0097
Saccharomycopsis	37	0.026297441	40	0.012502095	0.18
Guehomyces	37	0.020158096	40	1.22E-05	0.14
Trichosporon	37	0.009869242	40	0.000326862	0.7
Cryptococcus	37	0.009186264	40	0.003510156	0.12
Malassezia	37	0.007957525	40	0.01364634	0.1
Meyerozyma	37	0.006428386	40	8.75E-06	0.078
Other	37	0.005770262	40	0.011345802	0.012
Cyberlindnera	37	0.005726457	40	0.002615145	0.8
Debaryomyces	37	0.005490932	40	0.0056597	0.94
Filobasidium	37	0.004115408	40	0.005586823	0.03
Wallemia	37	0.002237	40	0.006678702	1.3E-05
Aspergillus	37	0.00221533	40	0.002294888	0.0016
Agaricus	37	0.000328547	40	0.009909633	0.098
Phoma	37	0	40	0.00686873	3.4E-07
Alternaria	37	0	40	0.004432869	3.4E-07

Table 2. Fungal strains used in the study

strain ID	Species	Strain description	Patient	Source
SC5314	Candida albicans	Blood-derived reference strain	N/A	
M1477	Candida albicans	BWP17+Cpl20 (Parental Strain)	N/A	Moyes et al., 2016
M2047	Candida albicans	<i>ece1</i> Δ/Δ (<i>ece</i> mutant)	N/A	Moyes et al., 2016
IDA651	Candida albicans	Gut-derived commensal strain	UC	This study
IDA652	Candida albicans	Gut-derived commensal strain	UC	This study
IDA653	Candida albicans	Gut-derived commensal strain	UC	This study
IDA921	Candida albicans	Gut-derived commensal strain	UC	This study
IDA922	Candida albicans	Gut-derived commensal strain	UC	This study
IDA923	Candida albicans	Gut-derived commensal strain	UC	This study
IDB311	Candida albicans	Gut-derived commensal strain	UC	This study
IDB312	Candida albicans	Gut-derived commensal strain	UC	This study
IDB313	Candida albicans	Gut-derived commensal strain	UC	This study
IDB831	Candida albicans	Gut-derived commensal strain	UC	This study
IDB832	Candida albicans	Gut-derived commensal strain	UC	This study
IDB833	Candida albicans	Gut-derived commensal strain	UC	This study
IDB071	Candida albicans	Gut-derived commensal strain	UC	This study
IDB072	Candida albicans	Gut-derived commensal strain	UC	This study
IDB073	Candida albicans	Gut-derived commensal strain	UC	This study
IDB101	Candida albicans	Gut-derived commensal strain	UC	This study
IDB102	Candida albicans	Gut-derived commensal strain	UC	This study
IDB104	Candida albicans	Gut-derived commensal strain	UC	This study
IDC481	Candida albicans	Gut-derived commensal strain	UC	This study
IDC482	Candida albicans	Gut-derived commensal strain	UC	This study
IDC483	Candida albicans	Gut-derived commensal strain	UC	This study
IDC571	Candida albicans	Gut-derived commensal strain	UC	This study
IDC572	Candida albicans	Gut-derived commensal strain	UC	This study
IDC661	Candida albicans	Gut-derived commensal strain	UC	This study
IDC662	Candida albicans	Gut-derived commensal strain	UC	This study
IDC711	Candida albicans	Gut-derived commensal strain	UC	This study
IDC712	Candida albicans	Gut-derived commensal strain	UC	This study
IDB032	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDB671	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDB891	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDC361	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDC561	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDC562	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDC563	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDD311	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDD312	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDD581	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDD582	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDD761	Candida albicans	Gut-derived commensal strain	Non-IBD	This study
IDB311 (<i>ece1</i> Δ/Δ)	Candida albicans	Modified from IDB311 strain	N/A	This study

IDC561 (<i>ece1</i> Δ/Δ)	Candida albicans	Modified from IDC561 strain	N/A	This study
IDB101 (<i>ece1</i> Δ/Δ)	Candida albicans	Modified from IDB101strain	N/A	This study
IDB891 (<i>ece1</i> Δ/Δ)	Candida albicans	Modified from IDB891 strain	N/A	This study
IDB311 (<i>efg1</i> Δ/Δ)	Candida albicans	Modified from IDB311 strain	N/A	This study
IDB101 (<i>efg1</i> Δ/Δ)	Candida albicans	Modified from IDB101strain	N/A	This study
pkID01	Pichia kudriavzevii	Gut-derived commensal strain	Non-IBD	This study

Table 3. Plasmid, primers and repair templates used in this study

Plasmids used in this study	Description
pV1524	<i>C. albicans</i> CRISPR vector flanked by Neut5+FRT targeting regions
pVXL21	pV1524 + sgCaECE1
pVXL22	pV1524 + sgCaEFG1
Oligonucleotide sequences used in this study	
sgRNA cloning Primers	
CaEfg1gRNA -fwd	atttgTCACAACAGCCACCACTACCg
CaEfg1gRNA -rev	aaaacGGTAGTGGTGGCTGTTGTGAc
CaEce1gRNA -fwd	atttgAATTTCTGGCAATCTGACGAg
CaEce1gRNA -rev	aaaacTCGTCAGATTGCCAGAAATTC
Repair Templates for mutagenesis	
CaEfg1-delta-fwd	AACGAATTAAGATTTGTTCTATTTGACTACCAAGAATATAACCCATATTATAAATATCAT
CaEfg1-delta-rev	TTTGGAATTTATGGCAGAAAGCAGAAGGTGATGTACACAAATGATATTTATAATATGGGT
CaEce1-delta-fwd	AACAAACAACCTTTCTTTATTTTACTACCAACTATTTTCCATTTCGTTAAAATGCTCAGCA
CaEce1-delta-rev	TGGAATAAAAAGATTAAGCTTGTGGAAAACAAATTTTATCTGCTGAGCATTTTAACGAAT
Colony PCR/Sequencing Primers	
Plasmid Sequencing F Primer	ggcatagctgaaacttcggccc
CaEce1-PCR-fwd	CAATTCAAAACGAATTGCACC
CaEce1-PCR-rev	ATATCAATACAGCGAGCCAT
CaEfg1-PCR-fwd	AATTCATTACCAGGCGTGTT
CaEfg1-PCR-rev	CGTTCATGTCAATGGATTG
Primers for RT-PCR	
CaEce1-PCR-fwd	cttcaaagactcccacaactcat
CaEce1-PCR-rev	agctttccgaaatattctcaatca
CaEfg1-PCR-fwd	CATTGATCCGATTTTACAACG
CaEfg1-PCR-rev	CCTACAACAGATATCAGTATCC
CaActin-PCR-fwd	TCAGACCAGCTGATTTAGGTTTG
CaActin-PCR-rev	GTGAACAATGGATGGACCAG

Table 4 Summary of whole genomes of *C. albicans* strains used in the study

C. albicans Strain	Site	Location	SNP.cluster	SRA.run.number	Source
IDA651	colon of UC	United States	2	PRJNA702809	This study
IDA652	colon of UC	United States	2	PRJNA702809	This study
IDA653	colon of UC	United States	2	PRJNA702809	This study
IDA921	colon of UC	United States	2	PRJNA702809	This study
IDA922	colon of UC	United States	2	PRJNA702809	This study
IDA923	colon of UC	United States	2	PRJNA702809	This study
IDB311	colon of UC	United States	NC	PRJNA702809	This study
IDB312	colon of UC	United States	NC	PRJNA702809	This study
IDB313	colon of UC	United States	NC	PRJNA702809	This study
IDB831	colon of UC	United States	NC	PRJNA702809	This study
IDB832	colon of UC	United States	NC	PRJNA702809	This study
IDB833	colon of UC	United States	NC	PRJNA702809	This study
IDB032	colon of Non-IBD	United States	1	PRJNA702809	This study
IDB071	colon of UC	United States	1	PRJNA702809	This study
IDB072	colon of UC	United States	1	PRJNA702809	This study
IDB073	colon of UC	United States	1	PRJNA702809	This study
IDB101	colon of UC	United States	1	PRJNA702809	This study
IDB102	colon of UC	United States	1	PRJNA702809	This study
IDB104	colon of UC	United States	1	PRJNA702809	This study
IDB671	colon of Non-IBD	United States	C	PRJNA702809	This study
IDB891	colon of Non-IBD	United States	NC	PRJNA702809	This study
IDC361	colon of Non-IBD	United States	1	PRJNA702809	This study
IDC481	colon of UC	United States	NC	PRJNA702809	This study
IDC482	colon of UC	United States	NC	PRJNA702809	This study
IDC483	colon of UC	United States	NC	PRJNA702809	This study
IDC561	colon of Non-IBD	United States	1	PRJNA702809	This study
IDC562	colon of Non-IBD	United States	1	PRJNA702809	This study
IDC563	colon of Non-IBD	United States	1	PRJNA702809	This study
IDC571	colon of UC	United States	1	PRJNA702809	This study
IDC661	colon of UC	United States	2	PRJNA702809	This study
IDC711	colon of UC	United States	1	PRJNA702809	This study
IDD311	colon of Non-IBD	United States	1	PRJNA702809	This study
IDD581	colon of Non-IBD	United States	1	PRJNA702809	This study
IDD582	colon of Non-IBD	United States	1	PRJNA702809	This study
IDD761	colon of Non-IBD	United States	1	PRJNA702809	This study
CEC3560	Superficial	Niger	1	SRR6669916	Ropars et al., 2018
CEC4480	Food spoilage	Unknown	1	SRR6669934	Ropars et al., 2018
CEC3623	Vagina	Morocco	1	SRR6669884	Ropars et al., 2018
CEC4500	Food spoilage	Unknown	1	SRR6669888	Ropars et al., 2018
CEC3544	Mouth	Belgium	1	SRR6669962	Ropars et al., 2018
CEC3658	Superficial	France	1	SRR6669900	Ropars et al., 2018
CEC4883	Vagina	China	1	SRR6670022	Ropars et al., 2018
CEC4484	Food spoilage	Unknown	1	SRR6669909	Ropars et al., 2018
CEC4107	Superficial	Senegal	1	SRR6669933	Ropars et al., 2018
CEC3621	Vagina	Brazil	1	SRR6669878	Ropars et al., 2018
CEC3612	Vagina	Morocco	2	SRR6669942	Ropars et al., 2018

CEC3558	Mouth	Belgium	2	SRR6669992	Ropars et al., 2018
CEC3669	Superficial	France	2	SRR6670019	Ropars et al., 2018
CEC3531	Mouth	France	2	SRR6669849	Ropars et al., 2018
CEC3615	Vagina	Morocco	2	SRR6669941	Ropars et al., 2018
CEC4493	Food spoilage	Unknown	2	SRR6669906	Ropars et al., 2018
CEC3614	Vagina	Morocco	2	SRR6669940	Ropars et al., 2018
CEC4946	Vagina	India	2	SRR6670002	Ropars et al., 2018
CEC4945	Vagina	India	2	SRR6670003	Ropars et al., 2018
CEC4494	Food spoilage	Unknown	2	SRR6669905	Ropars et al., 2018
CEC3626	Mouth	Belgium	3	SRR6669883	Ropars et al., 2018
CEC3597	Blood	France	3	SRR6669920	Ropars et al., 2018
CEC3579	Mouth	France	3	SRR6669918	Ropars et al., 2018
CEC3637	Mouth	Niger	3	SRR6669875	Ropars et al., 2018
CEC3681	Blood	France	3	SRR6669865	Ropars et al., 2018
CEC709	Mouth	France	3	SRR6669979	Ropars et al., 2018
CEC3557	Digestive tract	Belgium	3	SRR6669991	Ropars et al., 2018
CEC3596	Blood	France	3	SRR6669917	Ropars et al., 2018
CEC3638	Mouth	Belgium	3	SRR6669899	Ropars et al., 2018
CEC1289	Blood	France	3	SRR6670011	Ropars et al., 2018
CEC3675	Blood	France	4	SRR6670014	Ropars et al., 2018
CEC2022	Disseminated	France	4	SRR6669857	Ropars et al., 2018
CEC3610	Vagina	Morocco	4	SRR6669936	Ropars et al., 2018
CEC3540	Blood	France	4	SRR6669964	Ropars et al., 2018
CEC3530	Mouth	France	4	SRR6669852	Ropars et al., 2018
CEC3674	Urine	France	4	SRR6670015	Ropars et al., 2018
CEC1492	Unknown	Unknown	4	SRR6670007	Ropars et al., 2018
CEC3535	Vagina	Morocco	4	SRR6669967	Ropars et al., 2018
CEC3536	Vagina	Morocco	4	SRR6669966	Ropars et al., 2018
CEC3532	Mouth	France	4	SRR6669850	Ropars et al., 2018
CEC3622	Vagina	Brazil	8	SRR6669877	Ropars et al., 2018
CEC3634	Vagina	Brazil	8	SRR6669881	Ropars et al., 2018
CEC2023	Feces	Guiana	8	SRR6669858	Ropars et al., 2018
CEC5026	Vagina	UK	9	SRR6669994	Ropars et al., 2018
CEC2018	Urine	France	9	SRR6670004	Ropars et al., 2018
CEC3533	Mouth	France	9	SRR6669969	Ropars et al., 2018
CEC3668	Urine	France	9	SRR6669904	Ropars et al., 2018
CEC3616	Vagina	Morocco	10	SRR6669944	Ropars et al., 2018
CEC3706	Urine	France	10	SRR6669959	Ropars et al., 2018
CEC3711	Urine	France	10	SRR6669949	Ropars et al., 2018
CEC3547	Mouth	Belgium	11	SRR6669972	Ropars et al., 2018
CEC3618	Mouth	Belgium	11	SRR6669880	Ropars et al., 2018
CEC3601	Mouth	Belgium	11	SRR6669922	Ropars et al., 2018
CEC4525	Mouth	France	11	SRR6669889	Ropars et al., 2018
CEC4492	Food spoilage	France	11	SRR6669911	Ropars et al., 2018
CEC4495	Food spoilage	France	11	SRR6669891	Ropars et al., 2018
CEC3494	Feces	Belgium	11	SRR6669854	Ropars et al., 2018
CEC3561	Feces	Belgium	11	SRR6669915	Ropars et al., 2018
CEC1426	Urine	France	11	SRR6670009	Ropars et al., 2018

CEC3704	Urine	France	11	SRR6669862	Ropars et al., 2018
CEC3537	Vagina	Morocco	12	SRR6669965	Ropars et al., 2018
CEC2019	Mouth	Niger	12	SRR6670005	Ropars et al., 2018
CEC3680	Blood	France	12	SRR6669983	Ropars et al., 2018
CEC3685	Blood	France	12	SRR6669864	Ropars et al., 2018
CEC3686	Blood	France	12	SRR6669861	Ropars et al., 2018
CEC716	Mouth	France	12	SRR6669982	Ropars et al., 2018
CEC4878	Vagina	China	13	SRR6669860	Ropars et al., 2018
CEC4882	Vagina	China	13	SRR6670025	Ropars et al., 2018
CEC4103	Vagina	Senegal	13	SRR6669961	Ropars et al., 2018
CEC4857	Vagina	Angola	13	SRR6669868	Ropars et al., 2018
CEC4889	Vagina	China	13	SRR6670027	Ropars et al., 2018
CEC5025	Vagina	UK	13	SRR6669995	Ropars et al., 2018
CEC5023	Vagina	UK	13	SRR6669997	Ropars et al., 2018
CEC5030	Vagina	UK	13	SRR6669976	Ropars et al., 2018
CEC4943	Vagina	India	13	SRR6670016	Ropars et al., 2018
CEC4860	Vagina	China	13	SRR6669869	Ropars et al., 2018
CEC3664	Urine	France	16	SRR6669898	Ropars et al., 2018
CEC3550	Starling feces	France	16	SRR6669985	Ropars et al., 2018
CEC3600	Starling feces	France	16	SRR6669919	Ropars et al., 2018
CEC2876	Blood	South Korea	18	SRR6669853	Ropars et al., 2018
CEC2872	Blood	South Korea	18	SRR6669856	Ropars et al., 2018
CEC3786	Blood	South Korea	18	SRR6669957	Ropars et al., 2018
CEC2871	Blood	South Korea	18	SRR6669855	Ropars et al., 2018
CEC3548	GI tract	Belgium	A	SRR6669971	Ropars et al., 2018
CEC4038	Wound	UK	A	SRR6669954	Ropars et al., 2018
CEC3715	Urine	France	A	SRR6669955	Ropars et al., 2018
CEC4254	Blood	France	B	SRR6669931	Ropars et al., 2018
CEC3708	Urine	France	B	SRR6669946	Ropars et al., 2018
CEC3661	Urine	France	C	SRR6669895	Ropars et al., 2018
CEC4039	Sputum	UK	C	SRR6669953	Ropars et al., 2018
CEC4498	Food spoilage	France	D	SRR6669894	Ropars et al., 2018
CEC3707	Urine	France	D	SRR6669925	Ropars et al., 2018
CEC4486	Food spoilage	France	E	SRR6669907	Ropars et al., 2018
CEC3712	Urine	France	E	SRR6669956	Ropars et al., 2018