Weill Cornell Medicine

# Treatment of Fungal-Associated Irritable Bowel Disease Using IL-1 Inhibitors


**Lead Inventor:**

**Iliyan D. Iliev, Ph.D.**

Associate Professor of Immunology in Medicine,
Weill Cornell Medical College



**Business Development Contact:**

Brian Kelly
Director, Technology Licensing

(646) 962-7041
bjk44@cornell.edu

# Treatment of Fungal-Associated Irritable Bowel Disease Using IL-1 Inhibitors

## Background & Unmet Need

- Intestinal fungi play an important role in regulating mucosal immunity as a highly immunoreactive component of the microbiota
- Deep sequencing-based assays of the gut mycobiome have revealed consistent evidence for “fungal dysbiosis” as a hallmark of inflammatory bowel disease (IBD)
- *Candida* is the most prevalent fungal genus, and its relative abundance is consistently increased in several IBD cohorts based on fecal sequencing
- However, it is currently unknown whether fungi play an essential role in directing mucosal immunity or disease outcomes
- **Unmet Need:** Methods to probe the mycobiome at the fungal strain and patient-specific level to inform potential mycobiome-targeted therapies for IBD

## Technology Overview

- **The Technology:** Method to identify and treat IBD patients harboring specific *C. albicans* strains with IL-1 inhibitors
- Using a proprietary platform that combines high-resolution sequencing, culturing, genomics, and in vitro and in vivo models, the inventors identified opportunistic *C. albicans* strains that dominate the colonic mucosa of ulcerative colitis (UC) patients
- **The Discovery:** *C. albicans* strains that secrete the toxin candidalysin drive intestinal inflammation through an IL-1β dependent manner
- **PoC Data:** IL-1R blockade using an anti-IL-1R antibody dramatically reduced neutrophil recruitment, inflammatory Th17 cell accumulation and colonic inflammation in *C. albicans* colonized mice

**Inventors:**
Iliyan D. Iliev
Xin Li

**Patents:**
US Application Filed

**Publications:**
Li et al. *Nature*. 2022.

**Biz Dev Contact:**
Brian Kelly
(646) 962-7041
bjk44@cornell.edu

**Cornell Reference:**
D-10153

Weill Cornell Medicine

# Treatment of Fungal-Associated Irritable Bowel Disease Using IL-1 Inhibitors

## Technology Applications

- Method for identifying IBD patients who may benefit from anti-IL-1 or antifungal therapies
- Platform for further studying the impact of the mycobiota on immunity and disease pathogenesis

## Technology Advantages

- Anti-IL-1 monoclonal antibodies are already approved for other indications
- Provides a precision medicine approach to identify IBD patients who are most likely to benefit from anti-IL-1 treatment

## Supporting Data / Figures

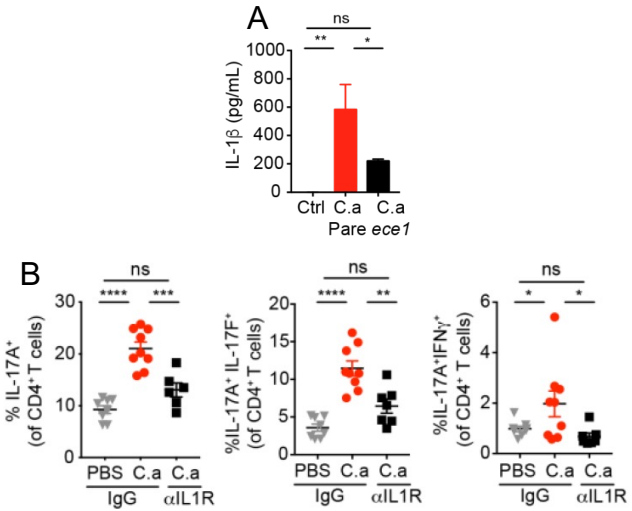


**Figure 1:** A: IL-1β induction is dependent on expression of *ECE1,* the factor which induces transition to hyphal morphology and expression of candidalysin. **B:** anti-IL-1R treatment improves markers of inflammation in mice colonized with *C. albicans.*


**Inventors:**
Iliyan D. Iliev
Xin Li


**Patents:**
US Application Filed

**Publications:**
Li et al. *Nature*. 2022.


**Biz Dev Contact:**
Brian Kelly
(646) 962-7041
bjk44@cornell.edu


**Cornell Reference:**
D-10153

Weill Cornell Medicine


Weill Cornell Medicine