Inflammatory Bowel Disease (IBD) Resources

Antibiotic Use and IBD

1. Potential association between the oral tetracycline class of antimicrobials used to treat acne and inflammatory bowel disease.
American Journal of Gastroenterology. 2010 Dec; 105(12):2610-6

“Tetracycline class antibiotics, and particularly doxycycline use may be associated with the development of IBD, particularly CD.”

2. Antibiotic use and inflammatory bowel diseases in childhood
Gut 2011; 60:49-54 doi:10.1136/gut.2010.219683

“Antibiotics have the potential to alter the composition of the intestinal microflora.”

“This is the first prospective study to show a strong association between antibiotic use and CD in childhood.”

3. Antibiotic Exposure and IBD Development Among Children: A Population-Based Cohort Study
Published online September 24, 2012 (doi: 10.1542/peds.2011-3886)

“Childhood antianaerobic antibiotic exposure (penicillin, amoxicillin, ampicillin, penicillin/β-lactamase inhibitor combinations, tetracyclines, clindamycin, metronidazole, cefoxitin, carbapenems, and oral vancomycin) is associated with IBD development.”


“We found a statistically significant association between Crohn’s disease and prior antibiotic use.”

5. Early-life exposures associated with antibiotic use and risk of subsequent Crohn’s disease.

“Pneumonia prior to age 5 years, but not later, was associated with subsequent Crohn’s disease and this may represent either susceptibility or causation. The results are consistent with early exposures influencing immune function, such as through disruption of bowel colonization, and thus increasing the risk of Crohn’s disease.”

“Eczema was found significantly more frequently in patients with CD (p less than 0.005) and in their fathers (p less than 0.025), mothers (p less than 0.002), and siblings (p less than 0.01) as compared with their respective controls. IBD was significantly more frequent in parents, siblings, cousins, grandparents, and uncles of patients than in their respective controls. The fathers of patients with UC had significantly more major gastrointestinal and cardiovascular diseases at the time of the patient's birth than the fathers of controls. ... Recurrent respiratory infections were more frequent in patients with UC and CD (p less than 0.001); it is uncertain whether this preceded disease. Hospitalization for respiratory diseases was more frequent in patients than controls, and the use of antibiotics more frequent in patients with CD."

Fungus and IBD


Evidence for a role of yeast in CD

“The presence of antibodies directed against Saccharomyces cerevisiae mannan in sera from CD patients suggested the possible involvement of yeasts in CD (McKenzie et al., 1990; Quinton et al., 1998). Indeed, anti-S. cerevisiae antibodies (ASCA) are present in 50-60% of CD patients (Quinton et al., 1998). Although the exact relationship between fungi and CD has not been clearly established, some evidence points to the possible role of Candida albicans in the processes leading to, or maintaining, inflammation in CD (Jawahara et al., 2008).

Candida albicans is a common commensal of the human digestive tract. During colonization or infection, it is able to induce the production of anti-glycan antibodies such as ASCA (Sendid et al., 2009; Standaert-Vitse et al., 2006). Interestingly, CD patients are more frequently and more heavily colonized by C. albicans than healthy subjects (Standaert-Vitse et al., 2009). Together, these observations suggest the possible role of this yeast in the inflammatory processes leading to CD in a particular genetic context.

In conclusion, it appears that several links exist between C. albicans colonization and CD. From antigens presented by yeasts to genes of the host, the links involve several pathways engaging major components of yeasts and major receptors of the innate immune response.”
2. **Candida albicans and Bacterial Microbiota Interactions in the Cecum during Recolonization following Broad-Spectrum Antibiotic Therapy.**

   “... the presence of C. albicans resulted in a long-term reduction in Lactobacillus spp. and promoted Enterococcus faecalis populations.”

3. **Mycobiota in gastrointestinal diseases.**

   “... fungi have been associated with a number of gastrointestinal diseases.

   ... the human microbiome in healthy individuals showed that the gastrointestinal tract contains 66 fungal genera and 184 fungal species, **with Candida as the dominant fungal genera.**

   ... fungi contribute to the aggravation of the inflammatory response, leading to increased disease severity.”

4. **Candida albicans primes TLR cytokine responses through a Dectin-1/Raf-1-mediated pathway.**

   “Candida albicans is able to modify cytokine responses to TLR ligands and colonizing bacteria, which is likely to impact the inflammatory reaction during mucosal diseases.”

5. **The role of Candida in inflammatory bowel disease. Estimation of transmission of C. albicans fungi in gastrointestinal tract based on genetic affinity between strains.**

   “The presence of fungi in the oral cavity of patients with IBD may affect more frequent colonization of the colonic mucosa in the active phase of disease. Genetic affinity of C. albicans strains indicates the possibility of fungal transmission from the oral cavity to further segments of the GI tract.”

6. **Effect of Candida colonization on human ulcerative colitis and the healing of inflammatory changes of the colon in the experimental models of colitis ulcerosa.**
   Journal of Physiology and Pharmacology 2009, 60, 1, 107–118

   “The influence of fungal colonization on the course of ulcerative colitis (UC) has not been thoroughly studied.

   Candida more frequently colonized patients with a history of UC within a 5-year period, when compared with those of shorter duration of IBS.
Candida delays healing of UC in both humans and that induced by TNBS in rats, and antifungal therapy and probiotic treatment during Candida infection could be beneficial in the restoration and healing of colonic damage in UC.”

**Other Microbes Associated with IBD**

1. **The treatment-naive microbiome in new-onset Crohn's disease.**

   “Using samples from multiple gastrointestinal locations collected prior to treatment in new-onset cases, we studied the microbiome in the largest pediatric CD cohort to date. An axis defined by an increased abundance in bacteria which include Enterobacteriaceae, Pasteurellaceae, Veillonellaceae, and Fusobacteriaceae, and decreased abundance in Erysipelotrichales, Bacteroidales, and Clostridiales, correlates strongly with disease status. Microbiome comparison between CD patients with and without antibiotic exposure indicates that antibiotic use amplifies the microbial dysbiosis associated with CD.”

2. **High prevalence of Mycobacterium avium subspecies paratuberculosis IS900 DNA in gut tissues from individuals with Crohn’s disease.**

   “The presence of MAP specific IS900 DNA is a predominant feature of CD. Therapeutic intervention against MAP might represent a potential target for disease mitigation in Crohn’s disease.”

3. **Mycobacterium avium subspecies paratuberculosis causes Crohn's disease in some inflammatory bowel disease patients.**

   “... clearly the majority of the studies overwhelmingly and definitively support the role of MAP in at least 30%-50% of CD patients.

   ... it has become quite problematic over the years to isolate and culture it [MAP] through conventional means. ... This led them to the utilization of IS900 polymerase chain reaction (PCR) for the detection of MAP and later on the development of appropriate culture media.

   [In one study] fresh ileocolonic mucosal biopsies were collected and analyzed for the presence of MAP by the performance of PCR specific for IS900. The results revealed that 92% (34/37) of CD patients were positive for the presence of MAP DNA compared to a significantly diminished number of healthy controls 26%.

   What is truly insightful in this study is the fact that MAP was found at a higher percentage (86%) in surgically resected tissue samples than in tissue biopsies (20%) taken from CD
patients[62]. These results alluded to the supposition that MAP may in fact be located below the mucosal layer instead of found on the apical surface area.

MAP is definitively involved in the pathogenesis of some CD cases even though other studies have not acknowledged this association ... It must be emphasized that much of the controversy concerning MAP and CD stems from the inconsistent methodologies that have been used in the detection and isolation of MAP, which have questioned the causal relationship between this bacterium and CD. These observed discrepancies result from the fact that the methods that were designed for the detection of MAP in animals with Johne’s disease are inappropriate for the detection of MAP in humans.”


“Clostridium difficile colitis is a major complication of antibiotic therapy. Antibiotics cause a reduction in bacteria that normally reside in the colon. If an antibiotic-treated patient ingests C. difficile bacteria, this organism may proliferate in the colon because it is resistant to most antibiotics and because it does not have to compete with the normal bacteria for nutrients. If the C. difficile organism has the gene for toxin production, the toxin can produce a colitis.

In addition to antibiotics, other proposed risk factors for development of C. difficile colitis include advanced age, contact with infected patients and with their health care providers, impaired immune function, suppression of gastric acid secretion by a proton pump inhibitor, and postpyloric tube feeding.”

Helpful Therapies for IBD


“... the colony forming units (CFUs) of C. albicans were greatly reduced in mice receiving S. boulardii.”

2. Case Reports of Anti-MAP Therapy in CD. Medscape Multispecialty – have to create a free account to access this. ... or just do a Google search of the title and it will come up.

“A number of patients have followed with similar treatment and results, indicating CD in these patients is infection-driven and immunosuppression has played no role.”

3. Research Papers – MAP and Crohn’s
4. **Faecal transplants succeed in clinical trial.**
Nature doi:10.1038/nature.2013.12227

“Faecal transplants — in which faeces from one person is infused into another's intestines — have dramatically outperformed a conventional antibiotic at treating recurring infections of *Clostridium difficile*, a bacterium that causes severe diarrhoea.

Despite their unappealing nature, the transplants have been used to treat hundreds of patients, more than 90% of whom have recovered.”

5. **Duodenal Infusion of Donor Feces for Recurrent Clostridium difficile.**

“Of 16 patients in the infusion group, 13 (81%) had resolution of *C. difficile*-associated diarrhea after the first infusion. The 3 remaining patients received a second infusion with *feces from a different donor, with resolution in 2 patients*. Resolution of *C. difficile* infection occurred in 4 of 13 patients (31%) receiving vancomycin alone and in 3 of 13 patients (23%) receiving vancomycin with bowel lavage (P<0.001 for both comparisons with the infusion group).

The infusion of donor feces was significantly more effective for the treatment of recurrent *C. difficile* infection than the use of vancomycin.”