Understanding host immune responses in *Clostridioides difficile* infection: implications for pathogenesis and immunotherapy

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Introduction

C. difficile infection

- Antibiotic therapy
  - Altered colonic microflora
  - C. difficile exposure and colonization
    - Toxin production
      - Protective immune response
        - Asymptomatic carriage
      - No protective immune response
        - Diarrhea and colitis

Treatment strategies for CDI and recurrence

- Healthcare exposure
- Asymptomatic C. difficile colonization
- Acquisition of a new toxigenic C. difficile strain or regrowth of the original strain
- CDI
- Successfully treated CDI
- Recurrent CDI

- Antimicrobials
- Prevent CDI
  - Bolster immune response to prevent CDI
  - Promote toxigenic C. difficile colonization resistance
- Potential interventions
  - FMT
  - Colonize the gut with NTCD
- Vaccination
- Monoclonal antibodies

- Treat CDI and prevent CDI recurrence
  - Restore intestinal microbiota
  - Promote toxigenic C. difficile colonization resistance
  - Bolster immune response
  - Potential interventions
  - Narrow-spectrum CDI antibiotics
  - CDI antibiotics and FMT
  - CDI antibiotics and NTCD
  - CDI antibiotics and vaccination
  - CDI antibiotics and monoclonal antibodies
Highlights

- Antibiotic treatment and intestinal surgeries
- Deleterious factors: Inflammasome, Age, Severe underlying disease, Host genetics, Antibody levels

Prophylaxis

- Toxins released from C. difficile
- Immunotherapy approaches for C. difficile infection
- Antibody released from plasma cell

Eradication

- T cell

Reinfection

- C. difficile infection

Immune

- Asymptomatic
C. difficile induce infection to activating host immune cells during CDI

In individuals experiencing intestinal inflammation, weakened host immunity leads to increased bacterial exposure, exacerbating inflammation.

In healthy individuals, host immune cells and secreted cytokines regulate CDI.

Figure 1 The intestinal immune response in health and CDI varies significantly between healthy individuals and those affected by CDI.
Pathogenesis of CDI

Figure 2 Pathogenesis of CDI
Figure 3 Intestinal immune system
Gut microbiota influences the host immune response to CDI

Figure 4 The composition of the gut microbiota profoundly influences the host immune response to CDI
In this study, we highlight the significant role of the host immune response in combating CDI (Clostridioides difficile infection)." 

The immune system regulates inflammatory responses, identifying, eliminating, and preventing infections caused by gut microbiota.

In addition, the host immune system promotes the proliferation of beneficial gut bacteria, maintaining intestinal homeostasis and reducing the risk of CDI.

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