CellTolerance

Key Supportive Findings in Clinical Publications

Fritscher-Ravens et al. (2019) [1]

Many Patients With Irritable Bowel Syndrome Have Atypical Food Allergies Not Associated With Immunoglobulin E. Gastroenterology.

Study Design

Prospective, Interventional, double-blinded, randomized, crossover dietary interventional study

Sample Size

155 IBS patients according to Rome III (108 completed the study)

Key Supportive Findings

- CLE visualized food-induced intestinal mucosal changes, such as epithelial breaks followed by leaks of fluorescein into the lumen in IBS patients
- After food challenge, 76 of 108 patients showed immediate mucosal responses to antigen(s)
- Specific allergen exclusion based on CLE findings led to significant symptom improvement in patients who showed mucosal responses to antigen(s) with 68% experiencing >80% symptom improvement after 6 months of allergen exclusion
- This study confirms that at least 50%–60% of IBS patients may have a nonclassical food allergy and that CLE is appropriate tool to identify such allergy.

Fritscher-Ravens et al. (2020) [2]

623 Exclusion of atypical food allergens detected by confocal endomicroscopy is superior to a low fodmap diet in patients with food-sensitive ibs.

Study Design

Prospective, interventional study with a healthy control group and randomly assigned low FODMAP diet, allergen exclusion diet as identified by CLE or placebo diet

Sample Size

52 IBS patients according to Rome III

Key Supportive Findings

- 41 out of 42 CLE-positive patients showed an improvement of symptoms of more than 70% following an allergen exclusion diet. Symptoms scored better with the CLE-guided allergen exclusion diet than with the low-FODMAP diet
- Anxiety and somatization scores improved significantly with CLE-guided dietary intervention
- Specific food allergens (wheat, yeast, soy, milk, gluten) were identified as triggers, enabling precise, personalized diets
- This study supports the prime role played by atypical allergies in food-sensitive IBS patients and highlights the CLE capacity to detect it.

Kiesslich et al. (2021) [3]

Food allergy sensitivity test (fast) with endomicroscopy of the duodenum enables tailored exclusion diet in patients with irritable bowel syndrome.

Study Design

Prospective, observational study

Sample Size

344 patients diagnosed with IBS and food-related symptoms according to Rome III - 256 of them underwent CLE

Key Supportive Findings

- Patients with endomicroscopic identified food associated functional changes of the enteric mucosa do profit from an endomicroscopic tailored exclusion diet and show long term improvement of their symptoms
- A food induced intestinal barrier dysfunction was found in 154(60.1%) of patients.
- 74.6% of patients with a food induced barrier dysfunction identified by CLE had an improvement of 80% or more of their symptoms based on the IBS-SSS after following a specific, CLE directed, 6 months exclusion diet
- This study reinforces CLE's role as a diagnostic tool for non-IgE-mediated food sensitivities

Bittel et al. (2024) [4]

Targeting confocal laser endomicroscopy-identified gut barrier dysfunction in irritable bowel syndrome via multimodal integrative therapy improves barrier integrity and symptom relief – insights from an exploratory, prospective observational clinical trail.

Study Design

Prospective and observational study

Sample Size

119 IBS patients

Key Supportive Findings

- IBS patients have a high prevalence of existing and food-induced duodenal barrier dysfunction (62%).
- A multimodal integrative therapy showed a stabilisation of the gut barrier in 71% of IBS patients in a 2nd CLE as well as significant and clinically relevant improvement in IBS-related symptom severity, quality of life and psychological well-being
- Details: Multimodal interventions included mind-body medicine, phytotherapy (e.g., myrrh), and dietary exclusion of CLE-identified food triggers
- This study reinforced CLE's role as a part of a global therapy concept

Frieling et al. (2024) [5]

Gastrointestinal adverse reaction to food (GARF) and endoscopic confocal laser endomicroscopy (eCLE)

Study Design

Prospective, proof-of-concept study

Sample Size

71 patients with gut-brain axis disorders, divided into groups with and without gastrointestinal adverse reactions to food (GARF)

Key Supportive Findings

- CLE with Duodenal food challenge (DFC) identified gastrointestinal adverse reactions to food (GARF) in 74% of patients with functional gastrointestinal symptoms without GARF (group I).
- CLE with DFC identified GARF in 69% of patients with GARF (group II)
- Overall, 14 % of the patients in group I and 79 % of the patients in group II reported a benefit through the dietary therapy with improvement of the intensity of their main symptom and/or reduction of frequency
- The results of this study suggest that eCLE with DFC might be a useful technique to reduce the gap between subjective feeling and objective measurable GARF

Frieling et al. (2022) [6]

Endoscopic laser endomicroscopy and "leaky gut" in patients with functional gastrointestinal symptoms and food intolerance.

Study Design

Prospective, observational study

Sample Size

85 patients with functional gastrointestinal symptoms, classified using Rome IV criteria

Key Supportive Findings

- CLE objectively confirmed "leaky gut syndrome" by detecting spontaneous fluorescein leakage in 28% of patients
- CLE detected fluorescein leakage after duodenal food challenge in 59% of patients
- The results of this study indicate that CLE is a clinical useful tool to evaluate patients with disorders of the gut brain axis and those suspicious of leaky gut syndrome

Blomsten et al. (2024) [7]

Food-induced intestinal mucosal reactions in irritable bowel syndrome detected with confocal laser endomicroscopy.

Study Design

Ongoing prospective, interventional study

Sample Size

43 IBS patients (interim results)

Key Supportive Findings

- CLE identified food-induced intestinal mucosal reactions in 50% of IBS patients, with gluten and wheat being the most frequent triggers
- Significant improvement after food elimination of the positive food item, and worsening after reintroduction, were noted affirming the tool's clinical utility
- CLE findings correlated with less severe baseline IBS symptoms, suggesting potential predictive value for identifying food-related reactions

Gjini et al. (2023) [8]

Food intolerance in patients with functional abdominal pain: Evaluation through endoscopic confocal laser endomicroscopy.

Study Design
Observational study

Sample Size
34 patients with functional abdominal pain

Key Supportive Findings

- CLE detected food-related mucosal reactions in 67% of patients, with soy (50%) and wheat (46.1%) as the most common triggers
- Overall, 69.5% (n = 16) of the patients reported improvement in pain intensity and reduction in pain frequency
- The study results indicate that CLE is a clinically useful tool to evaluate patients with functional abdominal pain and adverse reaction to food and to create individualized dietary therapy with clinical benefit for patients
- This study reinforced CLE's role in aligning subjective patient complaints with measurable clinical data

Balsiger et al. (2025) [9]

Intra- and Interobserver Variability of Acute Food–Induced Reactions During Confocal Laser Endomicroscopy: An International Multicenter Validation Study

Study Design
International, multicenter, blinded, randomized validation study, based on data from prospective studies, for observer agreement of CLE recordings

Sample Size
87 individual recordings used for analyses (total of 86,408 frames)

Key Supportive Findings

- Optimal and standardized analysis protocol was defined with objective cutoffs: using 6 observation zones and requiring at least 2 altered zones to confirm mucosal disruption led to 100% sensitivity and specificity in the reference set
- High reliability and reproducibility with substantial to perfect intraobserver agreement (80%-100%) for 2-category assessment and (60%-100%) for 3-category assessment and a substantial interobserver agreement 85% ($\kappa = 0.68$), both in real-time and blinded post hoc assessments
- Robustness of real-time assessments as slow-motion revision did not lead to different interobserver agreement rates
- This study confirms the reliability and reproducibility of CLE as a real-time readout for food-induced epithelial barrier disruption

Huang et al. (2024) [10]

Confocal laser endomicroscopy with food allergy sensitivity testing to detect atypical food allergies in pediatric patients with chronic abdominal pain and irritable bowel syndrome,

Study Design
Single-center retrospective review

Sample Size
19 pediatric patients between the ages of 2-19

Key Supportive Findings

- Of the 12, 8 (66.7%) had a positive CLE reaction. CLE reaction to wheat was the most common
- On subsequent follow up visits, seven patients with positive CLE/FAST, reported resolution of symptoms once the offending agent was removed from their diet
- This study reinforces the role of CLE in screening atypical food allergies

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To find out more

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