Cell-based infiltration of IEL: CD3+ (red) and CD8+ (green) IEL. Patients were divided into two groups: those with a count of IEL in the duodenal biopsy (CD3+ and CD8+) above 50% and those below 50%.

### Results

**Duodenal biopsy**
- IEL (red) and epithelial cells (green)

**Colon biopsy**
- IEL (red) and epithelial cells (green)

**Antrum biopsy**
- IEL (red) and epithelial cells (green)

**Pitfalls**

- **Example of scanned duodenal biopsy:** CD3 staining with moderate IEL infiltration of IEL and diagnosis of lymphocytic gastritis and colitis + high correlation with pathologist count.

- **Example of scanned antrum and colonic biopsies:** CD3 staining with high IEL infiltration and clusters of IEL + poor correlation with pathologist count.

### Methods

- **35 patients from the French network CELAC (Centre d'Expert National des Lymphomes Associés à la maladie Coeliaque):**
  - 20 CD under GFD
  - 6 active CD
  - 9 RCD2
  - including immunohistochemistry scanned slides (Nanozoomer 560 Hamamatsu)

- **46 anti-CD3** (dudumend n=28
  - stomach n=8 (4 controls and 4 lymphocytic gastritis)
  - colon n=10 (4 controls and lymphocytic colitis)
  - 25 anti-CD8 (duodenal biopsies)

After aletory delineation of regions of analysis (ROA) localized in surface epithelium of the whole biopsy

- 138 for CD3 (3 ROA/sample)
- 50 for CD8 (2 ROA/sample)
- we used Calpix Software (TRIBVN Health) and its Cell Recognition plugin with machine learning (pixel classification with human labelling) to create an automated count of the IEL and epithelial cells (EC).

Additionally, an expert pathologist (JB) manually counted IEL and EC in the same ROA.

Prom V3.2.0 software was used for statistical analysis.

### Discussion

- **CD3+ and CD8+ IEL automated count in the digestive tract using Cell Recognition plugin with machine learning is highly concordant with pathologist manual count.**

However, the pathologist should be aware of the limit of this approach especially in cases of dense clusters of lymphocytes or absence of staining as CD8 negative IEL in RCD2. A deep learning approach is underway to overcome this pitfall.

This study highlights the applicability of such analysis in a routine pathology practice and offers a new tool in the detection of IEL all along the digestive tract from stomach to colon.