# BACKGROUND

- Currently, the gold standard for the diagnosis of celiac disease (CD) is an upper GI endoscopy (EGD) with an intestinal biopsy.

- During the past few years, several non-invasive serological screening tools for CD have been developed.

- To establish the true sensitivity and specificity of these serological tests, either alone or in combination, and to develop possible non-invasive CD diagnostic algorithms alternative to EGD, a study design in which an intestinal biopsy is the entry criterion is necessary.

# AIMS

- **To establish the positive predicted value (PPV) and negative predicted value (NPV) of a combination of serological tests for CD using an intestinal biopsy as a gold standard.**

# MATERIALS

- **Group A:** Between August 2004 and July 2005, 68 consecutive patients (average age 38 yrs range 18-80) referred by the Small Bowel disorders clinic to EGD and intestinal biopsy, with suspicion of intestinal disorders (chronic diarrhea, weight loss, abdominal distention, recurrent abdominal pain and/or anemia) were prospectively enrolled.

- **Group B:** During the same period, a random sample of subjects (n:98, mean age 47 yrs, range 23-73) undergoing to an EGD for symptoms or disorders not related to CD was also enrolled.

# METHODS

## 1- Clinical assessment

- Age at diagnosis, presence of diarrhea, weight loss, abdominal pain, malnutrition, anemia .

## 2- Diagnostic procedures

### Biochemical tests :

- Serum anti-actin antibodies (AAA) ( INOVA Diag. Inc;CA; USA)
- Anti-tissue transglutaminase antibodies ( TTG) IgA (INOVA. Diag. Inc.:CA;USA)
- Zonulin levels.

### Upper gastrointestinal endoscopy (EGD) Intestinal biopsy :

- All duodenal biopsies were blindly scored using the modified Marsh criteria.

# CONCLUSIONS

- **In subject experiencing malabsorptive symptoms, the combination of positive AAA, TTG, and Zonulin can be used to rule in CD without the necessity to perform an EGD.**
- **This approach would have allowed avoiding an invasive procedure in 38% of the cases of malabsorption enrolled in this study, an approach that could traslate in cost saving and better patient’s acceptance.**
- **The combination of negative AAA, TTG, and zonulin rules out CD without the necessity of any additional study. In these cases, an EGD could be still necessary to rule out other causes of malabsorption.**

| Individual test or combinations | Sensitivity | Specificity | PPV | NPV | LR+ | LR- | Accuracy |
|---|---|---|---|---|---|---|---|
| a tTG Ig A | 91.2 | 97.7 | 91.1 | 97.7 | 39.6 | 0.09 | 96.4 |
| AAA IgA | 82.3 | 97.7 | 90.2 | 95.5 | 35.8 | 0.18 | 94.5 |
| Zonulin | 88.2 | 40.9 | 27.7 | 93.1 | 1.49 | 0.29 | 50.6 |
| atTG + Zonulin | 91.2 | 99.2 | 96.7 | 97.8 | 114 | 0.09 | 97.6 |
| atTG + AAA | 82.3 | 99.2 | 96.3 | 95.6 | 102.9 | 0.18 | 95.7 |
| Zonulin + AAA | 82.3 | 90.9 | 69.9 | 95.2 | 9.0 | 0.19 | 89.1 |
| atTG + Zonulin + AAA | 82.3 | 100 | 100 | 95.6 | INF | 0.18 | 96.4 |
| EmA | 85.3 | 100 | 100 | 96.3 | INF | 0.15 | 97.0 |
| EmA + Zonulina | 85.3 | 100 | 100 | 96.3 | INF | 0.15 | 97.0 |
| EmA + atTG | 82.3 | 100 | 100 | 96.3 | INF | 0.18 | 96.4 |
| EmA+AAA+atTG +Zonulina | 82.3 | 100 | 100 | 96.3 | INF | 0.18 | 96.4 |