



# Features of the intestinal microbiome in patient with gluten-sensitive diseases who are on an agliadin diet

Submitted by: Prof. Olena Gubska, MD, PhD, Olga Naumova, MD, PhD, Andrii Kuzminets, MD, PhD, Oleg Denesyuk, MD, Oleksandr Kolyada, PhD, Vladislav Moseyko, Oleksii Dolko, MD.

## Introduction

Gastrointestinal bacteria are crucial for human health. They form an intestinal microbiome (IM) - a set of microorganisms that live on the surface and inside the human host. Its disturbance - intestinal dysbiosis - is associated with a violation of both quantitative and qualitative composition of the IM and accompanies different gastrointestinal disorders, including functional digestive disorders, organic diseases, and special conditions, such as NCGS and CD.

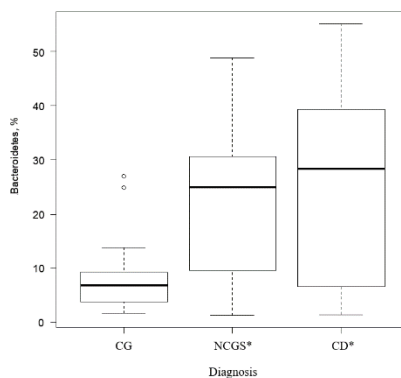
## Methods

The study included 25 adults, 14 (56%) with CD and 11 (44%) - with NCGS. The control group (CG) included 24 people without clinical or anamnestic signs of gluten-sensitive pathology or diseases of the gastrointestinal tract. We used the real-time PCR method and studied the faecal content of the Bacteroidetes, Firmicutes, Actinobacteria phylae, other representatives of the IM ("other" indicator, which reflects the total percentage of all bacterial DNA, except for the mentioned above), and calculated the ratio Firmicutes/Bacteroidetes.

## Results

The medians of the agliadin diet duration (DD) were 9 (IQR 6-12) years in the CD group and 4 (IQR 3-5) years in the NCGS group ( $p = 0.087$ ). DD and the patients' age were correlated with faecal content of Bacteroidetes, Firmicutes, their ratio (F/B), and Actinobacteria and did not correlate with the content of "other" types.

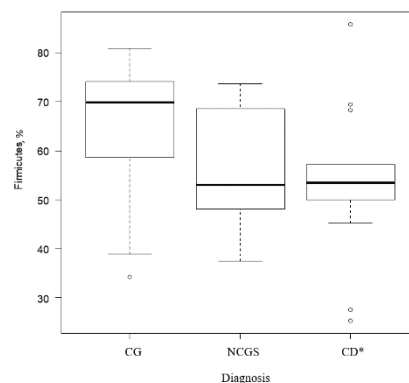
The Bacteroidetes content was 28.4 (IQR 6.58-39.28) % in CD patients, 24.98 (IQR 8.83-31.04) in NCGS patients ( $p > 0.1$  with CD), and 6.83 (IQR 3.69-9.22) in the CG ( $p < 0.05$  with GRDs). There was a positive correlation of average strength with age ( $\rho = 0.47$ ,  $p < 0.001$ ) and the DD ( $\rho = 0.398$ ,  $p = 0.006$ ).



Faecal content of Bacteroidetes, %

Firmicutes content was 53.47 (IQR 49.98-57.21) % in CD patients ( $p < 0.05$  with CG), 53.0

(IQR 47.13-71.95) % in NCGS patients ( $p > 0.1$  with other groups) and 69.89 (IQR 58.58-74.1) % of CG. Negative correlations of medium strength of Firmicutes bacteria were revealed with age ( $\rho = -0.42$ ,  $p = 0.003$ ,) and a weak correlation with the DD ( $\rho = -0.36$ ,  $p = 0.015$ ).

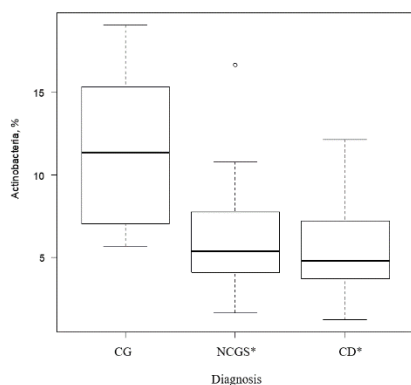


Faecal content of Firmicutes, %

The Actinobacteria content was 4.8 (IQR 3.73 - 7.2) % in CD patients, 5.37 (IQR 3.89-8.56) % in NCGS patients ( $p > 0.1$  with CD), and 11.36 (IQR 7.07-15.34) in the CG ( $p < 0.01$  with GRDs). There was a negative correlation of average strength with age ( $\rho = -0.53$ ,  $p < 0.001$ ) and the DD ( $\rho = -0.5$ ,  $p < 0.001$ ).

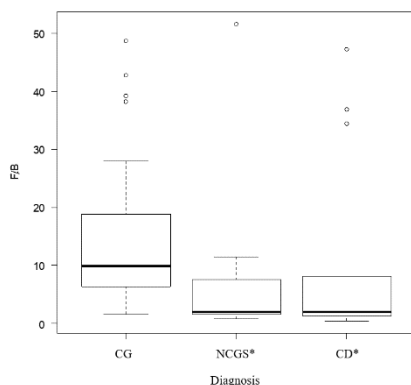
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**Faecal content of Actinobacteria**

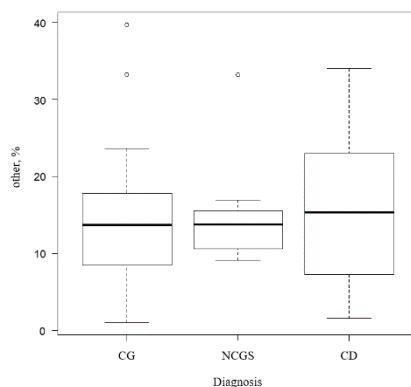
The *F/B* ratio was 1,996 (IQR 1.27-8.15) in CD patients, 2.0 (IQR 1.63-8.25) in NCGS patients ( $p > 0.1$  with CD), and 9.986 (IQR 6.37-18.80) in CG ( $p < 0.05$  with GRDs). Negative correlations of medium strength with age ( $\rho = -0.46$ ,  $p < 0.001$ ) and with the DD ( $\rho = -0.38$ ,  $p = 0.009$ ) were revealed.



**Faecal F/B ratio**

The content of "other" types of IM was 15.39 (IQR 7.25-23.06) in CD patients, 13.78 (IQR 9.48-16.05) in NCGS patients, and 13.66 (IQR 8.43-17.78) in CG. This indicator had no significant difference ( $p > 0.99$ ) between all three groups. No correlation was found between the content of "other" types of

intestinal microflora with age or the DD ( $p > 0.7$ ).



**Faecal content of "other" types of IM**

## Conclusion

We found significant IM changes in patients with celiac disease and non-celiac gluten sensitivity, which was expressed in an increase of the Bacteroidetes content with a parallel decrease in the content of Firmicutes and Actinobacteria. The most significant were changes in Actinobacteria content, a little less significant - the Firmicutes/Bacteroidetes ratio. The detected intestinal microbiome changes are most likely to be a consequence of dietary features of such patients, namely the side effect of maintaining an agliadin diet.

## References

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