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# View Abstract

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**APPLICANT:** Juan Ignacio Olmos

**APPLICANT (EMAIL ONLY):** juan.ignacio.olmos@gmail.com

## **ABSTRACT**

**TITLE:** COVID-19: DIARRHEA, INFLAMMATION AND INTESTINAL MICROBIOTA

**AUTHORS (LAST NAME, FIRST NAME):** Piskorz, Maria<sup>1</sup>; Pisarevsky, Ana Andrea<sup>1</sup>; Ludueña, Guillermina<sup>1</sup>; Vega, Patricia<sup>1</sup>; Uehara, Tatiana<sup>1</sup>; Lopez Mingorance, Fabiana<sup>1</sup>; DIAZ CARRASCO, JUAN<sup>2</sup>; Stefanolo, Juan Pablo<sup>1</sup>; Olmos, Juan Ignacio<sup>1</sup>; Gonzalez Ballerga, Esteban<sup>1</sup>; Olmos, Jorge A<sup>1</sup>

**INSTITUTIONS (ALL):** 1. Hospital de Clinicas, Buenos Aires, Argentina.

2. Instituto de Patobiología Veterinaria, INTA-CONICET, BUENOS AIRES, BUENOS AIRES, Argentina.

### **ABSTRACT BODY:**

**Abstract Body:** Introduction: Increased inflammatory cytokines has been observed in COVID-19 patients and there is evidence showing an alteration in gut-microbiota composition. SARS-CoV-2 can cause gastrointestinal symptoms, such as diarrhea. Evidence of an altered gut-microbiota composition and cytokines levels in COVID-19 diarrhea patients is lacking.

Objectives: To compare serum cytokine levels and gut microbiota between COVID-19 diarrhea (D-COVID-19) and non-diarrhea (NonD-COVID-19) patients and non- COVID-19 controls (HC).

Material and methods: We included 143 hospitalized COVID-19 patients (positive quantitative reverse transcription PCR) in a single University Hospital, and 53 ambulatory HC (negative rapid serological test) were included. Blood and stool samples were collected at hospital admission in COVID-19 patients and at the time of HC recruitment. 27- pro and anti-inflammatory cytokines (Bio-Plex Pro™, Bio- Rad) were measured.

Gut microbiota composition and diversity profiles were characterized by sequencing the 16S rRNA gene V3-V4 region amplified using DNA extracted from stool samples. Bioinformatics analysis was performed with QIIME2 software. First, we compare cytokine levels between COVID-19 and HC and then COVID-19 with and without diarrhea. All comparisons were adjusted for age, sex, and BMI with linear regression.

Results: The mean age in COVID-19 patients was 54 +/- 15 years (F=50%) and 52 +/- 8 (F=62%) for HC.

Diarrhea was present in 19 (13.29%) of COVID-19 patients.

COVID-19 patients had significant higher levels of: IL-1ra, IL-2, IL-6, IL-7, IL-8, IL-13, IP-10 and PDGF-bb.

Significant lower values of: IL-9, FGF -basic, MIP-1β, TNF-α were observed in D-COVID-19 compared to NonD-COVID-19.

COVID-19 patients had a significant reduction of bacterial species (p=0.0001), and diversity and complexity of the bacterial community (Shannon's index) (p=0.0001) compared to the HC. There was no difference between D-COVID-19 and NonD-COVID-19. There were also changes in the composition of the microbiota associated with COVID-19. At the phylum level, COVID-19 patients showed a significant decrease in Actinobacteria and Firmicutes, and an increase in Bacteroidetes. At species level, an increase of 4 species of the genus Bacteroides was observed in COVID-19 patients. 31 very diverse bacterial species were found, all decreased in D-COVID-19.

Conclusions: An alteration in serum cytokine levels was observed between COVID-19 and HC. D-COVID-19 had a decrease in some pro-inflammatory cytokines. A significant decrease in richness and species diversity of gut-microbiota was observed in COVID-19 patients compared to HC, but no significant differences were observed between D-COVID-19 and NonD-COVID-19. However, in D-COVID-19, a decrease in some bacterial species was observed.

