

## Ha *et al.* Serotonin is elevated in COVID-19 associated diarrhea

**This supplement contains the following item:**

### Methods

#### Human Samples

Plasma samples were collected from COVID-19 patients in the Renown Regional Medical Center, Reno Nevada. Plasma samples from healthy volunteers were collected prior to the pandemic at Stanford University School of Medicine. All patients provided informed consent, and all study procedures were approved by the Stanford University Institutional Review Board, the Institutional Review Board at University of Nevada Reno and Renown's Clinical Research Department. SARS-CoV-2 infection was confirmed by RT-PCR from nasopharyngeal swab specimens (Cepheid or thermo fisher) and SARS-CoV-2 IgG Antibody ELISA (antibodies-online Inc, Pennsylvania, USA) or SARS-CoV-2 IgM Antibody ELISA Kit (antibodies-online Inc, Pennsylvania, USA) test. Diarrhea symptom was defined as loose stools >2 or 3 times a day.

#### Enzyme-linked immunosorbent assay (ELISA)

Plasma protein (for detected ELISA kit) was isolated using Trizol LS (Thermo Fisher Scientific, Massachusetts, USA), according to the manufacturer's specifications. 5-HT, 5-HIAA and IL-6 levels were measured by the serotonin ELISA (LDN Labor Diagnostika Nord GmbH & Co, Nordhorn, Germany), 5-HIAA [ELISA](#) (Novus Biologicals, Colorado, USA), and human IL-6 ELISA (Invitrogen, Carlsbad, USA), according to the manufacturers' specification.

#### Statistics

All data obtained in the present study were compared using the one-way (versus critical group) and/or two-way analysis of variance (ANOVA) in order to determine whether differences were statistically significant. Measured variables were expressed as the mean  $\pm$  standard errors of the mean (SEM).