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FINDING IMMUNOLOGICAL DIFFERENCES TO HELP DIAGNOSIS AND EARLY TREATMENT OF KAWASAKI DISEASE AND MIS-C (MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN)

Kennedy-Batalla, Rebeca[1]; Fernández-Cooke, Elisa[2]; Aracil-Santos, Javier[3]; Saavedra, Jesús[4]; García-Salido, Alberto[5]; Gómez, Manuel José[6]; Albendea-Gómez, Teresa[7]; Escobar, Beatriz[7]; Cano-Nieto, Miguel Ángel[1]; Mesa, Sofía[8]; Ruiz-Domínguez, Jose Antonio[9]; González, Felipe[4]; Martín-Puig, Silvia[7]; Correa-Rocha, Rafael[1].

[1]Instituto de Investigación Sanitaria Gregorio Marañón (IiSGM), Madrid; [2]Unidad de Infectología Pediátrica. Hospital Universitario 12 de Octubre, Madrid; [3]Enfermedades Infecciosas Pediátricas. Hospital Universitario La Paz, Madrid; [4]Pediatría. Hospital Universitario Gregorio Marañón, Madrid; [5]Fundación de Investigación Biomédica Hospital Infantil Universitario Niño Jesús, Madrid; [6]Unidad de Bioinformática. Centro Nacional de Investigaciones Cardiovasculares (CNIC), Madrid; [7]Centro Nacional de Investigaciones Cardiovasculares (CNIC), Madrid; [8]Unidad de Urgencias de Pediatría. Hospital Universitario 12 de Octubre, Madrid; [9]Servicio de Urgencias Pediátricas. Hospital Universitario La Paz, Madrid.

The recent COVID-19 pandemic was first thought to spare children from health deprivation caused by infection with SARS-CoV-2. However, soon a new syndrome resembling Kawasaki Disease (KD) was reported: Multisystem Inflammatory Syndrome in Children (MIS-C). The aim of this study is to provide new biomarkers for both diseases in order to facilitate diagnosis and reduce the time-lapse until treatment is provided – which will reduce the risk of developing severe cardiovascular complications.

An extensive immune system characterization by flow cytometry and serum protein characterization by a multiplex technology (Olink) was performed from fresh blood samples of patients with acute MIS-C (n=19) and KD (n=10). For protein characterization we also analysed recovery samples for these groups (n=19 and n=8, respectively).

Besides the already described lymphopenia in MIS-C, we found additional significant immune differences in both groups. Although lymphocyte numbers (cells/ml) were lower in MIS-C, percentages of activated T-CD4+ and T-CD8+ cells were higher compared to KD. Moreover, when comparing activated T cells in MIS-C and KD individually, regulatory T cells (Treg) showed the highest levels. These data suggest a stronger response of T cells in MIS-C, and higher Treg activity in both groups, which could reflect the response to the excessive inflammation. Ratios previously described in other inflammatory conditions were evaluated: MIS-C showed higher neutrophil/lymphocyte and Th17/Treg ratios than KD, suggesting higher inflammatory conditions in this group. In addition, monocyte and dendritic cells (DCs) numbers were decreased in MIS-C relative to KD. Parallel to these inflammatory cellular profiles, we identified increased levels of inflammatory cytokines in plasma of patients during the acute phase of the disease compared to recovery samples. Moreover, IL-6, which is one of the main

cytokines involved in cytokine storm in adult COVID-19, was higher in MIS-C suggesting, again, stronger inflammatory conditions in this pathology compared to KD.