



## Research article

# Evaluation the frequencies of HLA alleles in moderate and severe COVID-19 patients in Iran: A molecular HLA typing study

Farhad Abolnezhadian<sup>a</sup>, Sara Iranparast<sup>b,c,\*</sup>, Mojtaba Shohan<sup>b</sup>, Zahra Shokati Eshkiki<sup>d</sup>, Mahtab Hamed<sup>e</sup>, Maryam Seyedtabib<sup>f</sup>, Roohangiz Nashibi<sup>g</sup>, Mohammad-Ali Assarehzadegan<sup>i</sup>, Seyed Ali Mard<sup>h</sup>, Ali Akbar Shayesteh<sup>i</sup>, Niloofar Neisi<sup>j</sup>, Manoochehr Makvandi<sup>j</sup>, Seyed Mohammad Alavi<sup>g</sup>, Gholamreza Shariati<sup>k</sup>

<sup>a</sup> Department of Pediatrics, Abuzar Children's Hospital, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>b</sup> Department of Immunology, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>c</sup> Immunology Research Center, Institute of Immunology and Infectious Diseases, Iran University of Medical Sciences, Tehran, Iran

<sup>d</sup> Alimentary Tract Research Center, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>e</sup> Immunobiology Center of Pasteur Medical Laboratory, Ahvaz, Iran

<sup>f</sup> Department of Biostatistics & Epidemiology, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>g</sup> Infectious and Tropical Diseases Research Center, Health Research Institute, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>h</sup> Physiology Research Center, Research Institute for Infectious Diseases of Digestive System and Department of Physiology, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>i</sup> Alimentary Tract Research Center, Imam Khomeini Hospital Clinical Research Development Unit, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>j</sup> Department of Virology, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>k</sup> Department of Medical Genetics, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

<sup>l</sup> Immunology Research Center, Department of Immunology, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

## ARTICLE INFO

## Keywords:

HLA alleles

DNA genotyping

SARS-CoV-2

COVID-19

## ABSTRACT

**Background:** Severe acute respiratory syndrome coronavirus 2 was first reported in December 2019 and it has spread globally ever since. The HLA system is crucial in directing anti-viral immunity and recent studies are investigating the possible involvement of the HLA genes on the severity of immune inflammation in different phases of COVID-19.

**Methods:** In this cross-sectional study, peripheral blood-extracted genomic DNAs of 109 COVID-19 patients and 70 healthy controls were genotyped for different alleles of HLA-A, HLA-B, and HLA-DRB1 loci using sequence-specific primer PCR method.

**Results:** The results indicated that frequencies of HLA-DRB1\*11:01 and HLA-DRB1\*04:03 were significantly higher in severe patients rather than moderates ( $p < 0.001$  and  $0.004$ , respectively). Also, it was observed that HLA-DRB1\*04:01 was more frequent in moderate patients and healthy controls ( $p: 0.002$ ). In addition, HLA-B\*07:35, and HLA-DRB1\*07:01 showed higher frequencies in patients compared with controls ( $p: 0.031$  and  $0.003$  respectively). Inversely, due to the higher frequencies of HLA-B\*51:01 ( $p: 0.027$ ), HLA-DRB1\*11:05 ( $p: 0.003$ ), HLA-DRB1\*13:05 ( $p: 0.022$ ), and HLA-DRB1\*14:01 ( $p: 0.006$ ) in healthy individuals rather than patients, they may be associated with COVID-19 resistance.

\* Corresponding author. Department of Immunology, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.  
E-mail address: [sara.iranparast@yahoo.com](mailto:sara.iranparast@yahoo.com) (S. Iranparast).