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Immunobiological Aspects of Stem Cells and Cell Free Treatment in COVID-19, Advantages or Disadvantages?

From December 2019, a burgeoning rate of population have been involved with SARS-CoV-2. Due to the high rate of mortality and morbidity, needless to say the importance of more efficient therapeutic approaches to reduce the risk of viral transmission. Overaggressive inflammatory cells/cytokines, reduced peripheral blood cells, and immunosenescence in PBMCs account for cellular aging, vulnerability in patients with ARDS-associated with COVID-19, and acute coronary syndrome. Several studies depicted promising windows of clinical applications of MSCs, targeting the hyperactive systemic inflammatory responses. They do not express ACE2, and suppress Neutrophil extracellular traps (NETs) levels in plasma of patients with ARDS-associated with COVID-19 by up-regulating integrin signaling. MSCs promote the transcription of chemotaxis/telomerase-related genes, increase peripheral lymphocytes, decrease CRP, and reduce over-activated cytokine-secreting immune cells in patients with COVID-19. Totally, intravenous injection of MSCs for patients with COVID-19 can substantially reduce immunothrombosis, regenerate capillary endothelial cells, and relieve acute pulmonary edema. MSCs induce their therapeutic characteristics by a paracrine pathway through releasing bioactive soluble secretomes (cytokines, chemokines, growth factors, microvesicles, and exosomes). Among those cargo molecules, miRNAs translate required genes for stimulation of cell death/coagulation cascade, and operate against weak antiviral/antibody responses in patients with COVID-19. Upon internalization of the molecules in the secretome, the neighboring cells modulate pro-angiogenesis, anti-protease properties, suppression of apoptosis/fibrosis, activation of endogenous stem cells, chemo-attraction, and remodeling of injured parenchymal cells. Systemic administration of secretomes is safer than MSCs due to lacking some potentials (endogenous tumor formation/self-renewal, induction of immunocompetency, requirement for ex vivo cell expansion), being non-immunogenic due to the limited number of antigenic components, functioning with a high stability in the blood flow, being cheaper than monoclonal-antibodies and MSCs, less risk for emboli formation, and efficiently acting as drug-delivery systems.

Conclusion: Development of more scientific collaboration among Cell/Gene-based therapists, Clinical Microbiologists/Virologists/Immunologists/Specialists, Basic Medical Scientists, and Clinical Laboratory Scientists is highly recommended for management of COVID-19.

Biography

Nazila Bahmaie studied MSc of Medical Microbiology at the Zanjan University of Medical Sciences, Iran which was supervised by Dr. A. Esmaeilzadeh, and graduated as a MSc in 2016. She started her scientific collaborations since 2013. Now, she is a PhD candidate of Cancer Immunology in Ege University, Izmir, Turkey, currently working as a credited expert at the Comprehensive Medical Diagnosis and Cancer Laboratory. Her research interests include Immunology, Infectious Diseases, Cancer, Immunotherapy, Immunopharmacology, Drug Delivery, Monoclonal Antibodies, Stem Cells, Regenerative Medicine, and Precision Medicine with 16 scientific published articles and more than 10 in progress articles.

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