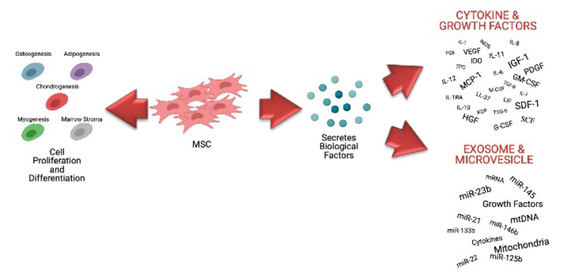
EFFECT OF SERUM FROM TYPE 2 DIABETES MELLITUS PATIENT IN MESENCHYMAL STEM CELL-DERIVED SECRETOME TOTAL PROTEIN

Angliana Chouw[1, 2], Cynthia R. Sartika[1], Tiana Milanda[3], Ahmad Faried[4]

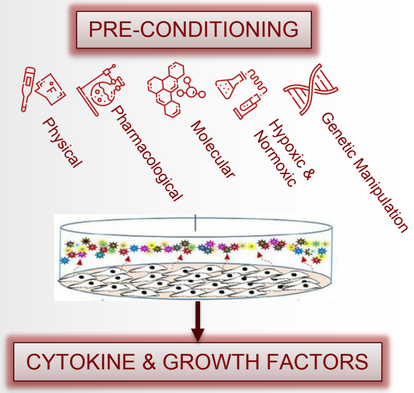
[1]Prodia StemCell Indonesia, Jakarta, Indonesia, [2]Doctoral Program in Pharmacy, Faculty of Pharmacy, Universitas Padjadjaran, Bandung, Indonesia, [3]Biological Pharmacy Department, Faculty of Pharmacy, Universitas Padjadjaran, Bandung, Indonesia, [4]Stem Cell Working Group, Universitas Padjadjaran, Bandung, Indonesia

Background

Mesenchymal stem/stromal cells (MSCs) are a promising cell-based therapy for regenerative medicine due to their ability to self-renewing and differentiate into different types of cells. Many researchers have studies the MSCs' mechanism of action in different pathologies. Most recent studies revealed that the benefits of using MSCs for regenerative medicine are associated with their paracrine activity by secreting a wide variety of soluble factors. Cytokines, growth factors, and enzymes are secreted or released into the culture medium in response to the local microenvironment.



The composition of MSC-derived secretome is significantly influenced by pre-conditioning treatment in vitro culture condition. The health status, serum used for the in vitro culture, and the presence of a pro-inflammatory environment might influence the MSC secretome. Serum collected from human peripheral blood contains proteins and others soluble factors such as antibodies, antigens, hormone and other substances. The human serum is used as biological molecule stimuli to induce the secretion of specific growth factors and cytokines that will improved MSC-derived secretome therapeutic potential.



Aims

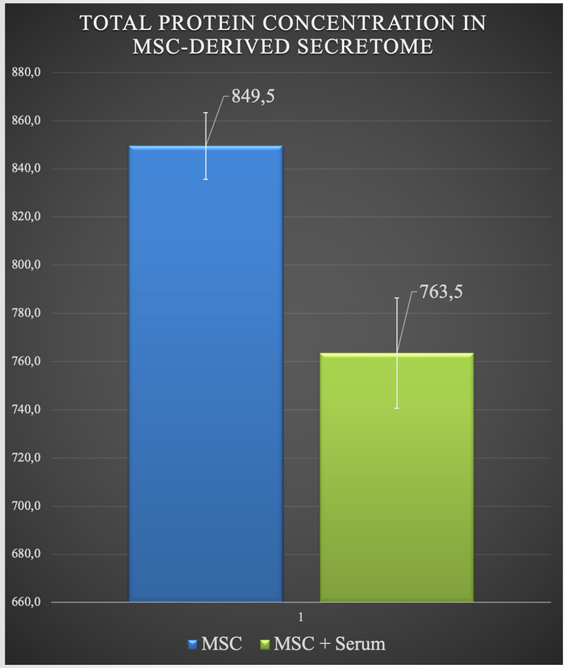
In this study, we would like to evaluate the effect of human serum from type 2 diabetes mellitus (T2DM) patients in total protein concentration of MSCs-derived secretome.

Method

Umbilical Cord-MSCs were seeded in the lower chamber of the trans-well plate at 5,000 cells per cm2. MSCs were culture with DMEM supplemented with 5% Human Platelet until it reaches the confluence of 80%. The culture medium was discarded and change with a fresh media according to the treatment. After 24 hours, media in lower chamber with content the MSC-derived secretome was collected. Protein concentration was counted using BCA Protein Assay Kit according to the manufacture instruction.

Result and Discussion

Total protein concentration is MSC-derived secretome is lower when exposed with T2DM uncontrolled serum patient compare to MSC-derived without any treatment, 763.7±5.79 µg/mL and 876.6±38.33 µg/mL, respectively. In most cases, it was predicted that the level of total protein was more in Serum Culture Medium than in Serum-Free Medium. This is different from the result of this study. The decreasing concentration of total protein in MSC-derived secretome expose with T2DM serum patient might due to the activity of MSC in response to growth factor from the serum. Further investigation is needed to detect the specific growth factor in the secretome.



Conclusion

Total protein of MSC-derived secretome exposed to T2DM serum patient is lower compare to control.