Letter to the Editor
Instructions/Template for Preparing Manuscript for Journal of Biomedicine and Translational Research

Effect of Umbilical Cord Cell Isolate to The Expression of Stro-1 and CD 34 in Dental Pulp Stem Cell Culture

Short Running Title: Effect of Umbilical Cord Cell Isolate

Dear Editor,
Journal of Biomedicine and Translational Research

Write down your research including:
< **Introduction:** *Dental Pulp Stem Cell (DPSC)* is one of the *mesenchymal stem cell (MSC)* that is ideal for repairing damaged cells, because it has great proliferative potential and the ability to regenerate complex dentin such as dental pulp. However, DPSC has limitations in providing stem cell sources because of the amount. Therefore, it is induced with umbilical cord cell isolates *(hUC-MSC)* which are currently being developed because of their advantages of being easy to obtain, having proliferative potential, and having anti-inflacmmatory effects. However, its influence and effectiveness on Dental Pulp Stem Cells is not yet widely known.
< **Case:** The prevalence of pulp and periapical diseases in Indonesia is categorized as high. Based on data from the Ministry of Health on the DTD (Basic Tabulation List), pulp and periapical diseases occupy the 11th position out of all outpatient diseases in Indonesian hospitals with a total of 30.06%. Even in 2018, according to the results of basic health research in 2018, the largest proportion of dental problems in Indonesia was damaged/cavities/diseased teeth by 45.3%, which shows that the prevalence of pulp disease in Indonesia is categorized as high (Dewiyani 2019).

Dental Pulp Stem cells (DPSCs) were first isolated from the third molar permanent tooth by Gronthos et al in 2000 (Intanries 2016). DPSCs isolated from pulp tissue showed characteristics such as mesenchymal stem cells considered to be ideal candidates for regenerating damaged dental pulp tissue due to their multipotent nature and high proliferation rate Research conducted by Murray, et al and Iohara, et al concluded that DPSCs have the ability to differentiate into odontoblasts and play a role in dentin regeneration. DPSCs are known to express several stem cell markers such as stromal-1 (STRO-1) which is known to be the best MSC marker24 and express CD34 but only <2% in number (Anggrarista et al. 2021).

Although DPSCs is ideal to be a source of stem cells for pulp tissue regeneration, human dental pulp cells have some limitations especially when providing a source of stem cells, in addition to having to obtain from healthy dental pulp tissue with limited indications, the number or volume of tissue obtained from such teeth is very limited, to provide the necessary source of stem cells for clinical needs becomes difficult (Hadi and Kusuma 2019). Therefore, researchers consider inducing with another source of MSC that is widely researched today, namely *human Umbilical Cord Mesenchymal Stem Cell* (hUC-MSC), because the source of hUC-MSC tissue from baby's umbilical cord, and it is easier to isolate (Li et al. 2015), has more ethical access compared to stem cells from other sources because it is a biological waste that is no longer used so it is not a problem to use (Nike Hendrijantini 2018), hUC-MSCs also have anti-inflammatory effects (Yao et al. 2019). When compared to other sources of

MSC such as *Bone Marrow Mesenchymal Stem Cell* (BM-MSC), hUC-MSCs have more primitive cells so that they have the ability to differentiate into different cells, are multipotent, non-hematopoetic, have the ability to repair themselves and differentiate into other cells such as osteoblasts, odontoblasts, fatty tissue and chondroblast (Zarrabi et al. 2013).

< **Conclusion:** The research that combines DPSC with hUC-MSC has also not been carried out so researchers are interested in conducting this study. Based on the descriptions above, MSCs have the ability to regenerate dental pulp tissue. It is hoped that the administration of umbilical cord isolate can increase the expression of Stro-1 and CD 34. There was an increase in the expression of Stro-1 and CD 34 in *Dental Pulp Stem Cell* cultures after being given umbilical cord cell isolates.

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Sincerely,

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