**PENGARUH MEDIA STARVASI TERHADAP PROLIFERASI SEL PUNCA MESENKIMAL (SPM) TALI PUSAT**

## ABSTRAK

**Latar Belakang**: Sel punca mesenkimal (SPM) merupakan agen terapi regeneratif jaringan rusak dengan kemampuan *self-renewal* dan diferensiasi yang multipoten. SPM tali pusat mampu berikan efek terapeutik melalui prosedur transplantasi. Namun, prosedur ini dapat terjadi kegagalan pascatransplantasi akibat menurunnya kemampuan proliferasi. Pengondisian menggunakan media starvasi dapat meningkatkan kemampuan hidup SPM pascatransplantasi ke jaringan tubuh yang rusak melalui inisiasi *quiescence* dan sinkronisasi siklus sel.
**Tujuan**: Penelitian ini bertujuan untuk mengetahui pengaruh media starvasi terhadap proliferasi SPM tali pusat.
**Metode**: Penelitian ini merupakan eksperimental murni dengan desain *post-test only*. Dilakukan kultur SPM dalam tiga kelompok perlakuan yakni media komplit α-MEM + serum (MK), media starvasi α-MEM tanpa serum (BASAL), dan media starvasi asam amino (HBSS). Sampel gambar mikroskop cahaya pada jam ke-4, 8, 24, 48, dan 72 diolah menjadi gambar biner menggunakan *Adobe Photoshop* lalu persentase luas penutupan SPM dianalisis menggunakan *ImageJ*.
**Hasil**: Rerata persentase tertinggi pada MK 48 jam (85,56±8,01%) dan terendah pada HBSS 72 jam (27,69±9,81%). Uji *Kruskal-Wallis* menunjukkan adanya pengaruh media starvasi terhadap proliferasi SPM ($p<0,001$). Uji *Post-Hoc Mann-Whitney* mengemukakan adanya signifikansi pada 19 perbandingan kelompok perlakuan ($p<0,05$).
**Kesimpulan**: Kultur SPM tali pusat dalam media starvasi α-MEM tanpa serum atau media starvasi asam amino (HBSS), menunjukkan persentase luas penutupan sel yang lebih rendah dibandingkan kultur dalam α-MEM + serum secara signifikan pada pengamatan jam ke-24, 48, dan 72, yang menunjukkan bahwa kultur SPM tali pusat dalam media starvasi α-MEM tanpa serum atau media starvasi asam amino (HBSS) memiliki proliferasi yang lebih rendah dibandingkan kultur dalam α-MEM + serum secara signifikan.

**Kata Kunci**: Media starvasi, Proliferasi, *Quiescence*, Sel punca mesenkimal

## *EFFECT OF STARVATION MEDIUM ON PROLIFERATION OF UMBILICAL CORD MESENCHYMAL STEM CELLS (MSC)*


### *ABSTRACT*

***Background**: Mesenchymal stem cells (MSC) are regenerative therapeutic agents of damaged tissues with the ability of self-renewal and multipotent differentiation. Umbilical cord MSC are able to provide therapeutic effects through transplantation procedures. However, this procedure may result in post-transplantation failure due to decreased proliferation ability. Conditioning using starvation medium can improve the viability of MSC post-transplantation into damaged body tissues through initiation of quiescence and cell cycle synchronization.*

***Objective:** This study aimed to determine the effect of starvation medium on umbilical MSC proliferation.*

***Methods**: This study was a pure experimental with post-test only design. MSC culture was carried out in three treatment groups, namely complete α-MEM + serum medium (MK), α-MEM starvation medium without serum (BASAL), and amino acid starvation medium (HBSS). Samples of light microscopy images at 4, 8, 24, 48, and 72 hours were processed into binary images using Adobe Photoshop and then the percentage of SPM closure area was analyzed using ImageJ.*

***Results**: The mean percentage is highest at MK 48 hours (85.56±8.01%) and lowest at HBSS 72 hours (27.69±9.81%). Kruskal-Wallis test showed the effect of starvation medium on MSC proliferation ($p<0.001$). Mann-Whitney Post-Hoc test suggested significance in 19 treatment group comparisons ($p<0.05$).*

***Conclusion**: Umbilical cord MSC cultures in α-MEM starvation medium without serum or amino acid starvation medium (HBSS), showed a significantly lower percentage of cell coverage area than cultures in α-MEM + serum at 24, 48, and 72 hours of observation, indicating that umbilical MSC cultures in α-MEM starvation medium without serum or amino acid starvation medium (HBSS) had significantly lower proliferation than cultures in α-MEM + serum.*



***Keywords**: Starvation medium, Proliferation, Quiescence, Mesenchymal stem cells*