Dampak Pemberian Vesikel Ekstraseluler Sel Punca Mesenkim Jaringan Tali Pusat terhadap Kepuncaan Sel Kanker Payudara (MDA-MB-231, MCF7, dan ALDH+) = The Effect Of Mesenchymal Stem Cells Derived Extracellular Vesicles Supplementation On The Stemness Of Breast Cancer Cells (MDA-MB- 231, MCF7, and ALDH+)

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Abstrak

Terapi penyakit degeneratif menggunakan sel punca mesenkim (SPM) dikembangkan dengan pendekatan seluler ataupun dengan conditioned medium (CM) yang mengandung faktor pertumbuhan dan vesikel ekstraseluer (VE). Sel punca kanker merupakan populasi kecil sel dalam jaringan kanker yang berkaitan dengan resistensi terapi. Belum diketahui dampak VE SPM tali pusat terhadap kepuncaan sel kanker payudara. Penelitian ini bertujuan menganalisis dampak pemberian VE SPM tali pusat terhadap kepuncaan sel kanker payudara. VE diisolasi dengan kromatografi kolom; diidentifikasi dengan mikroskop konfokal dan transmission electron microscope. Internalisasi VE oleh sel kanker payudara dikonfirmasi dengan mikroskop konfokal. Analisis viabilitas sel pasca kokultur VE dilakukan menggunakan trypan blue exclusion assay, ekspresi mRNA OCT4 dengan qRT-PCR, ekspresi protein OCT4 dengan Western Blot, aktivitas enzim ALDH dengan ALDEFLUOR™. Hasil, VE SPM tali pusat berhasil diisolasi serta diidentifikasi. Derajat internaliasasi VE oleh ketiga jenis sel kanker payudara berbeda. VE 5% meningkatkan viabilitas ketiga jenis sel serta ekspresi mRNA OCT4 sel MCF7 dan ALDH+. Tingkat ekspresi protein OCT4 sel MCF7 dan ALDH+ berbanding terbalik dengan peningkatan konsentrasi VE. VE 5% meningkatkan ekspresi protein OCT4 sel MDA-MB-231. VE 5% meningkatkan aktivitas ALDH ketiga sel kanker payudara. Pada VE 10%, aktivitas ALDH sel MDA-MB-231 dan MCF7 menurun, namun pada sel ALDH+ meningkat. Kesimpulan, pemberian VE SPM tali pusat dengan konsentrasi yang berbeda memberikan dampak berbeda terhadap kepuncaan berbagai sel kanker payudara, berkaitan dengan regulasi ekspresi OCT4 dan aktivitas ALDH.

.....Therapy of degenerative diseases using umbilical cord mesenchymal stem cells (UCMSCs) are currently developed either using the cell or the conditioned medium containing extracellular vesicles (EVs). Cancer stem cells are a minor subpopulation of cells within cancerous tissue that had been associated with therapy resistance. This study aimed to investigate the effect of EVs secreted by UCMSC (UCMSC-EVs) on the stemness of human breast cancer cells. UCMSC-EVs were isolated using SEC, then identified using confocal microscope and TEM. UCMSC-EV uptake by MDA-MB-231, MCF7, and ALDH+ cells was analyzed by confocal microscope. The viability of co-cultured breast cancer cells was determined using trypan blue exclusion assay, mRNA and protein expression of OCT4 as well as ALDH activity were analyzed qRT-PCR, Western Blot, and ALDEFLUOR™, respectively. As the result, UCMSC-EVs were successfully isolated and identified. The internalization ability of each type of breast cancer cell seemed different. Notably, 5% EVs increased the viability of those three cells. Five percent of EVs increased the mRNA expression of OCT4. On MCF7 and ALDH+ cells, the higher the EVs concentration given, the lower expression of OCT4 protein was. Supplementation of EVs 5% increased the ALDH activity of cells. In conclusion, supplementation of UCMSC-EVs in different concentrations gives different impacts in terms

of stemness that was correlated with OCT4 and ALDH regulation within the treated cells.