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Profil Brain Derived Neurotrophic Factor dan Stromal-Cell Derived Factor-1 Sekretom Umbilical Cord Mesenchymal Stem Cell Macaca Fascicularis Pre-Kondisi Hipoksia = Profile of Brain Derived Neurotrophic Factor and Stromal-Cell Derived Factor-1 Umbilical Cord Mesenchymal Stem Cell Secretome of Macaca Fascicularis Hypoxia Pre-Conditioned

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Abstrak

Sekretom stem cell dapat menjadi pilihan sebagai terapi adjuvan stroke karena efek neuroprotektif dan neuroregeneratifnya. Efek ini muncul karena faktor parakrin seperti Brain Derived Neurotrophic Factor (BDNF) dan Stromal-Cell Derived Factor-1 (SDF-1) yang dapat diinduksi dengan prekondisi hipoksia. Selama ini model uji produk terapi baru untuk stroke belum dapat menggambarkan keadaan sesungguhnya yang mendekati terapi stroke di manusia. Sekretom dari umbilical cord M. fascicularis yang ketersediaannya berlimpah sebagai limbah pembiakan hewan uji vaksin PT Bio Farma, diharapkan dapat menjadi model uji yang baik karena memiliki kemiripan secara genetik dengan manusia. Penelitian ini melakukan optimasi prekondisi hipoksia pada Umbilical Cord MSC (UCMSC) Macaca fascicularis. Isolasi dan kultur UCMSC dilakukan pada medium MEM dengan suplementasi 20% FBS. Karakterisasi fenotipik dilakukan dengan flow-cytometry sementara karakterisasi diferensiasi menggunakan kit kemudian diamati secara mikroskopis. Prekondisi hipoksia 1%, 3% dan 5% dikerjakan dalam inkubator dua gas. Konsentrasi BDNF dan SDF-1 dipantau menggunakan metode ELISA. UCMSC Macaca fascicularis telah berhasil dikultur dan dikarakterisasi dalam hal fenotip dan diferensiasi. Prekondisi hipoksia mampu menginduksi sekresi BDNF hingga 264 pg/mL dan SDF-1 hingga 666 pg/mL. Kesimpulan penelitian ini menunjukkan profil prekondisi hipoksia dengan oksigen 3% dapat menginduksi sekresi BDNF dan SDF-1 yang paling optimal, dibandingkan dengan hipoksia 1% dan 5%.

.....Stem cell secretome may offer a promising option as adjuvant therapy for stroke due to its neuroprotective and neuroregenerative effects. These benefits are attributed to paracrine factors like Brain-Derived Neurotrophic Factor (BDNF) and Stromal-Cell Derived Factor-1 (SDF-1), which can be enhanced through hypoxic preconditioning. Current testing models for stroke therapies often fail to accurately replicate human stroke conditions. The secretome from the umbilical cord of Macaca fascicularis, a by-product of vaccine test animal breeding at PT Bio Farma, is considered a viable model due to its genetic similarity to humans. This research aims to optimize hypoxia preconditioning in Umbilical Cord MSC (UCMSC) from Macaca fascicularis. UCMSC were isolated and cultured in MEM medium with 20% FBS, and characterized phenotypically by flow cytometry while differentiation characterization using kits was then observed microscopically. Hypoxia preconditioning at 1%, 3%, and 5% oxygen levels was conducted in a two-gas incubator. BDNF and SDF-1 concentrations were measured by ELISA. Results showed that UCMSC could be successfully cultured and characterized, with 3% oxygen hypoxia preconditioning inducing the highest levels of BDNF (264 pg/mL) and SDF-1 (666 pg/mL), compared to 1% and 5% oxygen levels.