Efek neurotrophin-3 pada diferensiasi neural sel punca mesenkim sumsum tulang tikus: kajian imunositokimia dengan penanda nestin dan microtubule associated protein-2 = Effect of neurotrophin 3 on neural differentiation of mesenchymal stem cells of rat's bone marrow: immunocytochemistry studies using nestin and microtubule associated protein 2 markers

Ariyani Noviantari, author

Abstrak

Latar Belakang : Penyakit neurodegeneratif disebabkan oleh regenerasi neuron yang rendah. Pemberian sel punca mulai dikembangkan untuk meningkatkan regenerasi sistem saraf pusat. Sel Punca Mesenkim SPM mampu berdiferensiasi menjadi berbagai tipe sel sehingga dapat dimanfaatkan sebagai sel terapi. Proliferasi dan diferensiasi sel punca neuron diregulasi gen endogen dan faktor neurotrofik seperti nerve growth factor NGF , brain-derived neurotrophic factor BDNF dan neurotrophin-3 NT-3 . Namun, peran NT-3 sendiri dalam diferensiasi SPM belum banyak diketahui, sehingga penelitian ini dilakukan untuk mempelajari peran NT-3 pada diferensiasi SPM dari sumsum tulang tikus menjadi neuron pada tahap awal dan tahap lanjut.
Metode : SPM diisolasi dari sumsum tulang tikus, kemudian dikultur dan dipropagasi dalam Minimum Essential Medium Eagle MEM , 10 Fetal Bovine Serum FBS dan 1 antibiotic-antimycotic. Induksi neuron dilakukan pada SPM pasase keempat dalam MEM, 2 FBS, 1 insulin like growth factor N2 dan NT-3 dengan konsentrasi 20, 25, 30 ng/mL dan kontrol selama 7 hari. Dilakukan imunositokimia Nestin sebagai penanda tahap awal dan MAP-2 pada tahap lanjut diferensiasi neuron. Data yang didapat adalah rata-rata persentase jumlah sel Nestin positif dan sel microtubule associated protein-2 MAP-2 positif pada setiap konsentrasi. Analisis statistik menggunakan program SPSS dengan uji one-way ANOVA.
Hasil : Hasil penelitian menunjukkan adanya perbedaan yang bermakna pada persentase jumlah sel Nestin positif pada SPM dengan penambahan NT-3 20, 25 dan 30 ng/mL selama 7 dan 14 hari dibandingkan dengan kontrol p

.....

Background : Neurodegenerative diseases showed partial or limited regeneration process. Transplantation of stem cells has been improve regeneration of the central nervous system. The mesenchymal stem cells MSCs can differentiate into various cell types including neurons that can be used for cell therapy. Proliferation and differentiation of neural stem cells are regulated by endogenous gene and neurotrophic factors such as nerve growth factor NGF , brain derived neurotrophic factor BDNF and neurotrophin 3 NT 3 . The aim of this research is to investigate the role of NT 3 in differentiation of MSC into neurons at the early stage and at the late stage.
Methods : MSCs were isolated from rat bone marrow, cultured and propagated in Minimum Essential Medium Eagle MEM , 10 Fetal Bovine Serum FBS and 1 antibiotic antimycotic. MSCs were induced for neuron differentiation induction medium MEM, 2 FBS, 1 insulin like growth factor N2 and NT 3 20, 25, 30 ng mL for 7 and 14 days control induction medium without NT 3. The immunocytochemistry of Nestin was performed on day 7 and MAP 2 was performed on day 14. All experiment were done triplicated. Five random high power field was documented. The data obtained is the average percentage of the number of

Nestin and MAP 2 positive cells at each concentration. Statistical analysis using SPSS with one way ANOVA test.

Results : The results showed a significant difference in the percentage of Nestin positive cells in MSCs with NT 3 20, 25 and 30 ng mL for 7 days compared to controls p