

## ABSTRAK

Latar belakang: *Mesenchymal Stem Cell* (MSC) adalah *Stem Cell* dewasa yang belum berdiferensiasi menjadi sel jenis lain. MSC membutuhkan mediator inflamasi seperti TNF- $\alpha$  untuk mendukung aktivitas proliferasi dan diferensiasinya. TNF- $\alpha$  dapat ditemukan pada kondisi luka atau cedera jaringan. Penelitian ini ingin mengetahui pengaruh TNF- $\alpha$  dari serum tikus yang dilukai terhadap kadar IL-6 dan proliferasi MSC.

Metode: Penelitian *post test only control group design* yang dilakukan pada MSC berasal dari *mice umbilical cord* dengan pemberian perlakuan serum TNF- $\alpha$  dari tikus yang dilukai pada konsentrasi 5%, 10% dan 15%. Proliferasi MSC diamati menggunakan mikroskop *inverted* pada perbesaran 400x dan kadar IL-6 diukur menggunakan *ELISA reader* pada panjang gelombang 450 nm. Perbedaan kadar IL-6 dan proliferasi MSC dianalisis menggunakan uji *One Way Anova* dilanjutkan dengan uji *Post Hoc*.

Hasil: *mean* kadar IL-6 kelompok kontrol dan serum TNF- $\alpha$  5, 10 dan 15% adalah 1.503,3; 1.628,70; 1695,61; dan 1683,57pg/ml. Terdapat perbedaan *mean* kadar IL-6 antar keempat kelompok ( $p=0,000$ ). Perbedaan ditunjukkan hampir pada semua kelompok, kecuali antara kelompok serum TNF- $\alpha$  5% dengan 10% dan 15%, dan kelompok serum TNF- $\alpha$  10% dengan 15%. *Mean* proliferasi MSC kelompok kontrol dan serum TNF- $\alpha$  5, 10, dan 15% adalah 51,682.33; 54,303.67; 57,861.00; dan 59,767.67 sel. Terdapat perbedaan *mean* proliferasi MSC antar keempat kelompok ( $p=0,000$ ). Perbedaan ditunjukkan hampir pada semua kelompok, kecuali antara kelompok serum TNF- $\alpha$  10% dengan 15%.

Kesimpulan: Terdapat pengaruh serum TNF- $\alpha$  tikus yang dilukai terhadap kadar IL-6 dan jumlah proliferasi MSC secara *in vitro*.

Kata kunci: TNF- $\alpha$ , Kadar IL-6, Proliferasi MSC.

## ABSTRACT

**Background:** *Mesenchymal Stem Cell* (MSC) are adult *Stem Cells* that do not yet differentiate into another cell type. MSC requires inflammatory mediators such as TNF- $\alpha$  to support their proliferation and differentiation activities. This study investigates the influence of TNF- $\alpha$  serum injured rat to the IL-6 levels and MSC proliferation.

**Methods:** The post test only control group design study performed on MSC derived from mice umbilical cord that treated with TNF- $\alpha$  serum from injury rat in concentrations 5%, 10% and 15%. MSC proliferation was observed using an inverted microscope at 400x magnification and IL6 levels were measured using ELISA reader at a wavelength of 450 nm. Differences in levels of IL-6 and MSC proliferation was analyzed using One Way Anova test followed by Post Hoc test.

**Result:** mean levels of IL-6 in control and serum TNF- $\alpha$  5, 10 and 15% group is 1503.3; 1628.70; 1695.61; and 1683,57pg/ml. There are differences in the mean levels of IL-6 within the four groups ( $p = 0.000$ ). Differences are shown almost in all groups, except between groups of serum TNF- $\alpha$  5% to 10% and 15%, and a group of serum TNF- $\alpha$  10% to 15%. Mean MSC proliferation control group and serum TNF- $\alpha$  5%, 10% and 15% was 51,682.33; 54,303.67; 57,861.00; and 59,767.67 cells. There are differences in the mean proliferation of MSC between the four groups ( $p = 0.000$ ). Differences are shown almost in all groups, except among groups of serum TNF- $\alpha$  10% to 15%.

**Conclusion:** It has been proven that TNF- $\alpha$  serum from injured mice influenced IL-6 levels and MSC proliferation numbers by in vitro.

**Keywords:** TNF- $\alpha$ , levels of IL-6, MSC proliferation.