INTISARI

Magnesium hidroksida merupakan salah satu biomaterial yang berpotensi mendukung regenerasi tulang melalui pelepasan ion magnesium yang berperan dalam aktivitas dan kelangsungan hidup sel osteoblas, serta ion hidroksida yang mampu menetralkan pH lingkungan. Penentuan konsentrasi yang paling efektif untuk mempertahankan viabilitas sel perlu dikaji untuk memastikan keamanan dan kelayakannya dalam aplikasi biomaterial. Penelitian ini bertujuan untuk mengetahui pengaruh paparan $Mg(OH)_2$ 0,1 mg/mL dan 1 mg/mL terhadap viabilitas sel MC3T3-E1 menggunakan metode *Live/Dead Assay*.

Penelitian ini merupakan penelitian eksperimental laboratoris dengan kultur sel preosteoblas MC3T3-E1. Sel preosteoblas MC3T3-E1 dibagi menjadi tiga kelompok, yaitu kontrol, perlakuan 0,1 mg/mL, dan perlakuan 1 mg/mL. Suspensi $Mg(OH)_2$ diberikan selama 24 jam. Pewarnaan *Live/Dead* dilakukan sebelum pengamatan dengan mikroskop fluorosensi, kemudian persentase sel hidup dihitung menggunakan perangkat lunak analisis citra *ImageJ*. Data hasil penelitian dianalisis dengan uji normalitas *Shapiro-Wilk*, uji homogenitas *Levene's test*, uji *one-way ANOVA*, dan uji *post-hoc LSD*.

Hasil penelitian menunjukkan peningkatan viabilitas pada kelompok 0,1 mg/mL dan 1 mg/mL dibandingkan kelompok kontrol. Nilai rerata viabilitas masing-masing adalah 65,25% (kontrol); 81,03% (0,1 mg/mL); dan 81,09% (1 mg/mL). Analisis *ANOVA* menunjukkan perbedaan bermakna ($p < 0,05$). Hasil uji *post-hoc* menunjukkan perbedaan bermakna antara kontrol dan kedua kelompok perlakuan, namun tidak antara 0,1 mg/mL dan 1 mg/mL. Kesimpulan penelitian ini menyatakan bahwa paparan $Mg(OH)_2$ 0,1 mg/mL dan 1 mg/mL meningkatkan viabilitas sel MC3T3-E1 tanpa perbedaan signifikan antar keduanya.

Kata Kunci: sel MC3T3-E1, viabilitas, magnesium hidroksida, *Live/Dead Assay*

ABSTRACT

Magnesium hydroxide is a biomaterial with considerable potential to support bone regeneration through the release of magnesium ions, which play a role in osteoblast activity and survival, as well as hydroxide ions that are capable of neutralizing the surrounding pH environment. Determining the optimal concentration for maintaining cell viability is crucialto ensure its safety and feasibility for biomaterial applications. This study aimed to investigate the effects of exposure to $Mg(OH)_2$ at concentrations of 0.1 mg/mL and 1 mg/mL on the viability of MC3T3-E1 cells using the Live/Dead Assay method.

This study employed an experimental laboratory design using MC3T3-E1 preosteoblast cell cultures. The MC3T3-E1 preosteoblast cells were divided into three groups: a control group, a 0.1 mg/mL treatment group, and a 1 mg/mL treatment group. MC3T3-E1 cells were treated with $Mg(OH)_2$ for 24 hours. Live/Dead staining was performed prior to observation under a fluorescence microscope, after which the percentage of viable cells was calculated using ImageJ (image analysis software). The data were analysed using the Shapiro–Wilk normality test, Levene's test for homogeneity of variance, one-way ANOVA, and the LSD post-hoc test.

The results demonstrated an increase in cell viability in both the 0.1 mg/mL and 1 mg/mL treatment groups compared to the control group. The mean viability values were 65.25% for the control group, 81.03% for the 0.1 mg/mL group, and 81.09% for the 1 mg/mL group. ANOVA analysis indicated a statistically significant difference ($p < 0.05$). Post-hoc analysis revealed significant differences between the control group and both treatment groups, but no significant difference between the 0.1 mg/mL and 1 mg/mL concentrations. The study concludes that exposure to $Mg(OH)_2$ at concentrations of 0.1 mg/mL and 1 mg/mL enhances the viability of MC3T3-E1 cells, with no significant difference between the two concentrations.

Keywords: MC3T3-E1 cells, viability, magnesium hydroxide, Live/Dead Assay