

ABSTRAK

UJI TOKSISITAS AKUT *BOVINE UMBILICAL MESENCHYMAL STEM CELLS-CONDITIONED MEDIUM* (BUMSCS-CM) TERHADAP JANTUNG DAN GINJAL TIKUS *SPRAGUE DAWLEY*

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Pemanfaatan produk turunan sel punca mesenkimal sebagai terapi regeneratif berbasis non-sel menunjukkan perkembangan yang pesat, namun evaluasi aspek keamanannya masih perlu dilakukan sebelum dapat diterapkan secara luas. Penelitian ini bertujuan untuk menilai toksisitas akut *Bovine Umbilical Mesenchymal Stem Cells-Conditioned Medium* (BUMSCs-CM), yaitu media kultur yang mengandung sekretom yang kaya akan faktor pertumbuhan dan sitokin. Penelitian ini menggunakan 50 tikus galur *Sprague Dawley* sebagai hewan coba yang dibagi ke dalam lima kelompok yang terdiri dari kelompok kontrol normal dan empat kelompok perlakuan yang diberikan dosis tunggal BUMSCs-CM (dosis 5 mg/kg BB, 50 mg/kg BB, 300 mg/kg BB, dan 2000 mg/kg BB). Setelah masa pengamatan selama 14 hari, hewan dikorbankan untuk dilakukan pengamatan terhadap parameter hematologi, biokimia darah, serta gambaran histopatologi organ jantung dan ginjal untuk mendeteksi potensi toksisitas. Analisis kualitatif dilakukan dengan mengamati gejala klinis, perubahan makroskopis, dan perubahan mikroskopis organ. Analisis kuantitatif dilakukan terhadap peningkatan berat badan harian, hematologi, biokimia darah, dan rata-rata berat relatif organ jantung dan ginjal. Data-data kuantitatif dianalisis menggunakan One Way-ANOVA dan dilanjutkan dengan uji *Dunnet*, di mana nilai $P < 0,05$ dianggap signifikan. Hasil penelitian membuktikan bahwa pemberian dosis tunggal BUMSCs-CM hingga dosis tertinggi tidak menimbulkan gejala toksisitas ataupun kematian pada hewan coba. Parameter hematologi dan biokimia darah berada dalam rentang normal tanpa perubahan yang signifikan. Pemeriksaan histopatologi jantung dan ginjal menunjukkan struktur organ yang normal, tanpa adanya inflamasi, degenerasi, ataupun nekrosis. Disimpulkan bahwa pemberian BUMSCs-CM hingga dosis tertinggi tidak bersifat toksik sehingga diklasifikasikan ke dalam kategori *5/unclassified* dan dapat dikembangkan sebagai agen terapeutik.

Kata kunci: BUMSCs-CM, Ginjal, Histopatologi, Jantung, Toksisitas Akut.

ABSTRACT

ACUTE TOXICITY STUDY OF *BOVINE UMBILICAL MESENCHYMAL STEM CELLS-CONDITIONED MEDIUM (BUMSCS-CM)* ON CARDIAC AND RENAL ORGANS OF SPRAGUE DAWLEY RATS

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The application of mesenchymal stem cell-derived products as cell-free regenerative therapies has shown rapid development. However, evaluation of their safety aspects is necessary prior to widespread clinical use. This study aimed to assess the acute toxicity of Bovine Umbilical Mesenchymal Stem Cells-Conditioned Medium (BUMSCs-CM), a culture medium containing secretome rich in growth factors and cytokines. Fifty Sprague Dawley rats were used as experimental animals, and divided into five groups consisting of one normal control group and four treatment groups receiving single doses of 5 mg/kg BW, 50 mg/kg BW, 300 mg/kg BW, and 2000 mg/kg BW. Following a 14-day observation period, the animals were euthanized for evaluation of hematological parameters, blood biochemistry, and histopathological structure of the cardiac and renal organs to detect potential toxic effects. Qualitative analysis was conducted by observing clinical signs, macroscopic changes, and microscopic alterations of the organs. Quantitative analysis was performed on average daily body weight gain, hematological parameters, blood biochemistry, and the mean relative weights of the heart and kidneys. Quantitative data were analyzed using one-way ANOVA followed by Dunnett's test, with a P value of < 0.05 considered statistically significant. The results showed that single administration of BUMSCs-CM, even at the highest dose, did not cause clinical signs of toxicity or mortality in the experimental animals. Hematological and blood biochemical parameters remained within normal ranges without significant changes. Histopathological examination of the heart and kidneys showed normal organ architecture without inflammation, degeneration, or necrosis. It can be concluded that BUMSCs-CM administration up to the highest tested dose was non-toxic, therefore it was classified into Category 5/unclassified, indicating its potential for further development as a therapeutic agent.

Key words: Acute Toxicity, BUMSCs-CM, Heart, Histopathology, Kidney.