MEKANISME REGENERASI SPERMATOGENESIS PADA DISFUNGSI TESTIS TIKUS MENGGUNAKAN SEKRETOME

INTISARI

Linda Miftakhul Khasanah
18/436448/SKH/00114

Disfungsi testis merupakan penyebab utama gangguan perkembangan seksual hewan jantan yang menyebabkan penurunan produksi testosteron dan kegagalan spermatogenesis. Sekretome atau ekstrak media penumbuh sel punca mesenkimal (EMPSPM) adalah agen terapeutik penyakit degeneratif yang berbasis teknologi sel. Sekretome dapat mempercepat proses regenerasi dengan cara merangsang substansi-substansi biologi seperti *growth factor* dan sitokin untuk mendorong diferensiasi sel punca menjadi sel-sel yang dibutuhkan. Penelitian ini bertujuan untuk mengetahui pengaruh sekretome pada disfungsi testis di tingkat seluler pada mekanisme regenerasi jaringan dan fungsi reproduksi testis dengan teknik Hematoksilin-Eosin, histokimia lektin dan imunohistokimia. Hewan coba tikus putih (*Rattus norvegicus*) jantan umur 3 bulan, sebanyak 39 ekor dibagi menjadi 4 kelompok yaitu, kelompok kontrol positif (sakit), kontrol negatif (sehat), sekretome 0,2 ml/kg BB, dan sekretome 0,5 ml/kg BB. Tikus diinduksi disfungsi testis secara akut dengan Cisplatin dosis 3 mg/kg BB tiga kali dengan interval pemberian 3 hari. Kelompok kontrol positif diinjeksi dengan NaCl, dan kelompok sekretome diinjeksi dengan sekretome 0,2 dan 0,5 ml/kg BB sesuai dengan masing-masing kelompok. Injeksi NaCl dan sekretome dilakukan 4 kali dengan interval satu minggu. Selanjutnya tikus dikorbankan dan sampel dikoleksi setiap minggunya dan diproses dengan menggunakan metode parafin. Data yang diperoleh dianalisis secara deskriptif, semi-kuantitatif, dan kuantitatif. Lektin PSA terdeteksi pada spermatid dan spermatozoa dengan intensitas kuat dan sangat kuat. Lektin LCA terdeteksi pada spermatogonia, spermatosit, spermatozoa, dan sel Sertoli dengan intensitas kuat dan sangat kuat. Lektin PHA-L terdeteksi pada spermatid dengan intensitas kuat. Lektin SJA terdeteksi pada spermatid dengan intensitas kuat. Enzim p450scc dan 3βHSD terdeteksi pada sel Leydig, enzim 17βHSD1 terdeteksi pada sel spermatogenik, sel Sertoli, dan sel Leydig. EGF terdeteksi pada sel Leydig dan TNF-α terdeteksi pada sel Sertoli dan sel Leydig. Kesimpulan dari penelitian ini adalah sekretome diduga mampu meregenerasi spermatogenesis dengan memperbaiki struktur testis, peran dari EGF dan TNF-α dalam proses spermatogenesis maupun steroidogenesis, terdeteksinya residu gula, serta perbaikan proses steroidogenesis yang dibuktikan dengan adanya enzim p450scc, 3βHSD, dan 17βHSD.

Kata kunci: cisplatin, disfungsi testis, regenerasi, sekretome, spermatogenesis

MECHANISM OF SPERMATOGENESIS REGENERATION IN TESTICULAR DYFUNCTION RAT USING SECRETOME

ABSTRACT

Linda Miftakhul Khasanah
18/436448/SKH/00114

Testicular dysfunction is the main cause of impaired sexual development in male animals, which causes decreased testosterone production and failure of spermatogenesis. Secretome, or extract of mesenchymal stem cell growth media, is a therapeutic agent for degenerative diseases based on cell technology. The secretome can accelerate the regeneration process by stimulating biological substances such as growth factors and cytokines to promote the differentiation of stem cells into the required cells. This study aims to determine the effect of the secretome on testicular dysfunction at the cellular level on the process of tissue regeneration and reproductive function of the testes using the Hematoxylin-Eosin technique, lectin histochemistry, and immunohistochemistry. Experimental animals were white rats (*Rattus norvegicus*) at 3 months old. 39 animals were divided into 4 groups, namely, a positive control group (sick), a negative control (healthy), a secretome of 0.2 ml/kg body weight, and a secretome of 0.5 ml/kg BW. In mice, testicular dysfunction was induced acutely with cisplatin at a dose of 3 mg/kg BW three times, with an interval of 3 days. The positive control group was injected with NaCl, and the secretome group was injected with 0.2 and 0.5 ml/kg BW according to each group. NaCl and secretome injections were performed four times at an interval of one week. Furthermore, rats were sacrificed, and samples were collected every week and processed using the paraffin method. The collected data was analyzed in three ways: descriptively, semi-quantitatively, and quantitatively. PSA lectin was detected in spermatids and spermatozoa with strong and very strong intensities. Intensities of LCA lectins were detected in spermatogonia, spermatocytes, spermatozoa, and Sertoli cells with strong and very strong intensities. With strong intensity, PHA-L lectin was detected in spermatids. SJA lectin was detected in spermatids with strong intensity. P450scc and 3βHSD enzymes were detected in Leydig cells. 17βHSD1 enzymes were detected in spermatogenic cells, Sertoli cells, and Leydig cells. EGF was detected in Leydig cells and TNF-α was detected in Sertoli cells and Leydig cells. The conclusion of this study is that the secretome is thought to be able to regenerate spermatogenesis by improving the structure of testicular tissue, the role of EGF and TNF-α in the process of spermatogenesis and steroidogenesis, detecting sugar residues, and improving the process of steroidogenesis as evidenced by the presence of enzymes p450scc, 3βHSD, and 17βHSD.

Keywords: cisplatin, testicular dysfunction, regeneration, secretome, spermatogenesis