Regenerasi Saraf Perifer Pascacedera Saraf Skiatik Tikus (Rattus norvegicus Berkenhout, 1769) Galur Sprague-Dawley dengan Sel Punca Mesenkimal Adiposa Manusia melalui Analisis Histologi serta Ekspresi Gen Agrin dan PROM1 = Peripheral Nerve Regeneration Postsciatic Nerve Injury in Sprague-Dawley Strain Rat (Rattus norvegicus Berkenhout, 1769) with Human Adipose Tissue Derived Mesenchymal Stem Cell by Histological Analysis and Expression of Agrin and PROM1 Genes

Melvin Sandrian Hadi, author

Abstrak

Cedera saraf perifer, seperti cedera saraf skiatik dapat mengakibatkan disabilitas. Metode pengobatan dalam memicu regenerasi saraf yang mengalami cedera dapat dilakukan melalui terapi berbasis sel punca mesenkimal (SPM) dengan potensi regenerasi dan memicu efek parakrin. Regenerasi saraf skiatik dianalisis secara histologi melalui analisis deskriptif otot gastroknemius tikus galur Sprague– Dawley dengan pewarnaan hematoksilin–eosin dan jumlah kluster neuromuscular junction (NMJ) pada serat otot dengan pewarnaan Palmgren silver. Analisis secara molekuler juga dilakukan untuk mengamati tingkat ekspresi gen esensial yang mampu meregulasi regenerasi dari saraf skiatik dengan qRT-PCR. Kelompok yang digunakan dalam penelitian ini adalah kelompok kontrol (sehat) dan kelompok perlakuan cedera saraf skiatik yang diinjeksikan dengan SPM adiposa manusia. Penelitian dilakukan untuk mengamati pengaruh injeksi SPM adiposa manusia terhadap regenerasi saraf skiatik dari aspek histologi dan mengamati pengaruh injeksi SPM adiposa manusia melalui ekspresi gen Agrin dan PROM1. Hasil penelitian menunjukkan bahwa injeksi SPM adiposa manusia menunjukkan aspek regenerasi histologi pada otot gastroknemius dengan mengurangi tingkat atrofi otot, tetapi belum adanya regenerasi jumlah kluster NMJ yang terbentuk pada serat otot. Ekspresi gen Agrin menurun sebesar 1,1 kali lipat, sedangkan gen PROM1 menurun sebesar 2,1 kali lipat. Uji statistik pada jumlah kluster NMJ dan ekspresi gen Agrin tidak menunjukkan perbedaan nyata antarkelompok, sedangkan ekspresi gen PROM1 menunjukkan adanya perbedaan nyata antarkelompok. Berdasarkan hasil penelitian, injeksi SPM adiposa manusia belum menunjukkan aspek regenerasi pada saraf skiatik.

.....Peripheral nerve injury, such as sciatic nerve injury, can result in disability. Treatment to induce nerve regeneration can be conducted with mesenchymal stem cells (MSC) therapy, which has regenerative potential and triggers paracrine effects. Sciatic nerve regeneration is analyzed histologically through descriptive analysis of the gastrocnemius muscle of Sprague–Dawley strain rat with hematoxylin-eosin staining and the number of neuromuscular junction (NMJ) clusters in muscle fibers with Palmgren silver staining. Molecular analysis is conducted to observe the expression levels of essential genes that can regulate the regeneration of the sciatic nerve using qRT-PCR. The groups used are the control group (healthy) and the treatment group of injection with human adipose tissue derived MSC. This study aims to observe the effect of human adipose tissue derived MSC injection on sciatic nerve regeneration with histological perspective and to observe its effect through the expression of Agrin and PROM1 genes. Results showed that the injection of human adipose tissue derived MSC demonstrates histological regeneration in

the gastrocnemius muscle by reducing muscle atrophy. However, there is no regeneration in the number of NMJ clusters formed on muscle fibers. The expression of the Agrin gene decreased by 1.1-fold, while the PROM1 gene decreased by 2.1-fold. Statistical analysis revealed no significant differences in NMJ clusters and Agrin gene expression between groups, but a significant difference was found in PROM1 gene expression. Based on the results, the injection of human adipose tissue derived MSC has not yet shown aspects of regeneration in the sciatic nerve.