

**PENGARUH MEDIA TERKONDISI SEL PUNCA MESENSIMAL  
TERHADAP EKSPRESI TIROSIN TERFOSFORILASI *INSULIN*  
*RECEPTOR SUBSTRATE 1 (IRS-1<sup>TYR612</sup>)* TIKUS MODEL DIABETES  
MELITUS TIPE 2**

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**INTISARI**

Diabetes melitus tipe 2 merupakan tipe diabetes dengan prevalensi tertinggi, namun belum ada pengobatan yang dapat mengatasi hambatan dalam proses operasi, reaksi rejeksi, dan banyaknya komplikasi yang terjadi. Penelitian ini bertujuan untuk mengetahui pengaruh Media Terkondisi Sel Punca Mesensimal (MT-SPM) dalam penormalan nilai *quantitative insulin sensitivity check index* (QUICKI) dan peningkatan fosforilasi tirosin 612 IRS-1(*IRS-1<sup>tyr612</sup>*) pada tikus model DM tipe 2 dengan dan tanpa terapi. Penelitian ini eksperimental murni laboratorium *Posttest Control Group* menggunakan hewan uji tikus *Sprague Dawley* jantan usia 7 minggu dan berat badan 150-200gram. Tikus dibagi menjadi 3 kelompok penelitian, yaitu K(-): kontrol normal, 9 tikus normal; K(+): kontrol diabetik, 9 tikus DM tipe 2 (injeksi 60mg/kgBB + NA 120mg/kgBB ip) tanpa terapi MT-SPM; P: perlakuan, 9 tikus DM tipe 2 + MT-SPM 0,1ml/200g bb ip. Pemberian MT-SPM dilakukan setiap 3 hari sebanyak 10 kali. Nilai QUICKI dihitung berdasarkan data kadar insulin puasa dan glukosa puasa anggota tim peneliti lain. Pada hari ke-30 setelah terapi, dilakukan analisis ekspresi *IRS-1<sup>tyr612</sup>* dengan IHC otot skelet. Analisis data dilakukan dengan *Independent Sample T-test* dan *Kruskal Wallis* pada signifikansi 95%. Hasil penghitungan QUICKI K(-)(0,91±0,29) > K(+)(0,74±0,18) > P(0,68±0,15) dengan perbedaan yang tidak bermakna secara statistik. Prosentase skor positif ekspresi *IRS-1<sup>tyr612</sup>* K(-)(75%) > P(62,5%) > K(+)(12,5%). Rerata ekspresi *IRS-1<sup>tyr612</sup>* P(45,46±9,15) > K(-)(44,41±4,61) > K(+)(21,29±3,49) dengan perbedaan yang bermakna secara statistik pada K(-)-K(+) dan P-K(+). Pemberian MTSPM dapat meningkatkan ekspresi *IRS-1<sup>tyr612</sup>* dan menjaga nilai QUICKI tetap normal pada tikus model DM tipe 2.

Kata kunci: MT-SPM, IRS-1<sup>tyr612</sup>, DM tipe 2, QUICKI, sensitivitas insulin

## THE EFFECT OF MESENCHYMAL STEM CELL-CONDITIONED MEDIUM ON PHOSPHORYLATED TYROSINE EXPRESSION OF INSULIN RECEPTOR SUBSTRATE 1 (IRS-1<sup>TYR612</sup>) IN TYPE 2 DIABETIC RAT MODELS

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### ABSTRACT

Type 2 diabetes mellitus is the highest prevalence among diabetes types, but there is no treatment that overcome obstacle in the process of surgery, rejection reactions, and increased complications that occur. The aim of this study was to investigate the effect of Mesenchymal Stem Cell-Conditioned Medium (MSC-CM) on the normalization of quantitative insulin sensitivity check index (QUICKI) and increased IRS-1 tyrosine phosphorylation (IRS-1<sup>tyr612</sup>) on the model of type 2 DM rat with and without treatment. This experimental study is purely laboratory Posttest Control Group using male Sprague Dawley rat, 7 weeks old and 150-200gram weight. Rat is divided into 3 research groups, K(-): normal control, 9 normal; K(+): diabetic control, 9 type 2 DM rat (injection 60mg/kgBW STZ+NA 120mg/kgBW ip) without MSC-CM therapy; P:treatment, 9 type 2 DM rat+MSC-CM 0,1ml/200gBW ip. Giving MSC-CM is done every 3 days 10 times. The QUICKI scores were calculated based on data on fasting insulin levels and fasting glucose of other research team members. On day 30 after therapy, an *IRS-1<sup>tyr612</sup>* expression analysis was performed with skeletal muscle immunohistochemistry (IHC). Data analysis was performed by Kruskal-Wallis and Independent Sample T-test at 95% significance. The calculation result of QUICKI K(-)(0,91±0,29)> K(+)(0,74±0,18)> P(0,68±0,15) with statistically inactive difference. Percentage of positive score of *IRS-1<sup>tyr612</sup>* expression K(-)(75%)> P(62,5%)> K(+)(12,5%). Average expression of *IRS-1<sup>tyr612</sup>* P(45,46±9,15)> K(-)(44,41±4,61)> K(+)(21,29±3,49) with significant difference of K(-)-K(+) and P-K(+). Giving MSC-CM may increase the expression of *IRS-1<sup>tyr612</sup>* and keep normal range of QUICK index on type 2 diabetic animal model rat.

Key words: MSC-CM, *IRS-1<sup>tyr612</sup>*, type 2 DM, QUICKI, insulin sensitivity