

ABSTRAK

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Program Studi : Kedokteran Umum

Judul Skripsi : Peran Sekretom Fibroblas Fraksi <100 kDa Terhadap Proliferasi Sel Keratinosit Menurut dan Tinjauannya Pandangan Islam

Latar Belakang: Penuaan kulit dan rambut, khususnya alopesia, merupakan masalah umum dengan prevalensi tinggi. Terapi konvensional seperti minoxidil dan finasteride tersedia, namun hasilnya sering kurang optimal dan dapat menimbulkan efek samping. Penelitian terdahulu menunjukkan potensi conditioned medium dari adipose-derived stem cell (ADSC-CM) dalam merangsang pertumbuhan rambut. Studi ini berfokus pada potensi sekretom fibroblas fraksi <100 kDa sebagai alternatif penanganan alopesia, sejalan dengan pandangan Islam yang mendorong ikhtiar dalam mencari pengobatan dan inovasi medis demi kemaslahatan.

Metode: Penelitian eksperimental in vitro ini menggunakan desain posttest-only control group. Model uji berupa sel keratinosit manusia yang diisolasi dari jaringan preputium. Sel dipaparkan dengan berbagai konsentrasi sekretom fibroblas fraksi <100 kDa hasil ultrafiltrasi. Parameter yang diamati meliputi proliferasi sel menggunakan Cell Counting Kit-8 (CCK-8) dengan pembacaan microplate reader pada 450 nm, kadar HGF yang diukur menggunakan metode ELISA, serta kadar total protein dari conditioned medium yang diukur dengan BCA Assay Protein Kit. Data dianalisis menggunakan uji One-way ANOVA atau Kruskal–Wallis sesuai pemenuhan asumsi normalitas dan homogenitas.

Hasil: Sekretom fibroblas fraksi <100 kDa tidak meningkatkan proliferasi sel keratinosit, bahkan menunjukkan efek penghambatan pada DIV 9 diduga akibat stres oksidatif dan efek sitotoksik pada konsentrasi tinggi. Kadar HGF juga tidak meningkat, kemungkinan karena mekanisme ligand-induced negative regulation melalui internalisasi dan degradasi kompleks (HGF/reseptor). Sebaliknya, kadar total protein dalam supernatant menunjukkan kecenderungan meningkat, yang mengindikasikan adanya respons adaptif sel berupa peningkatan aktivitas biosintetik dan sekresi protein pelindung.

Kesimpulan: Sekretom fibroblas fraksi <100 kDa tidak mampu meningkatkan proliferasi maupun produksi HGF secara signifikan, namun berpotensi meningkatkan produksi total protein seiring waktu kultur dan peningkatan konsentrasi. Pemanfaatan bioteknologi ini selaras dengan prinsip Islam yang menekankan kemaslahatan, kehalalan, serta upaya menghindari mudarat dalam pengembangan ilmu pengetahuan untuk kesehatan manusia.

Kata Kunci: Sekretom Fibroblas, Proliferasi Keratinosit, *Hepatocyte Growth Factor* (HGF), Alopesia, Tinjauan Islam.

ABSTRACT

Name : Gana Atria Kemala

Study Program: General Medicine

Title : *The Role of Fibroblast Secretome Fraction <100 kDa on Keratinocyte Proliferation According to Islamic Perspective.*

Background: Skin and hair aging, particularly alopecia, is a common condition with high prevalence. Although conventional therapies such as minoxidil and finasteride are available, their outcomes are often suboptimal and may cause adverse effects. Previous studies have demonstrated the potential of adipose-derived stem cell conditioned medium (ADSC-CM) in promoting hair growth. This study focuses on the potential of fibroblast secretome fraction <100 kDa as an alternative approach for alopecia treatment, in line with Islamic perspectives that encourage efforts in seeking medical innovation for human well-being (masalah).

Methods: This in vitro experimental study employed a posttest-only control group design. The test model consisted of human keratinocyte cells isolated from preputial tissue. The cells were exposed to various concentrations of fibroblast secretome fraction <100 kDa obtained through ultrafiltration. Observed parameters included cell proliferation assessed using the Cell Counting Kit-8 (CCK-8) with absorbance measurement at 450 nm, HGF levels quantified by ELISA, and total protein concentration in the conditioned medium determined using the BCA Protein Assay Kit. Data were analyzed using One-way ANOVA or Kruskal–Wallis tests based on the fulfillment of normality and homogeneity assumptions.

Results: The fibroblast secretome fraction <100 kDa did not enhance keratinocyte proliferation; instead, it exhibited inhibitory effects on day 9 in vitro, possibly due to oxidative stress and cytotoxic effects at higher concentrations. HGF levels also did not increase, which may be attributed to ligand-induced negative regulation involving internalization and lysosomal degradation of the HGF/receptor complex. Conversely, the total protein concentration in the supernatant tended to increase, suggesting an adaptive cellular response characterized by enhanced biosynthetic and protective protein secretion activity.

Conclusion: The fibroblast secretome fraction <100 kDa did not significantly promote keratinocyte proliferation or HGF production; however, it showed potential to increase total protein synthesis in a concentration- and time-dependent manner. The utilization of this biotechnology aligns with Islamic principles emphasizing masalah (benefit), permissibility (halal), and the avoidance of harm (mafsadah) in advancing scientific knowledge for human health.

Keywords: Fibroblast Secretome, Keratinocyte Proliferation, *Hepatocyte Growth Factor* (HGF), Alopecia, Islamic Perspective.