

**PEMANFAATAN ISOLAT Epigallocatechin gallate (EGCG)
TEH HIJAU KLON GMB4 PADA ADIPOSIT : STUDI IN VITRO
DAN IN VIVO**

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Cell Viability, Differentiation, PPAR γ and Adiponectin Levels of Primary Culture of Visceral Preadipocytes of *Rattus norvegicus* Wistar Exposed to Catechins Isolated from Green Tea (*Camelia sinensis*) GMB4 Clone.

Viabilitas, Diferensiasi Sel, Kadar PPAR γ dan Adiponektin pada Kultur Primer Sel Preadiposit Viseral Tikus (*Rattus norvegicus* Wistar) yang Dipapar dengan Isolat Golongan Senyawa Katekin Teh Hijau (*Camelia sinensis*) Klon GMB4.

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ABSTRAK

Isolat golongan senyawa katekin teh hijau (*Camelia sinensis*) klon GMB4 berpotensi untuk dikembangkan sebagai agen terapeutik untuk obesitas. Penelitian ini ditujukan untuk mengetahui pengaruh antiobesitas dari pemaparan isolat golongan senyawa katekin teh hijau (*Camelia sinensis*) klon GMB4 secara *in vitro* terhadap kultur sel preadiposit tikus (*Rattus norvegicus* Wistar). Metode yang digunakan dalam penelitian ini yakni *Quick Cell Proliferations Assay*, pewarnaan *Oil Red-O*, ELISA dan imunositokimia yang digunakan untuk mengamati pengaruh pemaparan isolat golongan senyawa katekin teh hijau dengan konsentrasi 25 μ M; 50 μ M; 75 μ M dan 100 μ M terhadap viabilitas sel, diferensiasi sel, kadar PPAR γ dan adiponektin pada kultur sel preadiposit viseral tikus. Hasil penelitian kami menunjukkan bahwa tidak terdapat perbedaan yang signifikan terhadap viabilitas sel antara kelompok kontrol dan perlakuan kecuali pada konsentrasi 50 μ M (128 ± 2.47) yang 28% lebih tinggi dibanding control (100 ± 2.21) $p = 0.037$. Diferensiasi sel preadiposit menjadi adiposit cenderung menurun seiring dengan penambahan konsentrasi isolat golongan senyawa katekin, dan pada konsentrasi 100 μ M (1.87 ± 1.36 sel/ 20 sel) penurunan mencapai 78% dibanding kontrol, $p = 0.000$. Walaupun kadar PPAR γ tampaknya menurun dengan penambahan konsentrasi isolat golongan senyawa katekin, namun secara statistik penurunan signifikan terlihat pada konsentrasi 75 μ M (1660 ± 1000 pg/ml), $p = 0.029$. Sebaliknya, kadar adiponektin meningkat seiring dengan penambahan konsentrasi isolat golongan senyawa katekin pada konsentrasi 75 μ M (0.786 ± 0.126 ng/ml) dan 100 μ M (0.673 ± 0.319 ng/ml), kontrol (0.077 ± 0.017), $p \leq 0.001$. Dengan demikian dapat disimpulkan bahwa isolat golongan senyawa katekin teh hijau klon GMB4 menunjukkan efek antiobesitas yang bergantung pada konsentrasi, dimana pada konsentrasi 50 μ M mampu meningkatkan viabilitas sel; pada konsentrasi 75 μ M ke atas mampu menghambat diferensiasi sel preadiposit dan berasosiasi dengan kadar PPAR γ yang lebih rendah dan kadar adiponektin sel preadiposit viseral *Rattus norvegicus* Wistar yang lebih tinggi.

Kata Kunci : Teh hijau GMB4; sel preadiposit; isolat golongan senyawa katekin, PPAR γ ; adiponektin

ABSTRACT

Catechins of green tea (*Camelia sinensis*) GMB4 clone may serve as a potential therapeutic antiobesity agent, probably through its effects on preadipocytes. Thus, to evaluate such antiobesity effects, we performed series of in vitro experiments using primary cultures of visceral preadipocytes from *Rattus norvegicus* strain Wistar. Quick Cell Proliferation assay, Oil Red-O staining, ELISA and immunocytochemistry were used to determine the effects of 25 μ M, 50 μ M, 75 μ M, and 100 μ M catechins on primary culture of preadipocytes, particularly on cell viability and differentiation as well as on expression of relevant obesity genes i.e. PPAR γ and adiponectin levels. Our results showed that there were no significant differences on preadipocytes viability among control and catechins treatments except in cells treated with 50 μ M catechins (means \pm SD:128 \pm 2.47) which resulted 28% higher viability than control (100 \pm 2.21), $p= 0.037$. Catechins inhibited preadipocytes differentiation into adipocytes, at 100 μ M up to 78% lower (1.87 \pm 1.36 cells/ 20 cells) than control. The level of PPAR γ apparently was reduced by catechins, but statistically significant only at 75 μ M (1660 \pm 1000), $p= 0.029$. In contrast, the adiponectin level on preadipocytes increased by catechins at 75 and 100 μ M (0.786 \pm 0.126 and 0.673 \pm 0.319 ng/ml; control: 0.077 \pm 0.017, $p \leq 0.01$). In conclusions, our data revealed that desired antiobesity effects of catechins of green tea GMB4 clone on visceral preadipocytes were concentration-dependent; at 50 μ M catechins enhanced cell viability; at more than 75 μ M inhibited differentiation of preadipocytes and was associated with lower PPAR γ and higher adiponectin levels.

Key Words : Green tea GMB4 clone; catechins; preadipocytes; PPAR γ ; adiponectin

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