

LEVEL EKSPRESI mRNA GEN CD163, CCL3, DAN CCR2 JARINGAN TUMOR PAYUDARA TIKUS (*Rattus norvegicus* Barkenhout, 1769) DENGAN PERLAKUAN MEDAN LISTRIK STATIS

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INTISARI

Saat ini tengah dikembangkan alat terapi alternatif bagi penderita kanker, yakni *Electro-Capacitive Cancer Therapy* (ECCT), berupa terapi medan listrik frekuensi menengah (100-300 kHz) dan intensitas rendah 2 V/cm. Penelitian yang sudah dilakukan menunjukkan adanya kemampuan antiproliferasi sel tumor pada mencit secara *in vivo* maupun *in vitro* setelah paparan medan listrik statis ECCT. Berdasarkan hal tersebut, penelitian ini dilakukan untuk mengevaluasi efek penggunaan ECCT di jaringan tumor payudara tikus (*Rattus norvegicus* Barkenhout, 1769) khususnya yang terkait level ekspresi mRNA gen CD163, CCR2, dan CCL3. Sampel yang digunakan dalam penelitian ini adalah jaringan payudara tikus normal dan jaringan tumor payudara tikus yang disimpan pada RNA Later di suhu -20°C. Metode yang dilakukan adalah isolasi RNA dilakukan pada sampel, sintesis cDNA, dan pembacaan ekspresi relatif gen menggunakan qPCR. Data yang diperoleh diolah menggunakan metode Livak. Analisis relatif ekspresi mRNA gen yang dikaji dibandingkan dengan kontrol normal kelompok NINT dengan masing-masing kelompok perlakuan NIT, INT dan IT, selanjutnya diuji dengan T-test. Level ekspresi mRNA gen yang dikaji antar semua kelompok perlakuan, data diuji statistik menggunakan *one way* ANOVA dengan program GraphPad Prism 9.0.0. Hasil yang diperoleh menunjukkan level ekspresi mRNA gen CD163 pada kelompok INT dan IT mengalami *down regulation* dibandingkan kelompok kontrol NINT, sedangkan kelompok NIT mengalami *up regulation* dibandingkan kelompok kontrol NINT. Ekspresi relatif mRNA gen CCR2 mengalami *down regulation* pada kelompok NIT, INT, dan IT terhadap kelompok kontrol NINT. Relatif ekspresi mRNA gen CCL3 pada kelompok NIT dan INT mengalami *down regulation* dibandingkan dengan kelompok kontrol NINT, sedangkan kelompok IT mengalami *up regulation* dibandingkan dengan kelompok kontrol NINT.

Kata kunci: ECCT, mRNA, Tumor payudara tikus, CD163, CCR2, CCL3.

**mRNA EXPRESSION LEVEL OF CD163, CCL3, AND CCR2 GENES IN RAT
(*Rattus norvegicus* Barkenhout, 1769) BREAST TUMOR TISSUE WITH
STATIC ELECTRICAL FIELD EXPOSURE**

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ABSTRACT

Currently, scientists are developing an alternative for cancer therapy, namely the Electro-Capacitive Cancer Therapy (ECCT), electric field based therapy with intermediate frequency (100-300 kHz) and low intensity (2 V/cm). The previous research showed tumor cell antiproliferative effect in animal model (rat) in vivo and in vitro after the exposure of ECCT electric field. Based on that statement, the aim of this research was to evaluate the effect of ECCT in mouse (*Rattus norvegicus* Barkenhout, 1769) breast tumor tissue in mRNA expression level by analyzing the CD163, CCL3, and CCR2 genes. Sample that used in this research were mouse breast normal tissue and mouse breast tumor tissue which collected from RNALater in -20°C temperature. RNA was isolated from the sample, cDNA synthesis, and qPCR based-gene relative expression level analysis, then The data obtained were processed using the Livak method. Relative analysis of the mRNA expression of the studied genes was compared with normal controls in the NINT group with NIT, INT and IT treatment groups respectively, then tested by T-test. The level of gene mRNA expression studied between all treatment groups, data were tested statistically using one way ANOVA with the GraphPad Prism 9.0.0 program. The results showed that the CD163 gene mRNA expression level in the INT and IT groups were down regulated compared to the NINT control group, while the NIT group was up regulated compared to the NINT control group. The relative expression of the CCR2 gene mRNA was down-regulated in the NIT, INT, and IT groups compared to the NINT control group. Relatively mRNA expression of the CCL3 gene in the NIT and INT groups were down regulated compared to the NINT control group, while the IT group was up regulated compared to the NINT control group.

Key words: ECCT, mRNA, mouse breast tumor, CD163, CCR2, CCL3