

**EFEK MEDAN LISTRIK STATIS TERHADAP
PROFIL HEMATOLOGIS TIKUS PUTIH (*Rattus norvegicus* Berkenhhout,
1769) DENGAN INDUKSI 7,12-Dimethylbenz(α)anthracene**

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INTISARI

Salah satu efek terapi kanker payudara, baik dengan kemoterapi maupun radioterapi adalah gangguan profil hematologis. Alternatif terapi kanker yang sedang dikembangkan yakni terapi medan listrik statis. Untuk itu perlu dilakukan uji praklinik untuk mengevaluasi profil hematologis sebagai efek dari metode terapi tersebut. Penelitian ini bertujuan untuk mengetahui efek medan listrik statis frekuensi menengah 100 kHz dan intensitas rendah 18 Vpp terhadap profil hematologis tikus betina galur Sprague Dawley yang diinduksi zat 7,12-Dimethylbenz[α]anthracene (DMBA). Parameter yang diamati meliputi profil eritrosit (RBC, HGB, HCT, MCV, MCH, MCHC); profil leukosit (WBC, rasio N/L); serta profil trombosit (PLT, PDW, dan MPV). Dua puluh empat ekor tikus dibagi menjadi satu kelompok kontrol (non induksi-non terapi) dan tiga kelompok perlakuan (non induksi-terapi, induksi-non terapi, induksi-terapi). Induksi kanker payudara dilakukan melalui administrasi DMBA secara peroral dosis 20 mg/kgBB sebanyak 10 kali dalam 5 pekan pada kelompok induksi-terapi dan induksi-non terapi. Terapi menggunakan kandang *Electro-Capacitive Cancer Therapy* (ECCT) dilakukan 2×5 jam/hari selama 3 pekan pada kelompok induksi-terapi dan non induksi-terapi. Pengambilan sampel darah dilakukan sebanyak tiga kali yaitu titik awal sebelum induksi DMBA (*baseline*), setelah induksi DMBA atau sebelum terapi (*pre-treatment*), dan setelah terapi (*post-treatment*). Pemeriksaan profil hematologis menggunakan *Automated Hematology Analyzer Sysmex XP-100*. Data diuji secara statistik dengan uji ANOVA dan uji *Duncan Multiple Range Test* (DMRT) pada tingkat signifikansi 5% dengan program SPSS ver. 23. Hasil menunjukkan bahwa pengaruh terapi medan listrik statis frekuensi menengah dan intensitas rendah terhadap profil hematologis tikus yang diinduksi DMBA, ditinjau dari perubahan profil darah keseluruhan terutama peningkatan signifikan ($p < 0.05$) pada jumlah WBC masih dalam kisaran normal. Terapi medan listrik juga berpengaruh signifikan pada tikus normal melalui peningkatan jumlah WBC, serta peningkatan nilai PDW dan MPV namun nilai tersebut juga masih dalam kisaran normal menurut *reference values* yang ditetapkan oleh Sharp and Villano (2012). Secara keseluruhan dapat disimpulkan bahwa efek terapi medan listrik statis frekuensi menengah dan intensitas rendah dinilai aman terhadap profil hematologis.

Kata Kunci: Terapi medan listrik statis, DMBA, Profil hematologis, Tikus putih

**THE EFFECT OF ELECTROSTATIC FIELD ON HEMATOLOGICAL
PROFILE OF ALBINO RATS (*Rattus norvegicus* Berkenhout, 1769)
INDUCED BY 7,12-Dimethylbenz(α)anthracene**

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ABSTRACT

One of negative effects of cancer therapies such as chemotherapy and radiotherapy is abnormalities in hematological profile. The cancer therapy method using electrostatic field exposure has been developed. Therefore it is necessary to conduct preclinical testing to evaluate the hematological profile of animal models after therapy. The aim of this study was to investigate the effect of medium frequency 100 kHz and low intensity 18 Vpp electrostatic field exposure on the hematological profile of female Sprague Dawley rats induced by 7,12-Dimethylbenz[α]anthracene (DMBA). Parameters observed included erythrocyte profile (RBC, HGB, HCT, MCV, MCH, MCHC); leukocyte profile (WBC, N/L ratio); and platelet profile (PLT, PDW, and MPV). Twenty-four rats were divided into one control group (Non induction-non therapy) and three treatment groups (Non induction-therapy, Non induction-therapy, Induction-therapy). Mammary cancer was induced by administration of DMBA orally at a dose of 20 mg/kg body weight 10 times in 5 weeks in the induction-therapy and induction-non therapy groups. Therapy using Electro-Capacitive Cancer Therapy (ECCT) cages was carried out 2 $\times$ 5 hours/day for 3 weeks in the induction-therapy and non induction-therapy groups. Blood sampling was performed in total three times; the starting point before DMBA induction (baseline), after induction of DMBA or before therapy (pre-treatment), and after therapy (post-treatment). Hematological profile was analyzed using Automated Hematology Analyzer Sysmex XP-100. The results were analyzed statistically using ANOVA test and Duncan Multiple Range Test (DMRT) at 5% level significance with SPSS program ver. 23. The results showed that the overall changes in hematological profile, especially the significant increase the number of WBCs is remain in the normal range. Electric field therapy also had a significant effect on normal rats through increasing the number of WBCs, as well as increasing the PDW and MPV values, but these values are also still within the normal range according to the reference values by Sharp and Villano (2012). In conclusion, the effect of intermediate frequency and low intensity electrostatic field therapy on hematological profiles of DMBA-induced rats was considered safe.

Keywords: Electrostatic field therapy, DMBA, Hematological profile, Albino rats