

EffectOf Panax Ginseng Extract For The Increased Number Of Fibroblasts Cells After Tooth Extraction

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Abstract

The process of tooth extraction can lead to injury. One of the factors that influence the process of wound healing after tooth extraction is the number of fibroblast cells. The content of saponins can increase the number of fibroblasts cells after tooth extraction. Asian ginseng plants known to contain saponins (*ginsenoside*). The purpose of this study was to determine the effect of Asian ginseng extract (Panax ginseng extract) for the increased number of fibroblasts cells after tooth extraction. The research method used is in vivo experimental design with the design methods *Randomized Post Test Only Control Group Design*. In this study used twenty male *Rattus novergicus* and divided into four group, consisting of control group (K1) were not given Asian ginseng extract, treatment groups number one (K2) were given 25mg/*Rattus novergicus*/day doses of Asian ginseng, treatment groups number two (K3) were given 50mg/ *Rattus novergicus*/day doses of Asian ginseng, and treatment groups number three (K4) were given 75mg/*Rattus novergicus*/day doses of Asian ginseng. Histopathologic preparations used for counting the number of fibroblasts cells. The results of statistical tests indicate there are differences in the number of fibroblast cells in *Rattus novergicus* between the four different groups (ANOVA, $p < 0.05$) and there is a very strong correlation between increasing doses of ginseng extract with a number of fibroblast cells in *Rattus novergicus* tooth socket (Pearson, $R = 0.915$ $p < 0.05$). The conclusion of this study is Asian ginseng extract can increase the number of fibroblasts in the tooth socket after tooth extraction, it is recommended that research about the amount of saponin in Asian Ginseng extract

Key words: Asian Ginseng extract; Fibroblast cells; Tooth Socket

Efek Ekstrak Ginseng Asia (Panax ginseng) Terhadap Jumlah Sel Fibroblast Pasca pencabutan Gigi Pada *Rattus novergicus*.

Abstrak

Proses pencabutan gigi dapat menyebabkan terjadinya luka. Salah satu faktor yang berpengaruh pada proses penyembuhan luka pasca pencabutan gigi adalah jumlah sel fibroblas. Saponin dapat meningkatkan jumlah sel fibroblas pasca pencabutan gigi. Tanaman Ginseng Asia diketahui memiliki kandungan saponin yang disebut ginsenoside. Tujuan penelitian ini adalah untuk mengetahui pengaruh pemberian ekstrak ginseng asia (*Panax ginseng*) terhadap peningkatan jumlah sel fibroblas

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pasca pencabutan gigi. Metode penelitian yang digunakan adalah eksperimental in vivo dengan metode rancangan *Randomized Post Test Only Control Group Design*. Pada penelitian ini menggunakan dua puluh ekor tikus *Rattus norvegicus* jantan dan dibagi menjadi empat kelompok, terdiri dari kelompok kontrol (K1) yang tidak diberikan ekstrak ginseng asia, kelompok perlakuan satu (K2) yang diberikan ekstrak ginseng asia dengan dosis 25 mg/tikus/hari, kelompok perlakuan dua (K3) yang diberikan ekstrak ginseng asia dengan dosis 50 mg/tikus/hari, dan kelompok perlakuan tiga (K4) yang diberikan ekstrak ginseng asia dengan dosis 75 mg/tikus/hari. Digunakan sediaan histopatologi untuk menghitung jumlah sel fibroblas. Hasil uji statistik menunjukkan terdapat perbedaan jumlah sel fibroblas pada tikus antara empat kelompok yang berbeda (ANOVA, $p < 0,05$) dan terdapat korelasi yang sangat kuat antara peningkatan dosis ekstrak ginseng dengan jumlah sel fibroblas pada soket gigi tikus (Pearson, $R = 0,915$; $p < 0,05$). Kesimpulan dari penelitian ini adalah ekstrak ginseng asia dapat meningkatkan jumlah sel fibroblas pada soket gigi pasca pencabutan gigi, disarankan agar dilakukan penelitian tentang besarnya kandungan saponin dalam ekstrak Ginseng Asia.

Kata Kunci: ekstrak ginseng asia; fibroblas; soket gigi

Introduction

Tooth extraction is the process of pull out tooth from alveolar bone in the socket, it is the daily actions performed by a dentist. This action will cause injury to the tooth socket and will be automatically followed by the response of the body through the healing process.¹

The process of wound healing is a complex series of biological events, it is influenced by many factors including location of injury, severity of infections, age, nutrition and the presence or absence of systemic disease. In the wound healing process there are various processes, including the most important is the process fibroplasia.²

Fibroplasia is the stimulation of fibroblasts out to repair damaged tissue, fibroplasia have a very important role in wound healing process because fibroblasts produce

mucopolysaccharide, aminoglysin acid, and proline which is the base material forming collagen fibers. Fibroplasia in the injured area will increase due to the role of cytokines, namely interleukin- 1β (IL- 1β). IL- 1β is produced and released by activated macrophages during trauma and inflammation.³

The use of modern medicine to speed up the process of wound healing after tooth extraction has various side effects, it makes treatment move to natural medicine that have minimal side effects even without any side effects. One natural medicine that has been very popular since hundreds of years ago was ginseng.⁴

The main content consists of ginseng saponin. Saponin glycosides are compounds consisting of a combination of glucose with a sapogenin which has various properties of ginseng farmakologis.⁵

Panax ginseng in the process of wound healing has been shown in previous studies conducted by Yoshiyuki Kimura. These studies use Asian ginseng (Panax ginseng) in the form of ointment and the wound on the backs of mice as an object of research. Yoshiyuki Kimura compares the healing of wounds treated with Asian ginseng (Panax ginseng) with untreated, observations indicate that wounds treated by Asian ginseng (Panax ginseng) heal two times faster than those not treated. Asian ginseng (Panax ginseng) contains saponin or commonly called ginsenoside. Ginsenoside, especially RB1, can increase the production of macrophages, thereby increasing the secretion of IL-1 β . Increased secretion of IL-1 β will enhance the proliferation of fibroblasts in the injured area. Ginsenoside RB1 is known to have the ability to influence the infiltration of macrophages.⁶

Therefore, it needs to do research on the effects of Asian ginseng extract (Panax Ginseng) against fibroblast cell number after tooth extraction in *Rattus norvegicus*.

Methods

Research Design.

The approach used to achieve the objectives of this research is to experimentally in vivo. The study design used was Randomized Post Test Only Control Group Design in which the subjects were divided into 4 groups (I to IV) are random. Each group consisted of 5 rats. Group I is a rat without Panax ginseng extract (control group) and group II through IV (treatment group) were given extracts of Asian ginseng with

different doses (25 mg / rat / day, 50 mg / rat / day, and 75 mg / rat / day) per oral with sonde once daily for 7 days. Then observed and compared the effects of Asian ginseng extract on the number of fibroblasts formed.

Tooth Extraction procedures.

Performed using ether inhalation anesthesia and ketamine IM dose 40mg/kgBB. Tooth extraction is done using le-cron and needle holder modification, le cron modification break in into the socket and used to undermine the stability of dental periodontal tissues of *Rattus Norvegicus*, then use the needle holder modification to pull out tooth from the socket, it done with the movement direction same as the tooth socket and carried out carefully with the same strength to minimize breakage of tooth. To prevent infections that occur in the mandible socket *Rattus norvegicus*, then for 3 days after the extraction, *Rattus Norvegicus* were given anti-inflammatory and antibiotic. Drugs used were Novalgin 500 mg / ml for anti-inflammatory with an IM dose of 0.3 ml for 1 day and gentamicin 40 mg / ml to 0.2 ml dose of antibiotics with IM per day for 3 hari.⁷

Preparation of Ginseng Extract Asia.

Selected Asian Ginseng was 6 years-old, because the optimal saponin content.⁸ It washed and dried, and then crushed using a mortar and Pistle, made weighing 100 grams with a balance of analytical and wrapped in filter paper, then put in a Soxhlet extractor tube. Performed with the solvent methanol Soxhlet method. Asian Ginseng Extract is used as a research variable. After that, Rat that had been done with tooth extractions be given with

Asian ginseng extract administered through the sonde in accordance with the specified doses for 7 days.

Tissue processing.

Decalcification process for 30 days by immersing the organ in liquid EDTA. The process of fixation, dehydration, clearing and impregnation by dipping into a solution of the tissue in sequence according to the specified time. Performed with tissue embedding and microtome. then tissue painted using haematoxylin eosin procedure. Observation of fibroblasts using Olympus microscope BX51 Photo Slide with 12 Megapixel DP71

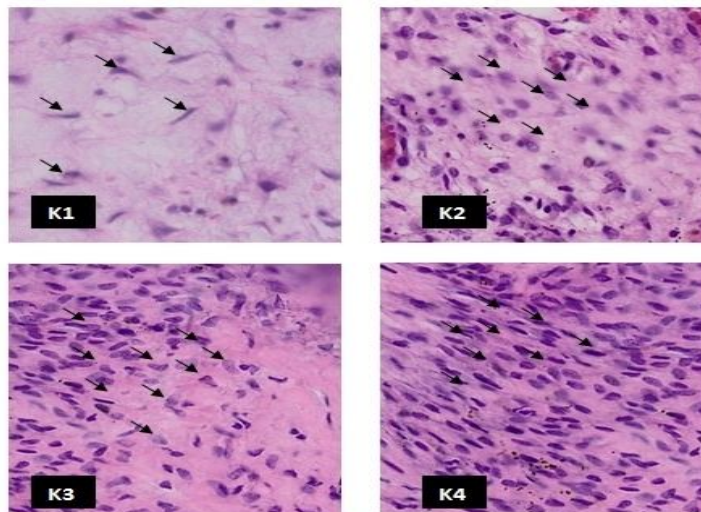
camera with 400x magnification in each tissue / slides from each rat by 5 field of view and then on the average.

Data analysis

observations the number of fibroblasts in the tooth socket on the control and treated rat were statistically analyzed using SPSS program for Windows 16:00 with a significance level of 0.05 ($p = 0.05$) and 95% confidence level ($\alpha = 0.05$). With the method of data analysis using One-way ANOVA test, Test Post hoc Multiple Comparison Equal Variance by LSD, and the Pearson Correlation Test.

Research Results

Microscopic picture



Microscopic picture of K1, the number of fibroblast cells appear normal in number. At K2 fibroblast cell numbers more visible. On K3 number of fibroblasts seen more than K2, but the difference was not significant. In the K4 fibroblast cell numbers look very much. Ginseng

extract affects the number of fibroblasts in the tooth socket after tooth extraction when compared to K1 then K2, K3, and K4 differ significantly.

Oneway ANOVA test.

Analysis using Oneway ANOVA test aims to value the

number of fibroblasts there are differences in tooth sockets significantly between groups. From the test results obtained that the value of $p = 0$, and based on these results the null hypothesis is rejected so it can be concluded that there are differences in the number of fibroblasts in the tooth sockets four groups

Post Hoc Multiple Comparison Test.

Analysis of the differences in the number of these four groups can be seen in the Post Hoc Multiple Comparison test. The method used is a Post Hoc LSD test. Based on the results of statistical testing, K2 has increased a significant number of fibroblasts compared with K1. K3 has increased the number of fibroblasts is not significant compared to the K2. K4 has increased a significant number of fibroblasts compared with K3.

Pearson correlation test.

Pearson correlation is used to measure the strength of the association of two or more variables in the scale interval (parametric). In this case the strength of correlation obtained $(r) = 0.915$, thus there is a very strong correlation between the dose of the liquid waste out with the number of cells Wistar rat osteocytes. Direction of the correlation is positive, so the greater the dose of Asian ginseng extract, the greater the number of tooth sockets fibroblasts Wistar rats.

Discussion

Experimental study was conducted with the aim to determine the effect of ginseng extract asia to the increased number of fibroblasts in the tooth socket after tooth extraction

in *Rattus norvegicus*. The results for the control group of rats *Rattus norvegicus* without treatment obtained fibroblast cell number was significantly different when compared with treatment groups of rats *Rattus norvegicus*. Results of the study groups of rats *Rattus norvegicus* without treatment obtained the number of fibroblasts in normal amounts, whereas in rats *Rattus norvegicus* treated fibroblasts contained increased number of cells in which the high concentrations used, the higher the number of fibroblasts that form.

This research was supported by Yoshiyuki Kimura, that Asian ginseng can promote wound healing in the back of mice as an object of research, the study compared the healing of wounds treated with the Asian ginseng is not treated, the observations show that the ginseng-treated wounds closed twice Asia faster than those not treated. Asian ginseng contains saponin or commonly called ginsenoside. Ginsenoside affecting an increasing number of fibroblasts due to the content of ginsenoside RB1 activity that has increased the number of macrophage migration in the region of wound.⁶ If the number of macrophages in the injured area to increase the production of cytokines (IL-1 β /TNF) will increase. IL-1 β and TNF have an important role in wound healing process, both these cytokines activate tissue fibroblasts, leads to increased proliferation and matrix production including fibroblast.³

On the results of a study of the treatment group showed significant improvement on the number of *Rattus norvegicus* fibroblast cells that do

tooth extractions and Asian ginseng extract administered 25 mg /kg, 50 mg / kg, and 75 mg / kg when compared with control groups of *Rattus norvegicus* performed tooth extraction but was not given the extract Ginseng Asia. In the post-hoc test showed an increase in the number of fibroblasts that meaningful than the dose of 25 mg / rat / day and 50 mg / rat / day, so the dose of 75 mg / rat / day to be the optimum dose of the extract of Panax Ginseng.

This is consistent with the theory that the presence of ginsenoside in the extract of Asian ginseng can improve the process of fibroplasia. In the study Tetsuto Kanzaki (1998) found that administration of ginsenoside will increase the production of macrophages, and macrophages will stimulate the formation of fibroblasts. Therefore we can conclude that with the increase of macrophages in the wound healing process will be increased fibroplasia, in which stimulation of fibroblast cell proliferation is essential for the healing process.⁹

Based on the Pearson correlation test statistic was found that there is a very strong correlation ($r = 0.915$) and significant ($p = 0.000$) on the relationship between increasing doses of ginseng extract with a number of fibroblasts in the tooth sockets of rats. R coefficient of 0.915 means that the contribution of ginseng extract in increasing the number of fibroblast cells by 91.5% while the remaining 8.5% are caused by other factors is not examined. Such factors could be the result of the condition itself so that the rats affects the absorption of active substances in

extracts of ginseng or due to other substances besides ginsenoside RB1 substances contained in extracts of ginseng can increase the number of fibroblasts in the rat tooth socket after tooth extraction. Direction of the correlation is positive, which means the greater the dose of ginseng extract, the greater the number of fibroblasts in *Rattus novergicus*.

Asian ginseng extract at doses of 25 mg / rat / day, 50 mg / rat / day, and 75 mg / rat / day trend of increase in the number of cells obtained fibroblas significantly after tooth extraction. This is consistent with the hypothesis that extracts of Asian ginseng (*Panax ginseng*) may increase the number of fibroblasts in the tooth socket after tooth extraction in *Rattus novergicus*.

Conclusion

The number of fibroblasts in the tooth socket tooth extraction group with treatment Asian ginseng extract significantly increased compared with the untreated group. There is a strong correlation with the positive direction between the dose of ginseng extract with a number of fibroblasts asia tooth socket, which means that the increasing doses of ginseng extract asia, the greater the number of fibroblasts in the tooth socket.

Suggestion

Conducted research on the magnitude of the content of saponin in ginseng extract asia. Clinical observation on the socket and biomolecular rat fibroblasts so that the effect is more apparent increase in fibroblast cells. Toxicology, safety and Asian ginseng extract

applications when used as therapy against human.

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