

Liver

Dig Dis Sci. 2005 May;50(5):949-54.

Enhancement of liver regeneration by the association of *Hyptis pectinata* with laser therapy.

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Since new molecules that normally would accelerate regeneration can also be potentialized by light, the use of new substances combined with laser therapy seems to be a natural type of experiment. Therefore, the purpose of this study was to assess the effects of *Hyptis pectinata* leaves on liver regeneration after partial hepatectomy (PH) associated with laser therapy. Twenty-four rats were divided into four groups--PH(control), PHL (laser therapy), PH200 (200 mg/kg of *Hyptispectinata*), and PHL200 (200 mg/kg of the plant and laser)--which were submitted to 67% hepatectomy. Laser treatment consisted of focusing the light on the remaining liver after hepatectomy. The data analyzed were serum levels of aminotransferases, liver regeneration, and mitochondrial function. Group PH200 showed a statistically significant decrease in AST levels, and PHL200 disclosed an augmentation in ALT levels. The liver regeneration index was significantly increased in group PHL200. Concerning liver mitochondrial respiratory assay, groups PH200 and PHL200 showed lower state 3 levels than groups PH and PHL. Group PHL showed an increase in state 4 levels and a reduction in membrane potential and RCR. The present study shows that the association of the aqueous extract of *Hyptis pectinata* leaves at 200 mg/kg with intraoperative laser therapy can stimulate liver regeneration and cause a reduction in liver mitochondrial respiratory function without altering its phosphorylative activity.

Fiziol Zh. 1999;45(6):31-6.

[The comparative effect of magnetic and laser irradiation of the liver and blood on the bile-secretory function in rats]

[Article in Ukrainian]

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The influence of percutaneous magnetolaser irradiation of the blood and liver on the bile secretion, general bilirubin excretion and its fractions, cholesterol and bile acids rate was studied experimentally on male rats. A laser generator "Luch-2" with a magnetic nozzle (wave-length 0.82 mm, power density 0.178 W.cm⁻², magnetic field tension 30-35 mT, the course s 2 daily procedures) was used. Bile secretion intensity was noted to depend on

the dose. Maximal bile secretion and its basic components were observed during the liver irrigation with an exposition for 120 s and blood ones with an exposition for 240 s respectively. Bile secretion rate was higher during magnetolazer influence on the blood. Liver irrigation was associated with an increased secretion of the conjugated bilirubin. Thus, there are various stimulant mechanisms of the liver function activity in the course of magnetolazer influence on the liver and blood.

Ter Arkh. 2001;73(11):26-30.

[Comparative efficacy of various methods of laser therapy in patients with acute viral hepatitis B]

[Article in Russian]

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AIM: To study response to laser therapy in different modes and effects on hemocoagulation in patients with acute viral hepatitis B (AVHB). MATERIAL AND METHODS: Of 173 patients with AVHB, 87 received only basic therapy, 28 patients received placebo (no laser radiation, only signal of the timer) and 58 patients were exposed to laser radiation (32 of them intravenously and 26 supravenuously). A course consisted of 10-12 sessions, laser radiation per 1 procedure 300 and 30 mJ, respectively. In addition to routine examinations, hemocoagulation was studied (platelet aggregation and desaggregation, electrocogulogram). RESULTS: Intoxication, hemorrhagic phenomena, jaundice, infusion therapy, hospital stay were shorter in AVHB patients exposed to laser therapy. Mode of action (intra- or supravenuous) was insignificant. CONCLUSION: Laser therapy normalizes hemostasis and platelet function. Clinical effectiveness of laser was the same in both modes.

Formos Med Assoc. 2003 Jul;102(7):486-91.

Effects of infrared and low-power laser irradiation on cell viability, glutathione and glutathione-related enzyme activities in primary rat hepatocytes.

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BACKGROUND AND PURPOSE: Both infrared and low-power laser have been applied to improve circulation, wound repair, and pain control. Infrared and low-power laser therapies have the potential for stimulating enzyme activities which might contribute to increased glutathione (GSH) concentration and provide protection against oxidative damage. This study investigated cell viability, and GSH and its related enzyme activities in rat hepatocytes after irradiation. METHODS: Hepatocytes were isolated from 8-week-old male Sprague-Dawley rats and the cultures were divided into infrared, laser, and

control groups. The cells were treated with infrared and low-power laser at a distance of 35 cm for 20 minutes. The cell morphology, lactate dehydrogenase (LDH) leakage, lipid peroxidation, GSH concentration, GSH peroxidase, GSH reductase (GRd), and GSH S-transferase activities were measured after irradiation. RESULTS: The morphology and LDH leakage of hepatocytes in the irradiation groups did not differ significantly from those of the control group. After infrared irradiation, a significant decrease in thiobarbituric acid-reactive substances and an increase in GSH concentration were found after 48 hours of incubation compared to the control group ($p < 0.05$). Furthermore, laser irradiation resulted in a significant increase in GRd activity after 48 hours of incubation compared to the control group ($p < 0.05$). A 48-hour incubation period produced greater GRd activity in all groups compared to a 24-hour period ($p < 0.05$). CONCLUSIONS: Irradiation did not damage rat hepatocytes in this study. Infrared was shown to stimulate GSH production, while laser irradiation increased GRd activity.

Eksp Klin Farmakol. 2002 Jan-Feb;65(1):58-61.

[Effects of riboxin, essentielle, and phylloquinone on the immunomodulating and antioxidant effect of laser and magneto-laser irradiation in liver toxicosis induced by gentamycin]

[Article in Russian]

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The introduction of gentamycine to Wistar rats leads to the toxic liver damage, suppresses humoral immune response to goat erythrocytes, and induces immunosuppressant properties in erythrocytes (caused by increased lipid peroxidation in their membranes and violated cell energy balance) Under these conditions, a combination of the laser or magneto-laser irradiation with the administration of phylloquinone of riboxin provides for a more effective correction of the immune reaction and antioxidant status as compared to the radiation treatment without drugs or with essential. Elimination of the gentamycine induced immunosuppressant properties of erythrocytes is explained by the ability of phylloquinone and essentielle to reduce the intensity of lipid peroxidation in the cell membranes and with the ability of riboxin to normalize the cell energy balance. An important factor of immunosuppression development in the case of a toxic liver damage caused by D-galactosamine is the interaction of thrombocytes and light erythrocytes with serum factors. The introduction of essentielle and riboxin favors this interaction and stimulates the development of immunosuppression in thrombocytes.

Lasers in Surgery and Medicine. 2001; 29(1): 73-77.

Laser enhancement in hepatic regeneration for partially hepatectomized rats.

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The bio-stimulation effect of laser has been observed in many areas of Medicine. However, there are a few works which investigate its use for liver regeneration. Most of their results were inconclusive due to the use of high power lasers. This work was carried out to investigate the bio-stimulation effect of laser in liver regeneration using low power lasers. We used Wistar male rats, which were irradiated with laser light (wavelength 590 nm and intensity of 50 mW/cm² for 5 minutes after 70% hepatectomy. The respiratory mitochondrial activity, the serum level of aminotransferase and the PCNA were measured. Results: Our results show a dramatic increase in the mitochondrial activity for the laser treated group at 24 hours after the hepatectomy. Conclusion: We conclude that the laser promotes a bio-stimulation effect on the early stages of liver regeneration without any detectable damage of the cells.

Lik Sprava. 2002;(2):39-42.

[A comparative study of efferent methods of treatment and bezonal on the absorptive and excretory liver function in patients with acute diffuse peritonitis]

[Article in Russian]

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Patients with acute general peritonitis display in the postoperative period manifest disturbances in the pharmacokinetics of cardiogreen. Conventional therapies, blood ultra-violet irradiation procedures, intravascular irradiation of blood with laser, and hyperbaric oxygenation have no positive effect on the detected inadequacies. Hemosorption embarked on in the complex of therapeutic measures in the above category of patients appeared to have but insignificant positive effect. Benzonal has been shown to have an apparent corrective effect on disordered pharmacokinetics of cardiogreen in patients with acute general peritonitis in the postoperative period.