The developing of medical use gold vapor laser and evaluation

1987 Fiscal Year Final Research Report Summary

The developing of medical use gold vapor laser and evaluation

Research Project

Project/Area Number

61870113

Research Category

Grant-in-Aid for Developmental Scientific Research

Allocation Type

Single-year Grants

Research Field

Urology

Research Institution

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Gold vapor laser / Laser beam focusing lens / Unstable resonator optics / レーザー光散乱ファイバー

Research Abstract

A pulsed gold vapor laser (AU 10, Oxford Lasers) emitting a multimode beam has been studied on the focusing of the beam, 44mm in diameter, into optical fibers for, delivery with a less coupling loss using three types of coupling lens. Using a lens being flat on one side and convex on the other side with 85mm of focal length among these lens, 1.15W of average output power from a 600um auartz fiber was obtained for 4.5W average laser output power. According to

important theroritical factors to increase the coupling efficiency on the basis of the optical theory of laser beam focusing technique for optical fibers, a bilateral convex lens, 50mm in diameter, 86mm of focal length, and unstable resonator optics producting a lower beam divergence, were studied, and thus approximately 75 per cent of coupling efficiency was obtained. This transmittance rate was quite sufficient for hematoporphyrin derivative (HpD) photodynamic irradiation contributing additional hyperthermic tumor destruction eff ects. To adapt laser irradiation fields requiring in various clinical cases and to disperse the light uniformly to produce photochemical effects, a variety of diffusing and non-diffusing fiberoptic probes, cavity spherical and 1.0 cylindrical diffusing tips and large spot submergible microlens tips, were developed. When the high output light, more than 500mW, was introduced into the fiberfs, these tips received a considerable damage. The results suggested to use some fiber tip protectors such as a balloom for cooling. In addition, we newly designed a light-scattering device employing 2 to 3 per cent Intralipos solution as a diffuser medium for whole bladder wall integral photodynamic therapy. Using this device, rabbit bladders bearing Vx2 carcinoma and superficial baldder cacner patients were treated with 10-30 J/sgcm of light density 48-72 hr after HpD administration. This device was proved to bve most useful for the integral therapy in terms of mechanical simplicity, solidity and uniform light dispersion.▲ Less

Research Products (14 results)

All Other

All Publications (14 results)

[Publications] 久住治男: 日本ハイパーサーミア誌. 2. 142-155 (1986)

[Publications] 打林忠雄: 日本レーザー医学会誌. 7. 135-136 (1987)

[Publications] 久住治男: 日本リーザー医学会誌. 7. 49-50 (1987)

[Publications] 久住治男: 日本レーザー医学会誌. 8. 11-14 (1987)

[Publications] 久住治男: 日本レーザー医学会誌. 8. 3-7 (1987)

[Publications] Amano,Toshiyasu: J.Urol.139. 392-395 (1988)

[Publications] 久住治男: "レーザー腫瘍治療マニュアル" サイエンス フォーラム, 8 (1986)

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[Publications] Hisazumi,Haruo: "Experimental studies on the usefulness of a gold vapor laser in photodynamic cancer therapy" Jpn. J. Hyuperthermic Oncology. 2. 142-155 (1986)

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[Publications] Hisazumi, Haruo: "HpD photodynamic therapy using a gold vapor lasser with reference to the usefulness of the induced hyperthermia" J. Jpn. Society for Laser Medicine. 7. 49-50 (1987)

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