

INTRANASAL LOW INTENSITY  
LASER THERAPY

# 低强度激光

主编 刘承宜 朱 平

# 鼻腔内照射疗法

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# 低强度激光鼻腔内照射疗法

Intranasal Low Intensity Laser Therapy

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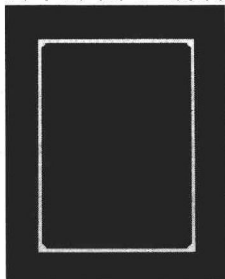
## Curriculum Vitae—Timon Cheng-Yi Liu

Timon Cheng-Yi Liu, Ph. D., Professor, Supervisor of Ph D candidates, Fellow of American Society for Lasers in Surgery and Medicine (ASLMS), head of Laboratory of Laser Sports Medicine (LLSM), South China Normal University (SCNU) (Guangzhou, China). Born in 1963 in Sichuan. Graduated as a BS in physical chemistry in Nanjing University in 1983, as a MS in quantum chemistry in Jilin University in 1986, as an Ph D in laser technology in Huazhong University of Science and Technology (HUST) in 1993. Worked as a assistant in physical chemistry in HUST (1986-1988), as an postdoctoral in biophotonics in SCNU (1993-1995), as an associate professor in biochemistry in biological department (1995-1997) and then in light propagation in laboratory of light transmission optics (LLTO) in SCNU (1998-1999), as a professor in light propagation in LLTO (1999-2002) and then in laser sports medicine in LLSM (2003-), as a visiting professor in physical education in department of science in Hong Kong Institute of Education (2002-2003). Main interests in the mechanisms of photobiomodulation (PBM) and function-specific homeostasis (FSH) and their applications in laser medicine, biomedicine and sports science. We have put forward the biological information model of PBM in 1996, observed the first phenomenon of extraocular phototransduction in 2001 and developed the concept of FSH from physiological homeostasis in 2008. Among our publications, 56 and 60 works were indexed in SCI and EI, respectively. In 2000, the paper of my MS candidate, Rui Duan, was awarded for its excellence in biostimulation by annual meeting of ASLMS as attached in the next page.

## 作者简介



刘承宜，博士、教授、博士生导师、美国激光医学会会员，华南师范大学（SCNU）激光运动医学实验室（LLSM）主任。1963 年生于四川。作为物理化学学士、量子化学硕士和激光技术博士分别毕业于南京大学（1983）、吉林大学（1986）和华中科技大学（HUST）（1993）。曾任 HUST 物理化学助教（1986—1988）、SCNU 生物光子学博士后（1993—1995）、SCNU 生物系（1995—1997）和传输光学实验室（LLTO）（1998—1999）生物化学副教授、LLTO（1999—2002）和 LLSM（2003—）生物物理学教授、香港教育学院科学系访问教授（2002—2003）。主要研究光生物调节作用（PBM）和功能内稳态（FSH）的机制及其在激光医学、生物医学和体育科学中的应用。1996 年提出 PBM 的生物信息模型。2001 年发现视觉外细胞光信号转导现象。2008 年将生理学内稳态发展为 FSH。所发表的论文中，分别被 SCI 和 EI 收录 56 篇和 60 篇。2000 年他指导的硕士研究生段锐获得美国激光医学会年会最佳生物刺激作用论文奖（附图）。



美国激光医学会 2000 年会生物刺激作用优秀论文奖

The paper excellent in biostimulation awarded by American Society  
for Lasers in Surgery and Medicine in 2000

## Abstract

The authors present the science clearly and in sufficient detail to enable readers to make up their own minds about the plausibility of intranasal low intensity laser therapy (ILILT) . The book mainly provide lay public and trainee experience on the present health care applications in hyperlipidemia, blood hyperviscosity, insomnia and high blood coagulation status in healthy pregnant women at term, and clinic applications in mild cognitive impairment, Alzheimer's disease, Parkinson's disease, schizophrenia, pain relief, stroke, depression, inflammation, coronary heart disease, myocardial infarction and cerebral palsy, and exports experience on its possible applications in hypertension, vascular dementia, cancer, diabetes, ageing, olfactory dysfunction, withdrawal symptoms, renal failure and health promotion. However, it doesn't offer a comparable level of technical detail when it comes to the clinic applications--and there is even less on the possible clinic applications, which can be found in the listed references. Nevertheless, readers won't have any difficulty evaluating the validity of the theory presented, because authors spell their ideas out clearly enough.



## 内容提要

本书主要介绍了鼻腔内低强度激光治疗在高脂血症、高黏血症、失眠症、孕妇分娩前血液处于高凝状态等方面的保健应用，以及在轻度认知障碍、阿尔茨海默病、帕金森病、精神分裂症、镇痛、卒中、抑郁症、炎症、冠心病、心肌梗死、小儿脑性瘫痪等方面的临床应用，为医务工作者提供了鼻腔内低强度激光治疗高血压、血管性痴呆、癌症、糖尿病、衰老、嗅觉障碍、戒断综合征、肾衰竭和保健等方面的基础知识和应用技能。本书内容权威，实用性强，可供医院及基层医务工作者、科研技术人员和对鼻腔内低强度激光治疗有兴趣的读者阅读参考。

## Preface

Photobiomodulation (PBM) is a photochemical effect of laser irradiation or monochromatic light (LI) on biosystems with the temperature elevation less than  $0.1 \sim 0.5^{\circ}\text{C}$ , which stimulates or inhibits biological functions but does not result in irreducible damage and widely applied in clinic. There are many forms of LI-biosystem interaction such as cutaneous irradiation of wound, ulcer, viscera and acupoints, intranasal irradiation, intravascular irradiation, intrabronchial irradiation and intrainstestine irradiation. In our country, 1970s and 1990s have seen the population of laser acupuncture and intravascular low energy laser therapy (ILELT) for rehabilitation therapy in internal medicine, respectively. However, the optical fiber should be introduced into vein by invasive needle for ILELT, which makes patients feel pain and might be infective if the operation is not very careful. 1998 saw the many kinds of study of cutaneous irradiation of low intensity LI (LIL) on blood vessel among which intranasal LIL therapy (ILILT) has been widely applied in clinic. ILILT as an integration of ILELT and laser acupuncture for rehabilitation therapy of internal medicine is originally put forward in our country although it has been used for intranasal inflammation in Russian before 1998. I myself have used ILILT for health promotion and enjoyed its excellent rehabilitation effects.

## 序 言

光生物调节作用，直接产生于单色光或激光（laser irradiation or monochromatic light, LI）对生物系统的化学效应，而不是热效应（温度升高不超过  $0.1\sim 0.5^{\circ}\text{C}$ ），这种不会造成不可逆损伤的刺激或抑制作用得到了广泛的临床应用。LI 作用于人体的途径是多种多样的，如体表有对伤口或溃疡、内脏器官、穴位、鼻腔照射等，体内有利用光纤实施的血管内照射、支气管内照射和肠内照射等。20 世纪 70 年代和 90 年代；我国先后流行内科疾病康复治疗的激光针刺疗法和低能量激光血管内照射疗法（intravascular low energy laser therapy, ILELT）。然而，ILELT 必须将光纤光针插入血管内，不仅给病人带来痛苦，如果操作不当，还可能引起医源性感染。1998 年开始探索低强度 LI（low intensity LI, LIL）血管外照射疗法，其中的鼻腔内 LIL 照射疗法（intranasal LIL therapy, ILILT）逐渐发展成为比较成熟的临床疗法。尽管早在 1998 年以前俄罗斯已经开始研究鼻腔内 LIL 照射，但主要处理的是鼻腔内局部炎症。ILILT 综合了激光针灸和 ILELT 的优势，可以说是我国首创的一种用于内科疾病康复治疗的 LIL 疗法。笔者本人也一直使用 ILILT 进行保健，效果可佳。

I have begun to study laser life science from as early as 1980, and established its key laboratory of Guangdong province in 1989 and then Ministry of Education in 2005. Our study on low level LI therapy (LLLT) was at in vivo level in 1989 and at cellular level in 1993. We have invited Prof. Tiina Karu, Academician of Russian Academy in Laser Science, who has been internationally famous in the science of LLLT to hold an international conference of LLLT in 1999 in Shunde, Guangdong. In 2000, one of our papers was chosen for its excellence in the speciality in biostimulation in the 20th annual meeting of American Society for Laser Medicine and Surgery. 2002 has seen our establishment of laboratories of laser sports medicine and photonic traditional Chinese medicine (TCM) . From then on, our depth study in PBM and its foundation and applications in TCM has included the cellular effects of low level LI and the mechanism of ILELT, laser acupuncture and ILILT.

早在 1980 年，笔者就倡导并开展了激光生命科学研究，先后于 1989 年和 2005 年建成广东省和教育部重点实验室。1989 年开始研究低水平 LI (low level LI, LLL) 在体效应。1993 年开始从细胞水平研究 LLL 治疗 (LLL therapy, LLLT) 的机制。1999 年邀请 LLLT 基础研究的国际权威、俄罗斯科学院的 Karu 院士组织了 LLLT 国际会议。2000 年，我们的研究成果获得美国激光医学会第 20 届年会最佳生物刺激作用论文奖。2002 年分别成立了激光运动医学实验室和光子中医学实验室，重点研究光生物调节作用及其中医基础与临床应用，包括 LLL 细胞效应，以及 ILELT、激光针灸和 ILILT 等作用机制。

Chinese therapeutic applications of LLLT, especially in ILELT and ILILT, were the most widely in the world, and its basic research was internationally progressive, but its randomized placebo-controlled trial need to be enforced. Although PBM has been widely applied in clinic, many physicians or persons interested in LLLT knew little on PBM mechanism, and many related clinic problems left unresolved. LLLT has been even used only according to the fixed parameters suggested by the instrument manufactory, which might not work and then increase the loss of patient belief. At this point, this book is very in time. The authors are very professional in the basic research of PBM and its clinic applications. It is very of use in studying, teaching and clinic in the mechanism research of LLLT and the clinic applications of ILILT because it has deeply reviewed the related topics. I believe our academic role will become bigger and the therapeutic effects will become more enhanced as our basic research of PBM and its clinic applications become wider and deeper in our country.

Prof. Song-Hao Liu  
Academician of Chinese Academy  
Fellow of Optical Society of American

虽然我国光生物调节作用的基础研究已经进入国际前沿，但临床研究却很不规范。尽管光生物调节作用的临床应用已经得到普及，但很多临床医生或普通使用者对其作用机制了解甚少，存在不少临床上亟待解决的问题，有的医生或普通使用者甚至一直使用厂家建议的固定参数进行治疗，不但影响了疗效，也使患者丧失信心。面对这种情况，推出本书是非常及时的。本书作者都是一直从事光生物调节作用的基础与临床应用研究的专家，他们从离体细胞实验和临床研究两个方面综述了 LLLT 作用机制和 ILILT 临床应用方面的大量研究成果。本书是相关领域研究、教学和临床应用方面的重要参考书。我相信，随着光生物调节作用基础研究与临床应用的普及和提高，无论是我国相应的学术地位，还是临床治疗效果，都将获得进一步提高。

**刘颂豪教授** 中国科学院院士  
美国光学会会士

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