

FINAL TECHNICAL REPORT
DOE Grant DE-FG02-91ER61228

The primary goal since inception of this DOE grant award in 1991 to Wellman Laboratories of Photomedicine, Harvard Medical School, Massachusetts General Hospital, has been to support competitive research fellowships aimed at solving important medical problems, contributing significant new knowledge and/or technology. This approach was taken according to the original intent of the DOE program, to foster excellent centers for research and development of lasers and optics in medicine. Laser photomedicine broadly encompasses optical therapy and optical diagnostics, within any organ system. The research supported clearly reflects this breadth and depth.

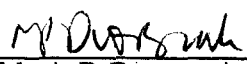
A strategy of meaningful collaboration between laboratory and clinical faculty was taken. Matching support from a hospital or Harvard Medical School department was required for every fellowship. Each research fellowship required a full-time one year commitment by a postdoctoral (MD or PhD) research fellow, with joint supervision from a faculty member at the Wellman Laboratories of Photomedicine and a collaborating clinical faculty member. The competitive process for funding research fellowships consisted each year of peer-review by the combined faculty (about 25) of Wellman Laboratories and the Executive Committee of the MGH Laser Center. Proposals were ranked yearly based on scientific quality and medical significance. Typically there were more excellent proposals than could be funded. For example, in the final 2001-2002 year of this grant, 11 qualified applications for research fellowship were received, and 3 were funded.

Research themes and accomplishments are summarized briefly on the following page. Publications and brief technical summaries for research fellowship projects are provided in 35 attached forms (DOE 241.3).

During the 11-year course of this grant (1991-2002), 35 fellows were supported. The research spanned a wide range of projects and medical specialties, and contributed significant advances in knowledge and medical application. Participating clinical departments included medicine, surgery, dermatology, ophthalmology, gynecology, oncology, gastroenterology, oral surgery, urology, and orthopedics.

DOE support was used mainly for the feasibility or early development phase of new discoveries with strong medical use potential. Some of the DOE-supported fellowships led to subsequent research support by NIH or industry, and to FDA-approved new optical treatments and diagnostics. During the period of DOE support, Wellman Laboratories of Photomedicine approximately tripled in size and became a premier laser-medical research center. Wellman Laboratories has continued to grow and was recently named to become a Thematic Center at MGH. A majority of the DOE-supported fellows have gone on in their careers to contribute further to laser photomedicine research and clinical photomedicine. The MGH Laser Center, which was established at the inception of this DOE grant, also continues to provide teaching, clinical and research mentorship.

DOE Patent Clearance Granted


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Date

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Primary research areas and medical impact

* in human studies

** FDA-approved for human use

Photodynamic Therapy (light-activated drugs)

- Inhibition of coronary artery disease (restenosis) *
- Targeted treatment of ovarian, prostate, and bladder cancer *
- Inhibition of ocular neo-vascularization (age-related macular degeneration) **
- Treatment of rheumatoid arthritis
- Potent, long-lasting treatment for acne *
- Treatment of ocular melanoma
- Sterilization of infectious organisms
- Alternative to hysterectomy *
- Tissue Bonding (sutureless repair) *

Optical Diagnostics

- Detection of oral cancer and pre-cancer
- Non-invasive microscopy of skin cancer **
- Detection of bladder cancers **
- Differentiation of benign from malignant lesions in the colon *

Laser Surgery

- Reversal of vasospasm due to subarachnoid hemorrhage
- Laser prostate surgery **
- Precise laser bone-cutting



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