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Introduction

Science and Peace

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"Science and peace will triumph over ignorance and war."
—Louis Pasteur; Sorbonne, Paris, France 1891

In a time in the world where there is much talk about division, anger and violence, scientists can come together to provide answers, inclusiveness and unity in moving the world forward to be better for all. Of course, one of the best uses of technology is to cure and to heal the physical and emotional manifestations of disease. Some physicians are afraid of technology, being concerned that certain specialties will become obsolete as innovations are incorporated into standard of care. I know that we can utilize technologies to evolve and improve, providing even better care for patients, achieving for them higher levels of health and happiness. This issue includes 15 outstanding examples of research that improves therapeutic technique (including approaching treatments in patients with darker skin), describes new technology, provides evidence-based information for treatment decision making, evaluates improved methods for laser assisted drug delivery or utilizes non-invasive technology for diagnosis or evaluation of disease pathogenesis.

At one of the first laser surgery meetings I attended in the 1990s, a gentleman expressed concern that technologies were improving yet laser surgeons were not addressing application of technologies for dark skin. The field of light-based technologies needs to continue to utilize new technologies to address the needs of all people. Because of the nature of melanin-light tissue interactions and subsequent historical bias excluding darker skin types in many studies, work needs to be done to understand needs and develop safe and effective treatment algorithms for Skin types IV–VI. Several publications in this edition address this issue. Wat et al. utilized a picosecond alexandrite laser with diffractive lens array, combining two relatively recent advances to light-based technologies (picosecond pulse duration and fractionated delivery of laser energy) for treatment of photoaging in patients in China [1] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23014). A 532/1064 nm picosecond laser was evaluated by Kung et al. for treatment of benign pigmented lesions (including melasma, freckles, lentigines, café au lait macules and Hori's macules) in Asians [2] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23028). Patients of all skin types can experience some degree of photoaging, general aging and pigmentary issues, and advances will need to continue to be made to identify concerns and find the most effective, yet safe, options. This work by Henry Chan's group is a perfect example of addressing these issues. Picosecond as well as Q-switched technology combined with perfluorodecalin (PFD)-infused patches was used by Vangipuram et al. for tattoo removal in Fitzpatrick IV–VI skin types [3] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23022). S. Tawfic et al. from Cairo University performed a split-face study comparing low power fractional ablative $C0_2$ laser alone or in combination with topically applied tranexamic acid solution pre-treatment or intradermal microinjections of tranexamic acid pre-laser in patients with melasma [4] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23032). Melasma is very difficult to treat and greatly affects the self-image of many patients and there is no question that improved treatments are needed.

Another manuscript in this edition, utilizes lasers for less invasive treatment of skin cancer. Researchers from the University of California, San Diego and Massachusetts General Hospital evaluated outcomes of long-pulsed 1064 nm Neodymium: Yttrium Aluminum Garnet (Nd:YAG) laser treatment of basal cell carcinoma [5] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23041). While excisional surgery remains the standard of care for many skin malignancies, optimization of laser techniques for removal of non-melanoma skin cancers may ultimately provide another treatment option with improved cosmetic outcome. It will continue to be important to consider and discuss risk of recurrence with patients, to allow informed decisions.

Several new technologies are evaluated in this issue. Brian Kinney and Paula Lozanova at the University of

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Southern California evaluated high-intensity focused electromagnetic technology utilizing magnetic resonance imaging and demonstrated a reduction in adipose tissue and an increase in muscle thickness [6] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23024). Robert Weiss and Jan Bernardy investigated induction of fat apoptosis with high-intensity electromagnetic technology and provide additional information about mechanism of observed effects [7] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23039). New technologies like this, offer interesting potential for patients. Future research will be needed to determine long term benefits of such technologies and compare this to exercise induced changes, including cardiac and cognitive benefits. Ultimately, the best treatments should make people healthier and in turn happier, with improved quality of life. Treatment of Poikiloderma of Civatte using a redesigned pulsed dye laser with a 15 mm diameter treatment spot was evaluated by Bernstein et al., reminding us that we can continue to improve on light-based technologies, even one of the oldest and best, the pulsed dye laser [8] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23036). In addition, Aria Vazirnia and Arisa Ortiz from the University of California, San Diego describe treatment of benign pigmented lesions using a novel dermal cooling system which provides precise skin freezing [9] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23037).

Lim et al. [10] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23030) in Seoul provide evidence-based information for treatment decision making, presenting a retrospective review of treatment options for small to medium congenital nevi. This is an important review as the treatment of choice is staged surgical excision, but for at least two decades, there have been discussions of the potential use of lasers for removal of congenital nevi. Congenital nevi are an important health issue because of malignant potential and, in some cases, cosmetic concerns. While patients should know all of their options, studies such as this can assist in guiding their decision making.

Laser assisted drug delivery in combination with drugs in development and gene technology has incredible potential for utilizing the skin to improve a wide range of conditions, including cancer and genetic diseases. Laser surgeons may ultimately play a primary role in treatment of these diseases. Christin Banzhaf with Merete Haedersdal's group at Bispebjerg Hospital at the University of Copenhagen evaluated the coagulation zone surrounding laser induced ablation channels [11] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23034). Research such as this will optimize laser assisted drug delivery and widen the potential for this important therapeutic option. Olesen et al. tested an exciting potential use of laser assisted drug delivery, using an ablative fractional laser to enable topical deliver of vismodegib [12] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23013). This treatment has the potential to treat aggressive basal cell carcinoma while minimizing the toxicity often associated with hedgehog inhibitors. Raff et al. from the Wellman Center for Photomedicine and affiliated departments describe how lidocaine potentiates thermal sensitivity of cell cycle active skin cells (such as cancer cell lines) [13] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23027). This information could potentially be used to develop additional treatments for skin cancer.

This special issue also contains multiple examples of utilization of non-invasive imaging for diagnosis or evaluation of disease pathogenesis. Lin et al. [14] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23017) at UC Irvine and the Beckman Laser Institute utilized multiphoton microscopy for evaluation of both scarring and non-scarring alopecias. Alopecia can greatly impact quality of life for patients. Recent years have provided treatment options with exciting potential for alopecias, including tofacitinib for alopecia areata and platelet rich plasma for androgenetic alopecia. Utilizing non-invasive imaging methods to aid diagnosis and then potentially track treatment effects, could greatly assist research aimed at understanding pathogenesis and determining, and then evaluating, treatment options. Fuchs et al. combined two non-invasive imaging modalities, reflectance confocal microscopy and optical coherence tomography, to evaluate acne characteristics associated with disease severity [15] (https://onlinelibrary.wiley.com/doi/10.1002/lsm.23008). Combining these technologies allows visualization of morphology, improved depth analysis and addition of blood flow parameters. Their elegant work demonstrates that the many non-invasive imaging techniques available should not be pitted against one another, but rather, each technology should be used to its best advantage to identify disease characteristics. This information can then be utilized to improve treatments, targeting the most important aspects of this common disease.

It was my privilege to serve as guest editor for this Special Issue of Lasers in Surgery and Medicine (LSM) and I am very appreciative for the many hours and outstanding work of co-editors Catherine DiGiorgio, M.D. and Arisa Ortiz, M.D. and managing editor Beth Mallen. I also want to thank Brian Wong, M.D., Ph.D. for this opportunity and his guidance.

Each time I read the science published in LSM, I am inspired to utilize the technologies I can access to discover and heal. Similarly, I have been motivated by key note speakers at the Annual Meeting of the American Society for Laser Medicine and Surgery (ASLMS) including, most recently, Kim Phuc in 2017 with her message of healing physical and emotional scars with technology and forgiveness and Dan Harris in 2018 using mindfulness and meditation to bring inner peace to allow you to achieve your best. The work of the ASLMS and the research published in LSM fosters and promotes healing. *Some of this research will change the world. All of this work, utilized for good, can alleviate a bit of suffering and bring a little more peace to the world.*

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