



PBM2024 Newsletter



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PBM2024 Chair
WALT Scientific Director**

10th December 2024

Dear WALT Member,

PBM2024 was held at the prestigious Park Plaza Westminster Bridge Hotel in London between 23rd-25th August 2024. It was the 14th International Congress of World Association for Photobiomodulation Therapy (WALT). It also marked WALT 30th Anniversary. PBM2024 was a great success and indeed we kept our promise to deliver the largest widely rewarded Photobiomodulation (PBM) conference in the history.

The conference hosted over 400 delegates of which 161 renowned speakers including young investigators and students from 30 countries presented the latest advancements in PBM research. The largest PBM conference in the WALT's 30-year history got together the global community of PBM researchers, clinicians, and students offering an outstanding scientific program, workshops, educational courses, master classes, roundtables, and 24 industry and exhibitors.

The Annual Meeting was the foremost international multidisciplinary and interdisciplinary conference, encompassing three days of cutting-edge research, engaging presentations and many networking activities. It delivered its promise to be a particularly interesting congress all round, with a range of plenary lectures, specialist presentations and contributing papers, as well as, educational courses and regular hands-on workshops.

I would like to express my great gratitude to Prof. René-Jean Bensadoun (WALT President at PBM2024) and the entire WALT Executive Board for their great support. I would like to extend my thanks to all the delegates for their continued participation and support. Thank you to all our speakers who shared their cutting-edge research. We achieved an important milestone with all the innovative inspirational research in PBM. I am very grateful to all the sponsors and exhibitors (24 in total) for their support and making PBM2024 a great success.

PRE-PBM2024 EDUCATIONAL COURSES

The PBM educational courses in several disciplines took place on the first day (23rd August). They were led by the following experts in the field; **Prof. René-Jean Bensadoun, Prof. Praveen Arany, Prof. Michael Hamblin, Prof. Reem Hanna, joined Prof. Nivaldo and Prof. Celber Ferraresi**, who delivered the following courses respectively: Supportive Care for Cancer; Neurology; Wound healing, Clinical Trials and Research Methodology; Dentistry and Oral Care; Musculoskeletal Applications. These courses were well-received. Thank you for the feedback.



PBM2024 OPENING CEREMONY

Prof. Reem Hanna, PBM2024 Chair, officially opened PBM2024 Grand Ceremony, Ribbon-Cutting Ceremony, on Friday 23rd August 2024. It was an unforgettable event enriched with momentous speeches.





Prof. Adam Mester from Hungary (son of Prof. Andre Mester) enlightened us about his Father’s journey to PBM discovery.



Prof. René-Jean Bensadoun delivered WALT presidential speech. He is well-recognised international authority in the field of PBM, and a leader, as well as one of the early pioneers in bringing PBM mainstream of strong evidence for his role in managing oral mucositis-induced by oncology therapies. His presidential talk was very inspirational and laid a solid foundation for the applications of PBM in this area, as well as in addressing other adverse effects caused by oncology treatments. The event was followed by speeches from other leading authorities in the PBM field.





WELCOME RECEPTION

It was well-received whereby the delegates mingled with each other over a glass of bubble and canapé, celebrating the ground opening PBM2024 conference.



SCIENTIFIC PROGRAMME (Two-day programme)

The scientific programme was comprehensive covered the entire PBM spectrum. It delivered its promise to be a particularly interesting congress all round, with a range of plenary lectures, specialist presentations and contributing papers, as well as, educational courses and regular hands-on workshops.

Rapid advances in PBM therapy have led to numerous innovations. At PBM2024 event, a stellar lineup of speakers covered a breath of PBM contemporaneous research and clinical applications. The featured leading authorities in the field addressed a plethora of PBM applications, including advances across all clinical categories, such as; bone and musculoskeletal; pain management and addiction; sports and rehabilitation; wound care; dermatology; dentistry and oral care, supportive care for cancer, neurorehabilitation, stem cells and regenerative medicine, PBM versus antiviral and antimicrobial applications; aesthetic medicine, acupuncture, metabolic and autoimmune disorders, and reproductive health. Also, advanced research in PBM mechanisms, treatment guidelines and position papers on the use of PBM technology were presented.



HIGHLIGHTS OF THE SCIENTIFIC PROGRAMME

Neurorehabilitation

This first session of the conference day was enlightened by the one of the fathers of PBM in the brain, **Prof Michael Hamblin**, who discussed the history and some of the key mechanisms underpinning PBMT in the brain, which set the scene beautifully for the session. Co-chair, **Prof Paul Chazot** then took us on his journey for the last 20 years, regarding the PBMT1070 story as a rationale strategy for neurodegenerative disease, together with some new mechanistic data for use in diabetic neuro- and retinopathies. **Prof. Paulo Cassano** then discussed the protocols of t-PBM used for the treatment of mood and anxiety. Two exciting talks were then given by pioneers of PBM in Parkinson's disease, by our Australian colleagues, **Drs Ann Liebert and Brian Bicknell**. An integrative approach utilising medication monitoring to increase or decrease as required with symptom changes associated with PBM and exercise was proposed to be best practice by Dr. Ann Liebert for Parkinson's, and Dr. Brian Bicknell reported a five year follow up on a series of Parkinson's case studies was reported highlighting the continuing effective utility of PBM. The session was completed by **Dr Andrew Stevens** who delivered his talk online, discussing the use of implantable and transcutaneous PBM for spinal cord injury (SCI), with new evidence of significant therapeutic benefit, either using iPBM or tcPBM application, and its potential to be developed for clinical use in SCI patient.

Pain Management and Addiction

The session featured a high calibre in the field of pain management and addiction. **Prof. Juanita Anders** who is pioneer in the field of neuroscience and instrumental in the field of PBM with a track record of publications. She enlightened the audience with her talk on the effects of direct PBM with high irradiance for pain modulation. Her research focused on different methods to deliver Direct PBM to nerves and determining

the duration of pain reduction, as function of laser irradiation parameters in large and small pre-clinical animal models. **Prof. Reem Hanna** shared her experience in harnessing 810 nm laser-PBM versus pharmacotherapy in the management of outpatient oral neuropathic pain (ONP). Her study was a prospective parallel feasibility trial aimed to evaluate pre/post-benefit of PBM and to allow for the first qualitative comparison with pharmacotherapy based on 9-month follow-up. She concluded that 810 nm PBM is effective in modulating ONP. Also, 810 nm-PBM can modulate NP pathology in a pro-reversative manner, presumably via antioxidant mechanism. Prof. Hanna highlighted that her study PBM dosimetry and treatment protocols prove to be valid and reproducible for future RCTs. **Dr. Scott Sigman** shared his experience in using PBM as an alternative pain management solution in the evolution of opioid crisis. It was very fascinating and informative talk. He highlighted the latest research findings and the efforts to mitigate the impact of opioid crisis on individuals, communities and society as a whole by utilising PBM therapy. **Dr. Ann Liebert** shared her research and expertise on the effects of PBM on the cytoskeleton in the PNS and CNS and how we can apply the knowledge of PBM influenced changes on cytoskeleton to neurological diseases. Dr. Liebert concluded that conformational changes to the cytoskeleton is a plausible mechanism of PBM that is additional to its other known therapeutic target. It was an informative and novel approach in the management of neurological diseases. **Dr. Hadagar** shared her experience in utilising transcranial PBM and cognitive rehabilitation in the management of opioid addiction. She concluded that both PBM and cognitive rehabilitation targeting working memory and inhibitory control effectively reduced opioid drug craving, low-level laser therapy proved to be more effective than cognitive rehabilitation in this regard. **Dr. Asius Rayen** shared his experience in using whole-body PBM LED light in the management of fibromyalgia.

Bone and Musculoskeletal

The Bone and Musculoskeletal Session showcased translational research applications with a focus on improving patient outcomes and enhancing clinician expertise. Here are the key takeaways from our speakers: **Dr. Santiago Navarro-Ledesma**: Presented results from a 6-month trial on whole-body PBM, demonstrating significant benefits in pain relief and quality of life for fibromyalgia patients. **Dr. Shikha Parmar**: Focused on empowering PBM clinicians by bridging theoretical research and practical application, enhancing protocol effectiveness. **Dr. Lisa Miller**: Explored the use of PBM in treating osteoarthritis and degenerative myelopathy in dogs, highlighting its potential in veterinary applications. **Dr. Arun Maiya**: Discussed the combined impact of PBM and rehabilitation on pain management and functional recovery in rotator cuff pathology. **Dr. Peng Xia**: Investigated the therapeutic effects and mechanisms of PBM in treating knee osteoarthritis, providing insights into its cellular interactions and pain relief properties. **Dr. Pilar Bianco**: Proposed PBM therapy as a novel treatment for maxillary osteonecrosis, presenting a less invasive option with promising outcomes.

Sports and Rehabilitation

Prof. Nivaldo Parrizotto opened the session by sharing his inspirational talk. He shared his proposal a randomised clinical trial on PBM effects associated with an exercise protocol in the treatment of non-specific neck pain. He concluded that a combining PBM with physical exercises and manual techniques may offer significant benefits superior to isolated techniques in managing this type of pain. **Dr. Elizabeth Metzger** shared her experience in using PBM in recovery of musculoskeletal injury, enhancing performance, nerve and healing repair and wound healing. She discussed PBM as a treatment modality in comparison to other treatments and detailed the translational approach towards PBM clinical trials. **Dr. Rinaldo Guirro** shared their study aimed to explore the influence of energy density on PBM therapy for muscle performance in healthy subjects in strength training program. They concluded that PBM was not effective to elicit performance enhancement, with divergent parameters evincing equivocal efficacy in this regard. **Dr. Cintia Cristia Santi Martignago** talked on the effects of PBM therapy associated with aerobic exercise training in modulating inflammation in an experimental model of knee osteoarthritis (KOA). Her findings suggested that aerobic physical training attenuated degenerative changes related to KOA progression. Furthermore, exercise associated with PBMT reduced the inflammatory process in KOA in rats.

Wound Care

Prof. Praveen Arany who is instrumental in PBM shared his experience in the use of PBM in wound care and the fundamental of light-tissue response in wound healing. Moreover, he highlighted that improved wound healing was among the very first clinical observations with PBM treatments. A key PBM mechanism mediating this response is its ability to directly activate a potent pro-healing latent growth factor complex, TGF- β 1. Other studies have outlined the role of Cytochrome C oxidase and non-visual opsins in PBM responses. Further, the role of ATF-4 in the phototoxicity pathway enables the determination of maximal dosing. **Prof. Nicolette Houreld** shared her experience in harnessing PBM in management of diabetic wound healing. Her talk focused on in vitro cellular and molecular evidence of PBM at 660 and 830 nm at 5 J/cm² on signal transduction in human skin fibroblast cells, and clinical evidence of daily at home-use PBM (808 nm) on non-healing DFU in individual with a dark skin tone. **Dr. Marianne Degerman** shared her experience in utilising a combination of 904 nm and 635 nm Laser PBM in the management of pressure ulcers-category 4 (severe). She demonstrated the effectiveness of combined wavelengths in accelerating the healing time. **Catherine Norton** shared her experience in utilising Evaluate the effectiveness of Multiwave Locked System (MLS) laser therapy in enhancing wound healing processes. Her study showed a significant wound size reduction and enhance wound healing in elderly patients, regardless of the wound aetiology, and also effective in alleviating pain. **Dr. Jaroslava Joniová** shared their experience in utilising red or near infra-red to stimulate cellular metabolism and prompt angiogenesis through quantitative identification of the optimal radiometric PBM conditions. **Dr. Elaine Guirro** shared her experience in utilising different laser PBM parameters on wound closure based on in vitro study. They concluded that different physical parameters of the Laser can mediate cellular responses related to wound closure. **Dr. Abdullah Jibawi** shared his experience in utilising PBM of specific wavelengths at different energy has emerged as a transformative approach in managing complex wounds, averting the need for major amputations. This study not only reaffirms the efficacy of PBM in accelerating wound healing but also emphasizes the importance of integrating it with best medical practices to enhance patient outcomes. Further exploration into PBM's clinical applications promises to broaden its therapeutic scope, offering new avenues in complex wound management.

Ophthalmology

Dr. Clark Tedford's talk was on PBM reduces risk for vision loss and onset of geographic atrophy In dry age-related macular degeneration (AMD). He evaluated the efficacy and safety of PBM and its anatomical effects in intermediate dry AMD. Dr. Clark concluded that the current analysis supports a reduced risk of best correction visual acuity vision loss and progression to new geographical atrophy. PBM therapy may offer a new treatment with a unique mitochondrial mechanism and modality for patients with dry AMD to maintain retinal health and slow AMD disease progression. In the same theme, **Prof. Pierdomenic D'andrea** shared his experience in utilising ultra-low irradiation PBM with a new self-medication device for the treatment of the AMD: short-and medium-term effects. The conclusion of his study demonstrated that LED PBM is safe and effective for improving short (10 days) and medium term (3-month) visual function in patients affected by severe non-neovascular AMD. **Prof. Janis Eells** shared her experience in harnessing PPBM for the treatment of retinal injury and diseases. This was based on experimental studies that showed that chronic proteotoxic disrupts retinal bioenergetics resulting in mitochondrial dysfunction, and retinal degeneration. They further demonstrate beneficial effect of PBM on retinal mitochondrial redox status in retinal injury and disease suggesting that therapies normalizing mitochondrial metabolism have potential for the treatment of retinal degenerative disease. In the same theme, but more on the regulatory perspective, **Dr. Rolando Toyos** shared his 24 years of experience when he introduced the concept of IPL and PBM to treat Dry eye disease and his journey of FDA approval of this treatment and beyond. **Dr. Arun Sachdev** shared their experience in utilising Multiwavelength PBM in Improving central serous chorioretinopathy (CSCR). He concluded that PBM is a non-invasive treatment option that may provide benefit in CSCR to resolve fluid, macular change and vision loss. Research into PBM as an immediate treatment option for CSCR, especially those with chronic presentations or those posed to have irreversible damage is warranted. **Dr. Veronica Molina Seoane** shared her study on the effectiveness of PBM in improving visual acuity and campimetry in patient with retinitis pigmentosa.

Dermatology

Prof. Reza Fekrazad shared his experience in use of PBM and PDT in the field of dermatology in terms of mechanism, applications and future perspectives. Dr. Luis Pérez-González's talk focused on the synergetic effect of blue light and terbinafine on the production of reactive oxygen species: a potential treatment for resistant cutaneous mycoses. **Dr. Katayoun Kalhori's** talk focused on the effects on PBM 940 nm laser on nasal. Oedema reduction two months after rhinoplasty. **Dr. Leila Fashtami's** talk focused on combined 980 nm PBM and electron radiation therapy on non-melanoma human squamous cell cancer. Dr. Lisa Miller shared her expertise in utilising PBM for veterinary oncology patient. **Dr. Jorge Naharro-Rodriguez's** talk focused on the efficacy of ALA PDT with half- versus full-light dose in large severe field cancerization. **Dr. Xavier Jimenez's** talk focused on pulsed blue light on fibroblasts and lung cells.

Dentistry and Oral Care

Prof. Georgi Tomov opened the session by sharing his expertise in the efficacy of PBM in clinical improvement of oral lichen planus (OLP) and restore the molecular disturbances associated with OLP. His talk inspired the audience with the findings of his study that showed PBM corrected P63 deficiency in OLP patients. This is a great marker explaining better improvement of atrophic-erosive OLP in patients received PBM. **Prof. Chandrashekar Yavagal**, shared his experience in the use of PBM in contemporary paediatric dental practice: from minimally invasive pulpotomy to pain-free & accelerated orthodontics in children. He concluded PBM is a promising technology in several paediatric dental applications. **Dr. Vahdatinia** shared his double-blind RCT in utilising 660 nm laser PBM for prevention or reduction of incidence of alveolar osteitis (AO) and postoperative pain following impacted mandibular third molar. He concluded that PBM reduced the incidence of AO frequency after surgical extraction of impacted 3rd molar. **Dr. Seyyedi** delivered a talk on the use of 940 nm PBM in the management of patients with myogenic temporomandibular joint disorder (TMD). He concluded that low power lasers can be considered as an alternative treatment method or a complementary treatment for patients with TMD of muscular origin which results in significant improvement in mouth opening with or without an assistant and hence it increases the level of patients' satisfaction. **Dr. Miresmaeili** presented a RCT aimed to determine whether intraoral 850nm LED irradiation could reduce the duration of lower anterior crowding alignment, and also could relief the orthodontic pain. He concluded that 850 nm significantly reduced the duration of correction of crowded lower incisors up to 36%, orthodontic pain alleviation, and enhance patient's experience. **Dr. Hazrati** shared his in vitro study aimed to assess the effects of PBM with different wavelengths on the viability and migration of nicotine human gingival fibroblasts (HGF). This could be used in the treatment of gingivitis and periodontitis in smoking patients. He concluded that neither cell migration nor viability of nicotine HGF was improved by laser irradiation. **Dr. Maboudi** shared that combined PBM with supracrestal fiberotomy (CSF) or conventional CSF can be effective in reducing orthodontic relapse, but further studies are required to support this concept.

Supportive Care for Cancer

What a great informative session. **Prof. René-Jean Bensadoun** who is instrumental in the field PBM opened the session with his inspirational talk on the use of PBM In the management of cancer therapy therapy-induced side effects: WALT Position Paper. He concluded that here is robust evidence for using PBM to prevent and treat a broad range of complications in cancer care. Specific clinical practice guidelines or evidence-based expert consensus recommendations are provided. These recommendations are aimed to improve the clinical utilization of PBM therapy in supportive cancer care and promote research in this field. It's anticipated these guidelines will be revised periodically. **Dr. Digpal Dharkar** shared his experience in incorporating PBM therapy in early integration of supportive care, a low-cost module for developing countries. He concluded that Early integration of nutritional support, multidisciplinary supportive interventions such as speech and swallow therapist interface along with oral care and rehabilitation lead to: improved quality of life, reduced treatment interruptions and improved treatment adherence. PBM therapy could significantly prevent or reduce the severity of many side effects related to cancer therapies. In future it will become an effective as well as cost effective tool for symptoms control and better treatment compliance, as well as cost benefits. **Dr. Jöri Pünchera** shared his experience in radiation-induced chronic

ulcerations and fistulae that successfully treated with PBM therapy. **Dr. Antoine Lemaire** shared his experience in PBM and supportive care in cancer: how to create an optimal ecosystem in the hospital setting? **Ms. Sharon Staton** inspired the audience with her novel ovel Implementation of PBM therapy decreases oral mucositis severity in pediatric stem cell transplant (SCT) patients. Moreover, **Dr. Kate Perkins** shared her case series report on the efficacy of PBM therapy for post-radiation fibrosis in head and neck cancer.

Stem Cells and Regenerative Medicine

This session was opened by an informative talk delivered by **Prof. Heidi Abrahamse** who is instrumental in the field of stem cells and regenerative medicine and PBM. Her research focused on Adipose -derived stem cells (ADSCs) differentiation into osteoblast cells and an increased cellular proliferation has been successfully achieved through a combination of osteogenic differentiation inducers, hydrogel encapsulation and PBM. Her research study provides relevant scientific knowledge, a standardisation for osteogenic differentiation *in vitro* using 3D hydrogel matrices and PBM as well as bridge the gap between *in vitro* and *in vivo* investigation for the speedy implementation of clinical trials to improve osteo-degenerative disease treatment. **Dr. Anie Crous** shored her research in harnessing PBM to enhance the neural embryoid body formation of immortalised stem cells from adipose tissue. Moreover, two speakers shared their PBM research in the field of dentistry. **Dr. Maboudi** shared their research in utilising combined blood contents and PBM in dental socket preservation based on clinical and radiographical perspectives, whereas **Dr. Hakimiha** demonstrated the efficacy of PBM on periodontal ligament of mesenchymal stem cells treated with Zoledronic acid. Dr. speaker demonstrated the effects of PBM of 6 different wavelengths (visible and IR) on human mesenchymal stem cells. **Dr. Sepehrmand** shared her study by comparing the effects of 6 different wavelengths of IR and visible PPBM therapy on human mesenchymal stem cells. **Dr. Farhadian** shared her research on the effects of LED and low-level laser irradiation on angiogenesis of human umbilical vein endothelial cells. **Dr. Cuisineir** shared his experience on using a new model for assessing PBM vial Zebrafish tail regeneration.

PBM versus Antiviral and Antimicrobial Applications

Prof. Chukuka Enwemeka who is instrumental in PBM filed opened the session with his valuable talk on the advances in pulsed blue light (PBL) inactivation of bacteria and viruses. He discussed the underlying mechanism of actions. Prof. Enwemeka highlighted the emerging reports potential of 405-470 nm PBL at lower fluences has higher antimicrobial and antiviral potentials than blue light. This is truly disruptive innovation. In the same theme, **Dr. Lilach Gavish's** shared her *in vitro* study in utilising PBL and Phage therapy and their synergetic bacterial effect against preformed biofilm of *P. aeruginosa*. Dr. Gavish's next step would be evaluating the safety and effectiveness of Phage/PBL in preclinical models aiming to validate this novel approach for combating antibiotic-resistant bacteria. Another talk by **Dr. Graves** highlighted the use of PBL inactivation of respiratory syncytial virus (RSV). Her findings indicated PBL significantly reduces RNA concentration of irradiated RSV when compared to untreated controls, with 405 nm and 410 nm yielding maximum reduction. Hence, she concluded that these findings have significant implications in the ongoing effort to mitigate RSV uprising. **Dr. Scott Sigman** shared his experience in using PBM in management of patients with COVID-19. He utilised near-infrared light targeting the lung tissue via Multiwave Locked System laser four daily sessions. The findings of his study showed rapid patients' recovery and did not require ICU admission or mechanical ventilation, and reported no long-term sequelae at 5 months after treatment. In the control group, 60% of patients were admitted to the ICU for mechanical ventilation. The control group had an overall mortality of 40%. At a 5-month follow-up, 40% of the control group experienced long-term sequelae. Dr. Sigman concluded that PBMT is a safe and effective potential treatment for COVID-19 pneumonia and improves clinical status in COVID-19 pneumonia. **Dr. Diane Meneguzzo** shared her experience in utilising PBM in the recovery of taste and smell senses after COVID-19 and the findings of her study showed PBM proved to be effective in the recovery of smell and taste senses regardless of patient's COVID history. In the same theme, Prof. Kassam shared his randomised clinical trial investigated the effect of diode laser in the management of loss of taste sensation in patients with post-covid syndrome. He concluded that 810nm laser PBM aided in rapid recovery of taste functionality.

Aesthetic Medicine

Dr. Sonia Bordin-Aykroyd enlighten the audience with her research on the role of PBM in anti-aging through light-induced melatonin and its universal role as an antioxidant. She also showed how melatonin can contribute to the cellular protection, rejuvenation and anti-aging. She highlighted the potential of PBM in stimulating the extra-pineal melatonin synthesis for anti-aging applications. This underscores the need for further research into the synergistic effects of PBM and melatonin in anti-aging strategies. **Prof. Ana Paula Tanko** shared her experience in utilising laser therapy in orofacial harmonization. Also, she demonstrated the effects of PBM as an adjunct to other treatment modalities in achieving orofacial harmonization. Moreover, she highlighted the benefits of the local and systematic action of laser photonic therapy in orofacial harmonisation treatments and the impact of PBM on the biological tissue in the aesthetic zone like the orofacial field. **Prof. Nivaldo Parizotto** shared his experience in exploring the frontiers in aesthetic through a comprehensive review aimed to explore the development of endolaser as a promising therapeutic tool in aesthetic procedure. The study highlighted the diversity in endolaser parameters used for different aesthetic conditions. Also, there was a lack of standardization in the protocols and the absence of objective measures in some studies, which limited the comparison and interpretation of the results. Hence, the need for randomized clinical trials and standardization in endolaser parameters is evident to ensure the validity and generalizability of results.

Acupuncture

The session started with a talk by **Dr. Grace Sun** who enlighten the audience with the integrative treatment approaches of PBM and acupuncture and the functional mechanisms of Photoacupuncture and its physiological effects on temporomandibular joint (TMJ). Dr. Sun shared clinical study whereby a treatment protocol of multiwavelength of red and infra-red LED PBM was utilised to evaluate its effect on TMJ range of motion (ROM). Significant results observed in increasing ROM when ST6 and ST7 meridian points were activated. She concluded the Photoacupuncture has a great impact on TMJ ROM and patient's quality of life. **Dr. Roberta Chow** presented a narrative review on the importance of treatment location including acupuncture points where PBM was utilised in knee osteoarthritis. Twenty-three trials were analyzed for the anatomical sites of laser application. The medial, lateral and posterior aspects of the knee were predominantly irradiated. Comparison of treatment sites around the knee joint showed points common to both PBM and Laser acupuncture (LA). In some LA trials, acupuncture points overlying muscles, nerves and blood vessels distant from the knee joint were additionally irradiated. She highlighted laser irradiation at anatomically selected sites in PBM and acupuncture points around the knee joint as well as acupuncture points beyond the joint can modify the pathophysiology of knee osteoarthritis. **Dr. Changsop Yang** highlighted the current status of International Standards in PBM laser devices. The International Organization for Standardization (ISO) 22466 is expected to provide safety recommendations to manufactures and users whereas it might lead to a technical limitation in regulatory fields. **Dr. Euhna Varigos** talked about the Clinical examination to elicit symptoms and signs to show a degree of ANS dysfunction extending totally unilaterally. She highlighted the PBM protocol to produce sympathectomy effect and response similar to LA lumbar sympathectomies. **Dr. Shojaeddin** shared her experience in utilising various treatment modalities such as PBM, dietary therapy and exercise, LA and acupuncture in weight loss of obese and overweight women.

Metabolic and Autoimmune Disorders

Five speakers discussed the role of PBM in metabolic and autoimmune disorders. Three speakers in this multidisciplinary session provided breakthrough evidence regarding positive PBM effects on the gut in human inflammatory bowel disease (Prof. Liisa Laakso; Dr. S. BenYehuda), and in an animal model of irritable bowel syndrome (Dr. N Ishibashi). The combined effect of PBM and supplements in Hashimoto thyroiditis was shown to be beneficial in restoring thyroid function when compared to supplements alone (Prof. Venera Berisha-Muharremi). The place of imaging guided PBM therapy was discussed (Prof. Adam Mester) as a method for optimising PBM dosing and distribution which is important for standardising treatment protocols.

Reproductive Health

The session of PBM in Reproductive Health featured lectures and case studies from practitioners working with PBM in the UK, Canada, France and China. **Prof. Yao Min** shared research from the Shanghai Jiao Tong University, School of Medicine, in the treatment of Intrauterine Adhesions (IUA), which can be associated with pregnancy-related complications such as difficulty in conceiving, recurrent miscarriages, abnormal implantation of the placenta and abnormal bleeding. Research demonstrated that PBM at 632 nm promoted the restoration of endometrial morphology and function suggesting a promising therapy for IUA. **Dr Lorne Brown** from the Acubalance Wellness Centre in Vancouver, Canada gave a brief history of PBM for fertility and reproductive health, and an overview of the mechanisms underlying PBM's potential for improving reproductive outcomes. He covered PBM's ability to modulate cellular activity and influence hormonal balance, inflammation, blood flow and the gut microbiome, and discussed the future of PBM in reproductive health research and how to integrate PBM into clinical practice. **Ruth Phypers** MA, from the Laser Medicine PBM clinic in London, UK shared 4 case studies of women who received PBM to improve fertility outcomes in the case of unexplained infertility. PBM was used to support two case studies in conjunction with IVF. Two case studies received PBM to support natural conception. All four case studies resulted in healthy live births. **Dr Michele Pellitier-Aouizerate** from the European LED Academy in Toulon, France shared a case study of a 79-year-old female patient with epidermoid carcinoma of the anal margin. PBM was applied as supportive care after surgical excision and further radiotherapy treatments. PBM proved successful in pain improvement and the gradual improvement of wounds and mobility, and in the prevention of collateral damages and complications of oncologic therapies.

PBM Mechanisms-Advanced Research

Prof. Shimon Rochkind who is instrumental in PBM especially in neuroscience. Hence, he shared 30 years of his Personal Experience. **Dr. Insoo Jang** shared a review on the effects of PBM on hypertension in experimental study. He concluded that this review suggests that there is a limited possibility for the blood pressure-lowering effect of PBM. However, the limitations of experimental studies are remained, so more scientific experimental studies and additional clinical studies should be warranted. **Dr. Lilach Gavish** provided an overview of the preclinical and clinical studies in which PBM was tested for relevance to cardiovascular diseases, including from her team laboratory, and discussed the underlying cellular and physiological mechanisms. Also, novel therapeutic methods of PBM application for cardiovascular pathologies was discussed. **Dr. Lew Lim** shared his experience in traumatic brain injury recovery With PBM from pathophysiological, clinical evidence and potential perspectives. Also, Dr. Lim delivered another talk on emerging new paradigms provide guideposts to a compelling future in Brain PBM. **Dr. Diane Meneguzzo** shared her experience and her pilot study of Multimodal PBM: transcranial, blood and abdominal in children with autism spectrum disorder. **Dr. Jaimie Hoh Kam's** talk was on differential effect of PBM on biophoton activity in cultured brain cells. Dr. Gerald Ross's talk was on PBM-What reaches the target tissue.

Technology and PBM Delivery Devices

Prof. Juanita Anders who is instrumental in the field of PBM focused in her talk on elucidating methodologies for obtaining spectral and irradiance measurements from three categories of PBM devices— panel-based, wearable technology, and full-body light beds. **Prof. Celber Ferraresi** shared his experience in optimising 808 nm PBM therapy by optical clearing agent (OCA) with chemical penetration enhancers (CPES). His findings suggest that application of OCA-CPE before PBM therapy with infrared light can discreetly improve light penetration inferred by backscattered light, possibility optimizing physiotherapy treatment in all skin phenotypes. **Prof. Steven Parker** shared his 5-year systematic review highlighting the effects of operating parameters and application technique on outcome of oral PBM therapy. A lack of significance is suggested to be due to a lack of operational detail relating to laser operating parameters, together with variation in a consistent clinical technique. As such, the outcome of this extensive study may expose a continued lack of accepted protocols when applying laser PBM. Adoption of consistent parameter recording and possible inclusion of laser data within ethical approval applications, may help to address the shortcomings in the objective benefits of laser PBM. **Prof. Mark Cronshaw** shared his pilot study of LED home used PBM devices

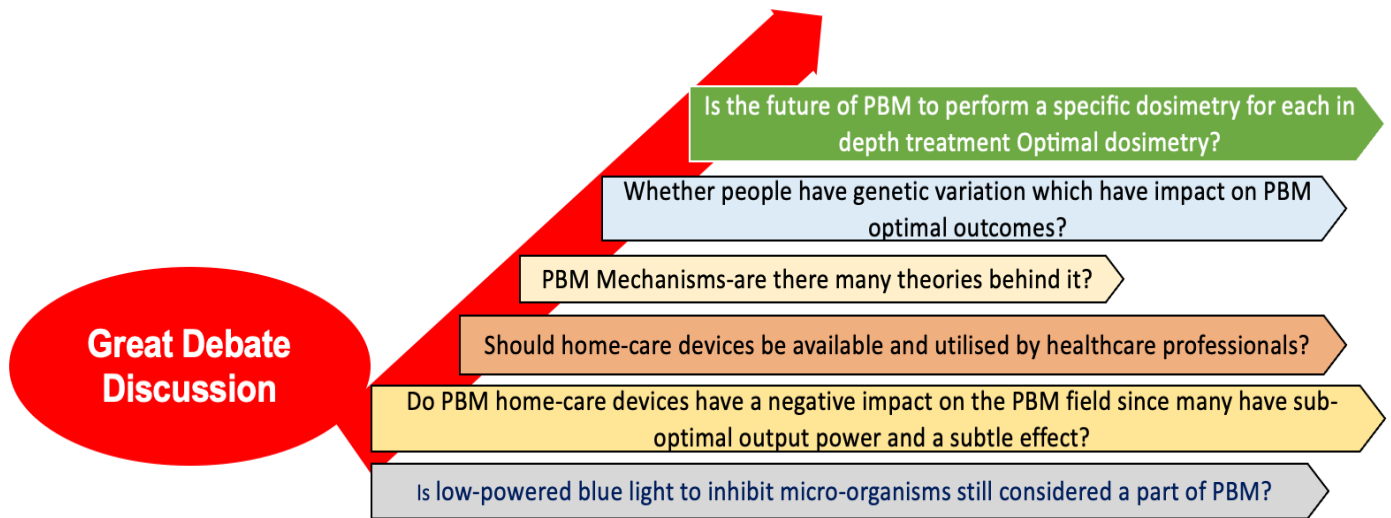
in terms of design, function and potential. He concluded that the concept of home PBM therapy is interesting, however the devices assessed require added design features and a mature appreciation of dosimetry parameters. **Mr. Emmanuel Gerelli** shared his experience in using Monte Carlo simulation of the light propagation in the skin during PBM based on the use of ATP38. His findings illustrated that strong wavelength dependence of the spatial distribution of the fluence rate in different layers of the skin. These results also illustrate the impact of the illumination geometry, particularly the ATP38®-skin surface distance, on the fluence rate within the skin.

PBM2024 GREAT DEBATE

One of the PBM2024 conference highlights was the “Great Debate” themed “Pathways to PBM Mainstreams in Healthcare”. led by Prof. René-Jean Bensadoun and Expert Panel (Prof. Praveen Arany, Prof. Nicolette Houreld, Prof. Michael Hamblin, Prof. Juanita Andres, Prof. Chukuka Enwemeka) and moderated by Prof. Reem Hanna focused on the “Pathways for PBM Mainstreams in Healthcare”.



The questions addressing the Great Debate Theme- “PBM Pathway to Mainstreams in Healthcare “ are listed In the figure below



A productive interaction and a fruitful discussion on the issues affecting pathways for PBM mainstreams in healthcare, potential opportunities and future perspectives in paving the roadmap and moving PBM mainstreams forward across all disciplines. The feedback we received during and since the conference has been very positive. All the comments and suggestions during the session were noted.





In the last 5 years, PBM has moved towards the mainstream in various clinical applications with strong evidence-based science and practice:

- Oral Mucositis
- Musculoskeletal
- Wound healing
- Neuropathic Pain
- Fibromyalgia
- Age-related macular degeneration.
- Cognitive and emotional function.

PBM2024 AWARD AND WALT STUDENT AWARD

PBM2024 Conference was a significant milestone, provided an excellent opportunity for young investigators, students, and innovative senior researchers to share their impressive basic sciences and clinical studies in all PBM spectrum. We introduced this year at the conference a SHARK-TANK Competition to win USA\$ 2000 cash to support their proposed research project. Also, we had Awards for the following categories whereby the first author received £100 cash: WALT Student Awards; Young Investigator- Clinical and Basic Sciences; Flash Poster Oral Presentation; Innovative PBM Research.

WALT Scientific Director and entire Executive Board are very much encouraging scholars with innovative research, young-investigators and students to share their research works, and we shall continue to support their participation in WALT future conferences. Just a small note to say that PBM2024 Awards Criteria for the categories listed below were based on robust and detailed scoring system. Two independent PBM2024 Award Committee evaluated the abstracts. PBM2024 chair was not involved in the nomination process. However, if there was any inconsistency or disagreement, a third member of the committee was involved to resolve the matter. We would like to congratulate all the awardees on their great achievements. I would like to share with you some of the awardees' photos and the categories of their winning abstracts are listed below:

Innovative PBM Research

1. UNCOVERING THE OPTIMAL WAVELENGTH FOR TRANSCRANIAL PHOTOBIMODULATION AFTER MILD TRAUMATIC BRIAN INJURY. **Andrew Stevens**, Mohammed Hadis, William Palin, David Davies, Zubair Ahmed, University of Birmingham, UK
2. PHOTOBIMODULATION IMPROVES PERFORMANCE ON A MOTOR TASK IN HEALTHY ADULTS: THE EFFECT IS GREATER ON NON-MUSICIANS. **Marjorie Dole**, John Mitrofanis, Université Grenoble, France.



Dr. Andrew Stevens, UK



Marjorie Dole, France

Young Investigator- Basic Sciences

1. THE OPTIMAL WAVELENGTH AND ENERGY DENSITY OF LIGHT EMITTING DIODE (LED) INFLAMMATION AND REGENERATION IN OSTEOARTHRITIS-ASSOCIATED CELLS. **Tianxiang Fan**, Peng Xia, Ye Li, Siu Ngor Fu. Hong Kong Polytechnic University, China.
2. *IN VIVO* ELECTROPHYSIOLOGICAL STUDY OF THE ANALGESIC EFFECTS OF PHOTOBIMODULATION IN RATS. **Daisuke Uta**, Naoya Ishibashi, Shinichi Tao, Masahito Sawahata, Toshiaki Kume. University of Toyama, Japan
3. PBM EFFECTIVENESS ON BIOFILM OF CANDIDA *SPP.* AND STREPTOCOCCUS MUTANS- AN *IN VITRO* STUDY. **Zuzanna Grzech-Leśniak**, Jagoda Szwach, Krzysztof Migas, Jakub Pyrkoaz, Maciej Szwajkowski, Magdalena Pajączkowska, Joanna Nowicka, Jack Matys, Kinga Grzech-Leśniak. Wrocław Medical University (POLAND).



Dr. Daisuke Uta, Japan



Miss Zuzanna Grzech-Leśniak, Poland



Dr. Tianxiang Fan, China

Young Investigator- Clinical Sciences

1. PHOTOBIMODULATION THERAPY IN THE PREVENTION AND MANAGEMENT OF RADIOTHERAPY-INDUCED VAGINAL TOXICITY. **Marithé Claes**, Jolien Robijns, Jeroen Mebis. Hasselt University, Belgium.
2. Effect of photobiomodulation therapy on the management of dental trauma in anterior permanent teeth: randomized, double-blind, controlled clinical trial. **Flávia Monari Belmonte**, Luciane Hiramatsu Azevedo, Pedro Cardoso Soarea, Celso Luiz Caldeira, Patricia Moreira de Freitas USP, São Paulo, Brazil.



Dr. Flávia Monari Belmonte, Brazil



Dr. Marithé Claes, Belgium

Flash Poster Oral Presentation

1. EFFECTIVENESS OF PHOTOBIMODULATION (PBM) FOR THE TREATMENT OF IRRITABILITY ASSOCIATED WITH AUTISM SPECTRUM DISORDER: CASE REPORT. Authors: **Cintia Leite**, Patricia Rodrigues LFLP, São Paulo, Brazil
2. THE USE OF PHOTOBIMODULATION THERAPY TO REDUCE SWELLING, PAIN AND TRISMUS AFTER DENTAL SURGERY: A CASE SERIES. Authors: **Nahid Derikvand**, Seyed Amir Hossein Ghasemi, Seyedeh Sara Ghasemi, Reza Hashemi. Islamic Azad University, Iran.
3. THERAPEUTIC EFFICACY OF PHOTOBIMODULATION IN MANAGING CHRONIC AND RELAPSING BONE PAIN IN A VARIANT CAMURATI-ENGELMANN DYSPLASIA: A CASE STUDY. Authors: **Kate Perkins**, Carol Pollock, David Sillence. Cancer Rehabilitation, Lymphatic Solution Clinic, Australia



Cintia Leite, Brazil



Dr. Nahid Derikvand, Iran



Dr. Kate Perkins, Australia

Shark-Tank Competition

PHOTOBIO-MODULATION TREATMENT OF INHERITED RETINAL DISEASES. **JANIS ELLES**. College of Health Professions and Sciences University of Wisconsin-Milwaukee, USA.

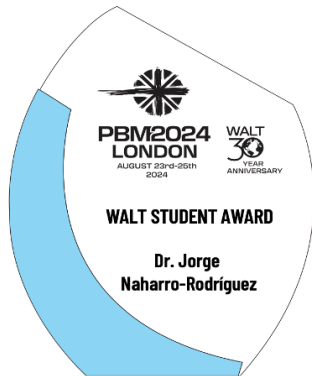


WALT Student Award

Prof. René-Jean Bensadoun and entire Executive Board were generous to support Students winners by awarding them WALT STUDENT AWARD with £100 cash to the first author.

- 1068 nm PBM-T FOR THE TREATMENT OF NEUROLOGICAL COMPLICATIONS OF COVID-19: AN *IN VITRO* STUDY. Authors: **Lydia Kitchen**, Paul Chazot, University of Durham, UK
- MATRIX MECHANICS DICTATE ODONTOBLAST RESPONSIVENESS TO PHOTOBIO-MODULATION TREATMENTS. **Mahmud Amin**, Ridham Varsani, Victoria Oliveira, Nimisha Rawat, Praveen Arany. Buffalo University, USA.
- SYNERGISTIC EFFECT OF BLUE LIGHT AND TERBINAFINE ON THE PRODUCTION OF REACTIVE OXYGEN SPECIES: A POTENTIAL TREATMENT FOR RESISTANT CUTANEOUS MYCOSES. **Luis Alfonso Pérez-González**, Maria Luisa Hernandez-Bule, Maria Antonia Martinez-Pascual, Elena Toledano-Macias, Jorge Naharro-Rodriguez, Emilio García-Mouronte, Montserrat Fernandez-Guarino. Instituto Ramón y Cajal de Investigación Sanitaria, Spain.
- A NOVEL THERAPEUTIC PBM APPROACH With FLATTOP BEAM PROFILE IN PAEDIATRIC RECURRENT APHTHOUS STOMATITIS. A CASE SERIES WITH 3-MONTH FOLLOW-UP. Reem Hanna, **Ioana Cristina Miron**, Stefano Benedicenti, University of Genoa, Italy
- OPTIMIZATION OF RED TO NEAR-INFRARED STIMULATION BY LIGHT-EMITTING DIODES To INCREASE CELLULAR METABOLISM. **Sofia Oliveira**, Jorge Padrão, Betina B. Hinckel, Óscar Carvalho, Ana Leal. CMEMS–UMinho, University of Minho, Guimarães, Portugal.
- NEAR-INFRARED LOW POWER PHOTOBIO-MODULATION THERAPY FOR BURNING MOUTH SYNDROME; A RANDOMIZED DOUBLE-BLIND CONTROLLED TRIAL. **Bruno Marotta**, Norberto Sugaya, Celso Lemos, Reem Hanna, Camila Gallo. University of São Paulo, Brazil.
- EFFICACY OF ALA HOTODYNAMIC THERAPY WITH HALF-VERSUS FULL-LIGHT DOSE IN LARGE SEVERE FIELD CANCERIZATION. **Jorge Naharro-Rodríguez**, Emilio Garcia-Mouronte, Luis Alfonso Pérez-González, María González-Ramos, Francisco Javier Pérez-Bootello, Montserrat Fernández-Guarino. Ramon y Cajal University Hospital, Spain.
- NOVEL IMPLEMENTATION OF PHOTOBIO-MODULATION THERAPY DEREASES ORAL MUCOSITIS SEVERITY IN PEDIATRIC STEM CELL TRANSPLANT (SCT) PATIENTS. **Sharon Staton**, Kathleen Magee, Jenell Robins, Corina Coffman, Khoi Pham. Texas Children’s Hospital

9. THE EFFECT OF PULSED BLUE LIGHT ON FIBROBLASTS AND LUNG CELLS. **Xavier Jimenez**, Lauren Milam, Deja Graves, Chukuka S. Enwemeka, Violet V. Bumah. University of Tennessee at Martin.
10. THE EFFECTS OF PULSED BLUE LIGHT ON COMMENSAL MICROFLORA. **Lauren Milam**, Xavier Jimenez, Justin Stroup, Chukuka S. Enwemeka, Violet V. Bumah. University of Tennessee at Martin. USA



Dr. Jorge Naharro-Rodríguez, Spain



Dr. Xavier Jimenez, USA



Dr. Sofia Oliveria, Spain



Dr. Lydia Kitchen, UK
Plaque was received by Prof. Chazot



Dr. Ioana Cristina Miron, Romania



Dr. Bruno Marotta, Brazil



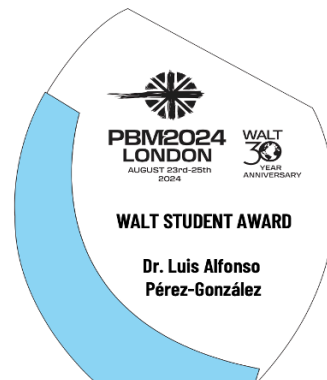
Dr. Lauren Milam, USA



Dr. Mahmud Amin, USA



Ms. Sharon Staton; USA



**Dr. Luis Pérez-González,
Spain**

PBM2024 EXTRAVAGANZA GALA DINNER

Thank you for attending PBM2024 gala dinner party. It was an opportunity to celebrate WALT 30th Anniversary together. It was great and memorable event.

Prof. Reem Hanna was the host who asked the guests to raise their glasses to celebrate WALT 30th Anniversary and wish the association all the very best in their mission for more success.

Prof. René-Jean Bensadoun greeted and welcomed all the guests to PBM2024 Gala Dinner and thanked them for their participation to PBM2024. He also thanked Prof. Reem Hanna, PBM2024 Chair, for the tremendous efforts and her leadership as a Chairperson of PBM2024 was world class. Also, thanked PBM Events for excellent conference organisation.



MEMORABLE EVENTS FEATUREED AT GALA DINNER

WALT Presidency Hand-Over

Prof. René-Jean Bensadoun's legacy serving the WALT Presidency from 2021-2024 was phenomenal. Through his robust and rigor research, PBM in the management of oral mucositis-induced by oncology therapies reached to the strong evidence-based science and practice of the PBM mainstream. His speech was very moving to hand-over the WALT Presidency torch to Prof. Nicolette Houreld, WALT current president.

Prof. Houreld's speech in her mission to serve WALT and taking the organisation and PBM to the next level of achievement was profound. The entire WALT Executive wishes Prof. Houreld all the very best in her presidency journey.



WALT PRESIDENCY HANDOVER



PROF. RENÉ-JEAN BENSADOUN, FRANCE
(2020-2024)



PROF. NICOLETTE HOURELD, SOUTH AFRICA
(2024-2026)



WALT Presidential Trophy

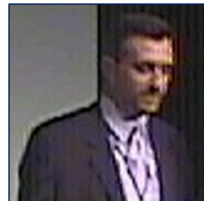
Thank you for celebrating with us WALT 30th Anniversary at extravagant Gala Dinner Party at Plaza Westminster Hotel on Saturday night, 24th August. Keeping with the growing recognition in the field of PBM, we honoured and acknowledged the leading contributors in WALT establishment with WALT PRESIDENTIAL TROPHY”



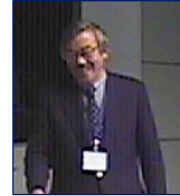
Prof. Shimon Rockind, Israel
(1996-1998)



Prof. Chukuka Enwemeka, USA
(1998-2000)



Prof. Nic Nicolopoulos, Greece
(2000-2002)



Prof. Kazuo Hanaoka, Japan
(2002-2004)



Prof. Aldo Brugnera Jr., Brazil
(2004-2006)



Prof. Farouk Al-Watban, Saudi
Arabia (2006-2008)



Prof. Jan Bjordal, Norway
(2008-2010)



Prof. Heid Abrahamse, South Africa
(2010-2012)



Prof. Liisa Laakso, Australia
(2012-2014)



Prof. Rodrigo Lopes Martins, Brazil
(2014-2016)



Prof. Jan Bjordal, Norway
(2016-2018)



Prof. Praveen Arany, USA
(2018-2020)



Prof. René-Jean Bensadoun, France
(2020-2024)



Prof. Nicolette Houreld, South Africa
(2024-2026)

2024 WALT Awards

2024 WALT Award was based on peers' nomination and was announced at the Gala Dinner Party. The awardees and their categories are listed below. I personally would like to congratulate them on their great achievements. Very well-deserved.

2024 WALT Award for Lifetime Achievement: **Prof. Juanita Anders**

2024 WALT PBM Leadership Award: **Prof. Michael Hamblin**

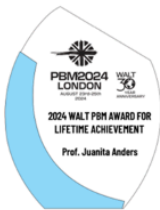
2024 Senior Investigator Award for Excellence in PBM Basic Sciences: **Prof. Praveen Arany**

2024 Senior Investigator Award for Excellence in PBM Clinical Sciences: **Prof. Reza Fekrazad**

2024 Mid-Career Award for Excellence in PBM Basic Sciences: **Prof. Cleber Ferraresi**

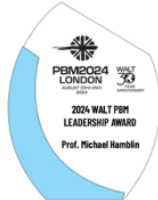
2024 Mid-Career Award for Excellence in PBM Clinical Sciences: **Prof. Reem Hanna**

WALT PBM AWARD FOR LIFETIME ACHIEVEMENT



Prof. Juanita Anders

WALT PBM AWARD LEADERSHIP AWARD



Prof. Michael Hamblin

SENIOR INVESTIGATOR AWARD FOR EXCELLENCE IN PBM BASIC SCIENCES



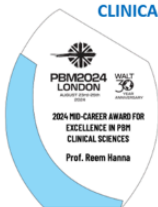
Prof. Praveen Arany

SENIOR INVESTIGATOR AWARD FOR EXCELLENCE IN PBM CLINICAL SCIENCES



Prof. Reza Fekrazad

MID-CAREER AWARD FOR EXCELLENCE IN PBM CLINICAL SCIENCES



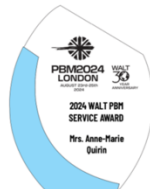
Prof. Reem Hanna

MID-CAREER AWARD FOR EXCELLENCE IN PBM BASIC SCIENCES



Prof. Cleber Ferraresi

WALT PBM SERVICE AWARD



Mrs. Anne-Marie Quirin

PBM2024 CLOSING CEREMONY

It was my great pleasure to make a few closing remarks, expressing my gratitude to you who made PBM2024 successful. We achieved an important milestone with all the innovative inspirational research in PBM at PBM2024 and we shall continue in mission to achieve more.

I also thanked all the sponsors and expressed my special thanks to PBM Events who I worked very closely with and have done a remarkable in organising such a successful event.

Needless to say, I am very grateful to Prof. René-Jean Bensadoun and Prof. Praveen for their tremendous support throughout the conference preparation and beyond. Also, I would like to extend my thanks to the rest of the WALT Executive Board.



Next WALT conference will be in 2026. We will announce where it will take place very soon. In the meantime, we are happy to announce WALT joined conference with Korean Medical Association for Integrative Laser Therapy, which will be held in Seoul, South Korea, in 2025.

Once again thank you for your participation and contribution to successful PBM2024

With best wishes,



Prof. Reem Hanna BDS, PhD, MSc, PG DipSed, PG DipHE, PG Cert.AP, FHEA, FIADFE
Chair-PBM2024 Conference
WALT Scientific Director.