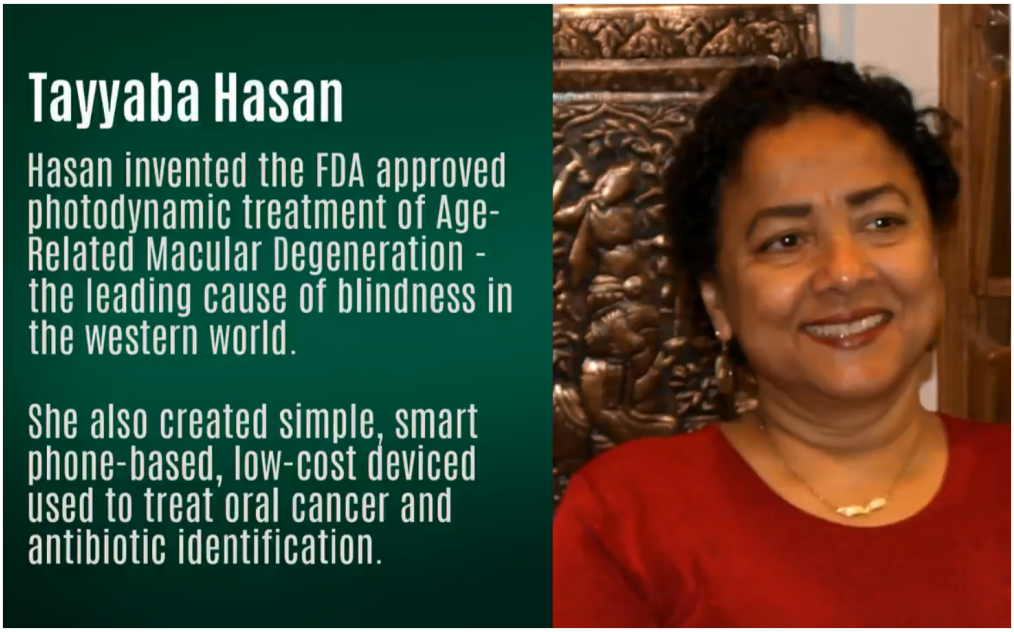


International Photodynamic Association (IPA) Newsletter:

Get Ready for the 2019 IPA Congress

06/21/19

THANK YOU, PRESIDENT HASAN! FOR YOUR STRONG LEADERSHIP AND YOUR CONTINUED COMMITMENT TO THE IPA.

President's note

Dear IPA Friends:

In this last letter from me as the International Photodynamic Association (IPA) President, the major news is that we, (my team, the organizing committee and I) in Boston eagerly await the arrival of many of you at the 17th World Congress of the IPA. I thought this might be a good point in time to summarize for you some of the highlights of the last few years.

Some years ago, we restructured the IPA to elect a President who could concentrate on building the organization and working toward getting recognition and a high profile for our Association. The Treasurer and the Secretary appointed or elected positions remain as before to work with the President toward the goal of developing the IPA. The 17th Congress in Boston, with high-profile Plenary speakers from academia and industry in diverse fields and a large number of registered attendees of about 400, will help toward increasing recognition of the IPA and PDT. The restructuring involved the separation of the Conference Chair from the President, so as to allow the President to focus on a broader vision of the IPA and was motivated by a desire to make the Association more than one that only hosts a Congress every two years. That framework has worked well for the past 30 years, but it is time to change. This separation of duties frees up both the Congress Chair and the President to pursue IPA goals with more of a focus on our new priorities. *These priorities must come from all of you.*

Moving forward, the Conference Chair will be different from the President, although during the transition as you must note, I have carried out both these duties. It has been hard work, but I feel we are ready to move forward with new leadership and enhanced membership. We are now an entity incorporated in Massachusetts with a tax identification number. We have a robust system of elections for the Board of Directors, the body that leads and manages the IPA, which will be captained by an active President. *Please suggest constructive changes to the process.* There is still room for improvement. Once the Board of Directors is in place, they elect a President from amongst them. As you see in this Newsletter, we have a new Board and a *new President, Luis Arnaut, PhD*. It was exciting to see the large number nominees for the 12 seats on the Board. We also have a formal structured Awards Committee with a Chair and a co-Chair and an increasing number of recognitions. During our Gala dinner, we will announce the many awards. In addition, this year we will have 22 Poster awards at 3 levels that will be associated with nominal monetary compensation.

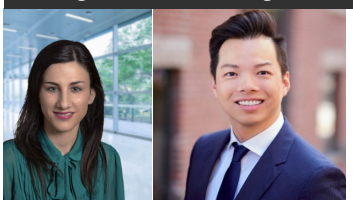
This quarterly Newsletter is another one of the changes to the Association's activity in the last couple of years. The idea here is to continue communication amongst the community and keep each other apprised of our successes and transitions. We thank our *Editors, Huang Chiao (Joe) Huang* and *Pilar Acedo* for the excellent job they have done in gathering information and crafting the Newsletter. I particularly like the interviews with senior members that they publish. Please cooperate with them by providing them information on your awards, grants, exciting papers etc. I hope that Joe will continue as one of our Editors and with new duties as a Board member we will replace Pilar with a new co-Editor. Our Social media activity has also increased substantially, thanks to our *General Secretary Vandana Grover* who also adds aesthetics to the Newsletter, hence the beautiful product that you see. Our *Treasurer Carolyn Cross* has helped ease this transition period. Both of us have had to release our own resources to help move things along so you will have a robust infrastructure in the future. I thank *Angelika Vance, Erin Brinkman and Mallika Priya* for assistance. Finally, it has been a lot of work increasing the membership and although it is approximately 10 times what it was 2 years ago, we need to continue to work at it and bring more people in our fold. This is an appeal to all of you to work toward getting participation in the IPA. There is much more that needs to be done. As one example, an education page on our website is needed. I hope a group amongst you will take leadership for it and perhaps form an education committee.

I end this letter with a note of gratitude to all of you for allowing me to lead this organization that represents PDT, a topic we all love so much. It has been a pleasure and an honor to have served you all the past few years. I have done my best to enhance the IPA although have not achieved all I wanted to. I am delighted to see the diversity in expertise and age of the new membership and Directors and expect them, the new President and you all to contribute toward moving the IPA/PDT to higher levels of recognition.

Good Luck to us all.
Tayyaba

Featured in This Issue

Edited by
Pilar Acedo &
Huang Chiao (Joe) Huang



Please join us in congratulating IPA President, Professor Tayyaba Hasan, inducted in to the 2018 class of National Academy of Inventors Fellows!

Dr. Tayyaba Hasan along with 147 academic inventors was honored with esteemed distinction at the National Academy of Inventors (NAI) Annual Meeting, April 11, 2019 at the Space Center Houston in Houston, Texas. She is among several other women in the field of science and technology to be recognized by the NAI.

Meet a Scientist: Prof. Mark Emberton

Edited by [Pilar Acedo, Andrés García and Huang Chiao (Joe) Huang]

PA: Dr. Pilar Acedo

ME: Prof. Mark Emberton

PA: Dear Prof. Emberton, thank you for your contribution to this IPA Newsletter issue and for your time. I read one of your last publications on the use of vascular-targeted PDT for localized prostate cancer. I would like to know a bit more about the possibilities and challenges of PDT for the treatment of prostate cancer. Just to start with, I would like to know how did you get involved with PDT?

ME: I was a student of Prof. Stephen Bown at the National Medical Laser Centre in London (University College London, UCL, Medical School). In the late 90's we started doing some work on using PDT. Obviously, with a different type of photosensitizer that we use today, and we focused on PDT in radio-recurrent prostate cancer. This was work also done with Prof. Caroline Moore (UCL).

PA: Interesting but, since your first contact with PDT, were you involved in prostate cancer or did you try at the beginning when you were still doing medical school to treat another type of cancers?

ME: Yes, I was a consultant urologist with a main interested in prostate cancer, that was the case, and because of the National Medical Laser Centre and because of Prof. Bown, we linked PDT to prostate. I think Prof. Bown's team was one of the first groups to do explore that field.

PA: Yes, I believe Prof. Bown is recognized worldwide for his solid contribution to the PDF field, not only for the treatment of prostate cancer but also for the treatment of pancreatic cancer.

ME: Yeah. I think Prof. Stephen Pereira (UCL) was doing some work with Prof. Bown back then and they have published several articles together.

PA: So as a clinician using PDT, because I am a basic scientist and I always find amazing the work clinicians do and anything related to translational medicine, I was wondering what in your view are the key challenges for the translation of PDT into the clinical practice and Why some clinicians are not really positive about the use of light-based therapies?

ME: It is difficult to know. I mean, I think the trouble PDT has had is that it has been around quite a long time. You have heard this from many people before, but it has not found many absolute indications yet. That is the cynicism I think that comes from it.

Now, the trial we did is a pretty solid trial. To date, it is the most important trial in focal therapy for prostate cancer. But it is still struggling to change practice, I think. But that is not because of cynicism, which is because of the cost of treatment and actually getting the treatment accepted by the various authorities. At the moment, NICE did not approve PDT or vPDT. They thought it was not cost-effective.

PA: I understand. Do you think it could also be related to the fact that some clinicians prefer to continue using standard techniques or treatments that more or less work for patients, instead of trying to develop novel treatment modalities? In the case of UCL, it is at the forefront of PDT clinical trials, which is simply amazing. Why do you think UCL is at the forefront of PDT research and it is not the case for other well-known clinical centres?

ME: I think we are at the forefront because of the people who were working at the National Medical Laser Centre. Prof. Bown's pioneering work on the early days was key to further support the development of PDT at UCL. Moreover, all the needed technology was available and that encouraged us to do some work. One of my colleagues is doing some work with a Canadian company at present, and they came to us because we published in this area. So, I think the records made a big difference.

PA: Let's move now to talk about your paper. I read that the described vascular-targeted PDT clinical protocol is now approved in Mexico. Is that right?

ME: It kind of always was, actually. It was approved long before our phase III study was published. I think you can have it, I do not really know, but it is approved in Mexico. I think it was also approved for a while with a temporary license in Israel.

PA: I read that this phase III trial is completed now in some countries like Spain or Italy, but it is still ongoing in the UK. Could you tell us a little bit more about the current situation in Great Britain? Are you still recruiting patients for those studies?

ME: There is a kind of phase IV long-term follow-up study in process. The company has also funded a comparative of VTP versus radical prostatectomy.

PA: How long would this study run for?

ME: The study will be a 5-year study. Prof. Hamdy is leading it from Oxford.

PA: Coming back to your phase III study and the results that you obtained, what do you think are the main benefits that PDT has shown in your studies? And the main benefits that PDT can bring into the table compared to other therapies?

ME: I think many. It is very safe, our study showed that. It has a very short learning time, so people can master the technology quite quickly. Because the biology between the light and the photosensitizer has the effect, all you have to do is to get the needles into the right place and administer the drug. So, it is simple. It is also highly versatile, it can be used to treat big lesions and small lesions.

PA: But I guess the studies that you have done could only include patients that had local disease and early-stage prostate cancer. Do you think in the future this therapy could be combined with other procedures or do you think it is going to be used only for early-stage disease?

ME: Well, I think it is currently been used in early-stage disease and I think it is doing very well there. Obviously, combining it with other targeted-therapies etc., so turning it into something that could treat metastatic disease, is a very interesting prospect, but we are a long way from that. So, the main short-term application will be

in early disease because of the low side effect profile. It is very well tolerated.

PA: Do you think it is key to establish a collaboration with industry or with a biotech company to sponsor this type of studies? Because you mentioned before that one of the main problems with PDT is that treatments can be expensive. How could we encourage biotech companies to get enrolled in PDT clinical trials?

ME: In our case, the company Steba biotech has spent a lot of money developing this. You know, a lot of money. Unusually, they had quite a bit budget to run a trial and that was one of the reasons why the trial was so successful. However, I think smaller companies could struggle to run big trials such as this. Now, obviously, even Steba, which is a private company, cannot run studies in pancreas, lung, and prostate all at once. It has to get a label in one area and then get some revenue before it goes into another area. So, I think, clinicians can get involved with companies to help them prioritize but ultimately, they will prioritize based on the pathway to market. So, they will want areas in which they could get a quick license. Pancreas is quite a good place because there are no effective treatments, so it is quite easy to get a quick license, but it is also quite difficult to show a benefit.

PA: It is risky, I guess.

ME: It is risky but quick. With prostate there is plenty of opportunities but studies take a long time and they are very expensive.

PA: Looking into the future, what do you think is the future direction of vascular-targeted PDT in prostate cancer? And also, do you see this therapy being used for treating other types of tumors?

ME: I think if they can get the pricing right, it will be a fantastic treatment that will work very well. However, this is not an easy task. I guess, interventions should be cost-effective.

PA: Thank you very much for your time. Only one last question. Could you give young photobiologists any advice to encourage them to continue doing research in this field?

ME: It is not easy and a lot about science is fashion. But I think it is a hugely important area and everything has its time. Immunotherapy in cancer was a graveyard and many good scientists left it because they were not making any progress. Suddenly, immunotherapy started to work, but that is after a hundred years of trying. And now immunotherapy is the hottest area in cancer. The same may prove for light-based therapies so I think, it is impossible to predict things. I would encourage people to do good science and through good science, I think we can certainly develop this field. I think it has a real contribution to make.

PA: Inspiring words, thanks. I think also translational research is key. Thank you very much once again for your contribution to this newsletter.

ME: Thank you!

FOR MORE INFORMATION

Representative Articles:

1. doi: 10.1016/j.euf.2018.04.003.

2. doi: 10.1016/j.juro.2018.05.121.

3. doi: 10.1016/S1470-2045(16)30661-1.

BIO: Prof. Mark Emberton
https://iris.ucl.ac.uk/iris/browse/profile?upi=MEMBE52

PHOTOS: Obtained from:

1. Institute of sports, exercise & health
http://iseh.co.uk/consultantdetails/board-members/74/mark-emberton

2. UCL Cancer Domain
https://www.ucl.ac.uk/research/domains/cancer/case-studies/mark-emberton

3. Youtube
https://www.youtube.com/watch?v=fhw7mv-09aa

Updates on Photodynamic Therapy in Dermatology: From Prof. Xiuli Wang's Group

by [Lei Shi, Peiru Wang]
Edited by [Pilar Acedo and Huang Chiao (Joe) Huang]

About Prof. Xiuli Wang

Prof. Xiuli Wang is the chief physician of Shanghai Skin Disease Hospital, Chief Expert for Photodynamic Therapy Research Center of the Chinese Medical Association, Director of Institute of Photomedicine of Tongji University School of Medicine, the Director-designate Member of Dermatology rehabilitation Branch of Chinese Association of Rehabilitation Medicine, the Standing Committee Member of Laser Medical Branch of Chinese Medical Association, and the Chairman of Laser Medical Branch of Shanghai Medical Association. She is also an Awards Committee Member of International Photodynamic Association (IPA).

Prof. Wang received her M.D. and Ph.D. degrees in Medicine and Dermatology from the University of Munich in Germany in 2004 and Fudan University in China in 2005, respectively. Prof. Xiuli Wang works in photodynamic therapy (PDT) for skin diseases for more than 20 years. She focuses on the expansion of indications, optimization of parameters, exploration of mechanisms, and the generalization of the PDT technology into the dermatology in China. By now, she had published more than 170 papers including 70 peer-reviewed English articles. As a principal investigator, Prof. Wang has held 22 grants including 4 Natural Science Foundation programs (NSFC). Besides, she has got 7 Provincial Science and Technology Rewards and 6 national patents. She is the editor member of Photodiagnosis and Photodynamic Therapy (UK), Photonics and Lasers in Medicine (Germany), Journal pigmentary disorders (US) and Chinese Journal of Dermatology.

In 2000, Prof. Xiuli Wang led the first team in the world that innovatively applied ALA-PDT to urethral condyloma acuminatum induced by HPV. They published their novel results on British Journal of Dermatology in 2004 and earned wide recognition around the world. Their work provided new indications to ALA-PDT, providing a promising future for the wide application of ALA-PDT. Based on the above previous fundamental works, they further developed ALA as a new therapeutic modality approved by The China Food and Drug Administration (CFDA) in 2007. Nowadays, ALA-PDT is the first line treatment for condyloma acuminatum in China.

Prof. Xiuli Wang's group was also the first team who introduced traditional Chinese plum blossom needle to ALA-PDT to facilitate the absorption of topical ALA in the treatment of skin cancers. Compare to the microneedles or fractional lasers, the plum blossom needles are easier to operate, and more cost-effective. Benefit by the usage of plum blossom needles, the effects of ALA-PDT for actinic keratosis, basal cell carcinoma, cutaneous squamous cell carcinoma (SCC) and nodular/cystic acne were enhanced in the clinic. In addition, they firstly found ALA-PDT-induced apoptotic cells induced by a low dosage of light and ALA were more capable in potentiating maturation of DCs than normal PDT treated or freeze/thaw treated necrotic tumor cells in vitro. Based on the above finding, they successfully developed an effective cutaneous squamous cell carcinoma PDT-DC-vaccine, which showed a stronger effect in mice than previous DC vaccine.

In recent years, the group also focused on of ALA-PDT for acne vulgaris. They were the first team to capture the fluorescence image of protoporphyrin IX (PpIX) enriched in the pilosebaceous unit after ALA incubation and prove the sebaceous gland becomes atrophy obviously after ALA-PDT. These above results indicate the pilosebaceous unit is an important target for ALA-PDT, preliminarily clarifying the mechanism of ALA-PDT for moderate to severe acne. They were also the first to establish the optimum treatment parameter for moderate to severe acne with a 5% of ALA concentration and a 1-3 h of incubation time, promoting the popularization of ALA-PDT worldwide for moderate to severe acne. Their studies were cited by "2016 Guidelines of Care for the Management of Acne Vulgaris" (J Am Acad Dermatol, United States).
Because of the continuing effort of Prof. Xiuli Wang' group, ALA-PDT is currently widely used in clinics in China for a spectrum of diseases including skin cancers, condyloma acuminatum, severe acne vulgaris, bladder cancers, and glioblastoma. Up to now, nearly 1,000 hospitals have implemented ALA-PDT, and more than 300,000 cases of patients benefited from it. In 2014, Prof. Xiuli Wang became the chief Chair of photodynamic branch of Chinese Society of Dermatology and established PDT clinical center owing 32 member-hospitals. In 2015, Prof. Xiuli Wang led the development of "Expert consensus on the clinical application of aminolevulinic acid photodynamic therapy" in China, formulating standard protocols and quality control scoring system of ALA-PDT for various skin diseases. And in the same year, she established Institute of Photomedicine affiliated Tongji University School of Medicine for the deepening of PDT researches from bench to bedside.

Resources and more information:
http://phototherapy.shskin.com/

The Institute of Photomedicine affiliated Tongji University School of Medicine

Established by Prof. Xiuli Wang in 2015, the Institute of Photomedicine affiliated Tongji University School of Medicine is the first institute for photomedicine on dermatology in China. The institute incorporates noninvasive optical diagnostic center and phototherapy center. In noninvasive optical diagnostic center, wood's lamp, fluorescence diagnosis (photodynamic diagnosis), dematoscopy, cutaneous ultrasound, confocal laser scanning microscopy, optical coherence tomography (OCT) and photoacoustic are used for the diagnosis of skin diseases. In phototherapy center photodynamic therapy, photo-thermal therapy, ultraviolet therapy, fractional lasers, intense pulsed light and other phototherapies are used to treat skin tumors, photoaging, acne, port wine stain, HPV related skin diseases, psoriasis, vitiligo, and so on.

Featured Articles:

1. Immune effects of 5-aminolevulinic acid photodynamic therapy on squamous cell carcinoma

The most interesting aspect in 5-aminolevulinic acid (ALA)-mediated photodynamic therapy (PDT) on cutaneous squamous cell carcinoma (SCC) is perhaps its potential in inducing antitumor immune responses. In their study, cutaneous SCCs were established by UVB irradiation of hairless mice and treated with multiple ALA-PDT. It was found that ALA-PDT could induce quick apoptosis, overexpression of TNFa and marked increases in DCs, CD_4+ and CD8+ T cells in tumor interstitium and subcutaneous connective tissues. ALA-PDT not only kills tumor cells directly but also rapidly recruits and activates immune cells favoring the development of antitumor adaptive immunity. It is believed that topical ALA-PDT can induce anti-tumor immune responses through dangerous signals damage-associated molecular patterns (DAMPs). Their study showed that ALA-PDT enhanced the expression of calreticulin (CRT), heat shock proteins 70 (HSP70), and high mobility group box 1 (HMGB1). These induced DAMPs played an important part in activating DCs by PDT-treated tumor cells, including phenotypic maturation (increase of surface expression of MHC-II, CD80, and CD86) and functional maturation (enhanced capability to secrete IFN-γ and IL-12). Furthermore, they developed a DC-based cancer vaccine using immunogenic apoptotic tumor cells induced by ALA-PDT. ALA-PDT-DC vaccine mediated by apoptotic cells provided protection against tumors in mice, far stronger than that of DC vaccine obtained from freeze/thaw treated tumor cells. Their findings indicate that ALA-PDT can increase DAMPs and enhance tumor immunogenicity, providing a promising strategy for inducing a systemic anticancer immune response. The clinical value of ALA PDT-induced specific antitumor immune responses in long-term control of SCCs deserves further study.

Resources and more information

1. Ji J et al. Improvement of DC vaccine with ALA-PDT induced immunogenic apoptotic cells for skin squamous cell carcinoma. Oncotarget. 2015 Jul;6(19):17135-17146.
2. Wang XJ et al. Stimulation of dendritic cells by DAMPs in ALA-PDT treated SCC tumor cells. Oncotarget. 2015 Dec; 6(42):44688-44702.
3. Ji J et al. DC vaccine generated by ALA-PDT induced immunogenic apoptotic cells for skin squamous cell carcinoma. OncoImmunology, 2016 Jun; 5(6): e1072674.
4. Bhatta AK et al. Therapeutic effect of Imiquimod enhanced ALA-PDT on cutaneous squamous cell carcinoma. Photodiagnosis Photodyn Ther. 2018 Sep;23:273-280.

2. The application of 5-aminolevulinic acid photodynamic therapy for condyloma acuminatum

Xiuli Wang group is the first team in the world innovatively applied ALA-PDT to urethral condyloma acuminatum induced by HPV. They published their results on British Journal of Dermatology in 2004, earning a lot of international recognition. Based on their works, Shanghai fudan zhangjiang bio-pharmaceutical Co., limited furtherly developed ALA as a new medicine approved by CFDA in China for the treatment of condyloma acuminatum. Because of their efforts, it became possible that ALA-PDT could be used on clinic in China for several kinds of diseases, including skin cancers, bladder cancers, glioblastoma, and severe acne.

Their further clinical researches showed that ALA-PDT produces a good result, lower recurrent rate and fewer side effects for the treatment of condyloma acuminatum. In the subsequent researches, they determined the optimal incubation time and ALA concentration for the treatment of condyloma acuminatum and explored the mechanism of ALA-PDT for condyloma acuminatum. It was found that ALA-PDT triggers both apoptosis and necrosis in human papillomavirus-infected keratinocytes and induce specific immunological effects.

In recent 10 years, they focused on the popularization of ALA-PDT for condyloma acuminatum and other HPV related diseases. Nowadays, around 200,000 cases with condyloma acuminatum was treated by ALA-PDT in China.

Resources and more information

1. Wang XL, Wang HW, Wang HS, Xu SZ, Liao KH, Hillemanns P. Topical 5- Aminolevulinic acid-photodynamic therapy for the treatment of urethral condylomata acuminata. Br J Dermatol, 2004 Oct;151(4): 880-885.
2. Wang XL, Wang HW, Huang Z, Stepp H, Baumgartner R, Dannecker C, Hillemanns P. Study of protoporphyrin IX (PpIX) pharmacokinetics after topical application of 5-aminolevulinic acid in urethral condylomata acuminate. Photochem Photobiol. 2007 Sep-Oct ; 83(5):1069-1073.
3. Wang HW, Zhang LL, Miao F, Lv T, Wang XL, Huang Z. Treatment of HPV infection-associated cervical condylomata acuminata with 5-aminolevulinic acid-mediated photodynamic therapy. Photochem Photobiol. 2012 May-Jun; 88(3): 565-569.

3. Therapeutic effect and parameter of 5-aminolevulinic acid photodynamic therapy on moderate to severe acne vulgaris

Encouragingly, ALA-PDT took faster effect and had better efficacy in the treatment of moderate to severe acne vulgaris compared with isotretinoin, a traditional gold-standard medication in our previous clinical study. And surprisingly, the severer lesion showed a more remarkable improvement by ALA-PDT. They captured the fluorescence image of protoporphyrin IX (PpIX) enriched in the pilosebaceous unit after ALA incubation and proved the sebaceous gland becomes atrophy obviously after ALA-PDT, which provided the reliable

evidence for photodynamic therapy of acne. They also explored the pharmacokinetic study of topical ALA for acne and concluded the best-suited lesion types (nodules, cysts, and pustules), optimal parameters for ALA-PDT. A new modality of ALA-PDT with 5% ALA incubated for 1-3 h proposed by them achieves a satisfying clinical effect for severe acne with reduced economic burden and less adverse reactions, compared to traditional 20% ALA incubated for 3-6 h. This new "Chinese standard treatment" of ALA-PDT for moderate and severe acne vulgaris proposed by them was completely different from the previous PDT parameters for the tumor. The relevant researches were cited by "Guidelines of care for the management of acne vulgaris" (JAAD, 2016).

Resources and more information

1. Wang XL et al. Topical ALA PDT for the treatment of severe acne vulgaris . Photodiagn Photodyn Therapy, 2010 Mar ; 7(1): 33-38.
2. Ding HL et al. Successful treatment of refractory facial acne using repeat short-cycle ALA-PDT: Case study. Photodiagnosis Photodyn Ther. 2011 Dec;8(4): 343-346.
3. Wang HW et al. Prospective study of topical 5-aminolevulinic acid photodynamic therapy for the treatment of moderate to severe acne vulgaris in chinese patients. J Cutan Med Surg. 2012 Sep-Oct;16(5): 324-333.
4. Ma L et al. Low-dose topical 5-aminolevulinic acid photodynamic therapy in the treatment of different severity of acne vulgaris. Photodiagnosis Photodyn Ther. 2013 Dec;10(4):583-590.

4. Remodeling of dermal collagen in photoaged skin using low-dose 5-aminolevulinic acid photodynamic therapy

5-Aminolevulinic acid photodynamic therapy (ALA-PDT) is known to be effective in the treatment of photoaged skin. However, the molecular mechanisms still remain elusive. Protoporphyrin IX (PpIX) fluorescence is primarily located in the epidermis while ALA-PDT affects the dermal collagen, presumably by an indirect mechanism. This study aimed to investigate the molecular communication in low-dose ALA-PDT occurring between epidermal keratinocytes and dermal fibroblasts. Western blotting and enzyme-linked immunosorbent assays were performed to evaluate collagen expression and transforming growth factor-β (TGF-β) signaling in human keratinocytes and dermal fibroblasts. The impact on fibroblast proliferation was assessed by morphology and proliferating cell nuclear antigen immunofluorescence. Skin biopsies from mice were used to analyze the histological changes in dermal collagen and PpIX distribution. When fibroblasts were co-cultured with keratinocytes treated with low-dose ALA-PDT, collagen synthesis and fibroblast proliferation were enhanced. Low-dose ALA-PDT stimulated TGF-β1 expression in keratinocytes. Fibroblasts co-cultured with low-dose ALA-PDT treated keratinocytes also showed activation of the TGF-β pathway. In vivo, PpIX fluorescence was densely distributed in photoaged mouse epidermis while collagen in the mouse dermis underwent remodeling. Their study suggests that low-dose ALA-PDT can stimulate keratinocytes to release TGF-β1, activating the TGF-β pathway in dermal fibroblasts to remodel collagen in the dermis.

Resources and more information

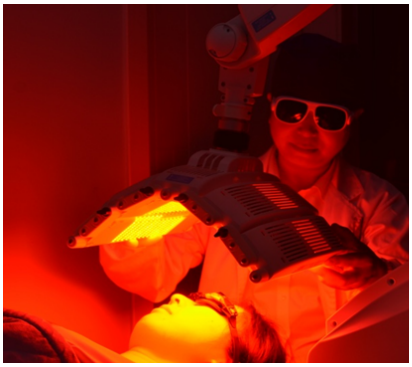
Wang P et al. Remodeling of dermal collagen in photoaged skin using low-dose 5-aminolevulinic acid photodynamic therapy occurs via the transforming growth factor-beta pathway. J Biophotonics. 2018 Jun;11(6):e201700357.

5. Biodegradable polymeric nanoparticles enhanced the effectiveness of topical PDT for squamous cell carcinoma

To improve the effectiveness of PDT for squamous cell carcinoma, Prof. Xiuli Wang group also apply themselves to the development of photosensitizers. They believe nanotechnology-based drug delivery system is a potentially effective method to optimize the properties of photosensitizers. Biodegradable polymeric nanoparticles show low toxicity, good biocompatibility, therefore making it a good candidate for the delivery of photosensitizers to increase the bioavailability and improve therapeutic outcomes of PDT. Two types of biodegradable polymeric nanoparticles, polylactic-co-glycolic acid nanoparticles (PLGA NPs) and chitosan/methoxy polyethylene glycol - polylactic acid nanoparticles (CPP NPs) were prepared by them to load the photosensitizer 5-aminolevulinic acid (ALA) and zinc pthalocyanine, respectively. The biodegradable polymeric nanoparticles were spherical with smooth surfaces and high encapsulation efficiency. ALA loaded PLGA NPs showed a particle size of 65.6 nm and an encapsulation efficiency of 65.8%. Pthalocyanine loaded CPP NPs showed a particle size of 189.7 nm and an encapsulation efficiency of 81.4%. A highly selective targeting of biodegradable polymeric nanoparticles to the tumor cells and lesions was observed in their researches. Biodegradable polymeric nanoparticles increased the production of fluorescence and reactive oxygen species by photosensitizers in the tumor lesion. And, the PDT based on these novel biodegradable polymeric nanoparticles showed a more effective result for the treatment of squamous cell carcinoma than free photosensitizers at the same concentration. In addition, these novel biodegradable polymeric nanoparticles did not show obvious toxicity in vivo.

Resources and more information

1. Shi L et al. In vitro evaluation of 5-aminolevulinic acid (ALA) loaded PLGA nanoparticles. Int J Nanomedicine, 2013 Jul; 8(1) :2669-2676
2. Wang XJ et al. Treating cutaneous squamous cell carcinoma using 5-aminolevulinic acid polylactic-co-glycolic acid nanoparticle-mediated photodynamic therapy in a mouse model. Int J Nanomedicine. 2015 Jan;10:347-355.
3. Keyal U et al. Zinc Pthalocyanine loaded chitosan/mPEG-PLA nanoparticles mediated photodynamic therapy for the treatment cutaneous squamous cell carcinoma. J Biophotonics. 2018 Jun 12:e201800114



Global Funding Workshop at the 2019 IPA Congress in Boston

by [Pilar Acedo and Girgis Obaid]
Edited by [Pilar Acedo]

The 17th meeting of the IPA is approaching, and we have organized a workshop focused on opportunities and strategies for Global Funding. The workshop will take place on Monday July 1st (Session 17) 4:30pm – 6:30 pm. We hope to see you all there!

The format of the workshop includes Introductory Talks given by **Prof. Tayyaba Hasan** (*A Mentor's Word of Advice*) and **Prof. Colin Hopper** (*Funding Strategies for Collaborative Bench-to-Bedside Research*) followed by a Q+A section. We will continue with a panel workshop where we will have four PDT experts as invited speakers: Dr. Imran Rizvi (United States), Prof. Theresa Busch (United States), Dr. Sabrina Oliveira (The Netherlands) and Dr. Masayuki Nitta (Japan). And just before closing this amazing session, we will have the opportunity to meet-and-greet the workshop panelists for some rapid one-to-one advice. Do not forget to take home a flyer with advice and contact details of funded PDT researchers from all over the world!

Keep reading and know a bit more about our workshop panelists.

Dr. Imran Rizvi

Dr. Rizvi holds a Ph.D. in Engineering Sciences from the Thayer School of Engineering at Dartmouth College, an M.S. in Tumor Biology from the Lombardi Comprehensive Cancer Center at Georgetown University, and a B.A. from Johns Hopkins University. He is a tenure-track Assistant Professor in the Joint Department of Biomedical Engineering at the University of North Carolina at Chapel Hill (UNC) and North Carolina State University (NCSU). He is also a member of the Molecular Therapeutics Program in the Lineberger Comprehensive Cancer Center at UNC, as well as a member of the Functional Tissue Engineering Program in the Comparative Medicine Institute at NCSU. His K99/R00 (NCI) develops photodynamic therapy (PDT)-based combinations against molecular pathways that are altered by fluidic stress in ovarian cancer.

He has co-authored 42 peer-reviewed publications and 5 book chapters with a focus on PDT, biomedical optics, and molecular targeting in cancer (h-index: 27, Web of Science Citation Report, April 2019). He is a Council member of the American Society for Photobiology (ASP) and Chair of the ASP Awards Committee, among others.

Prof. Theresa M Busch

Theresa M Busch, PhD is a Professor in the Department of Radiation Oncology at the University of Pennsylvania and Associate Director of the Division of Oncology Research in this department. She has more than 20 years of experience in translational research in the study of tumor microenvironment as it relates to radiation therapy, including a focus in studies of photodynamic therapy. As of 2001, her work has been continuously funded by the NIH through R21, R01 and P01 grants of which she is PI or co-PI.

Dr. Sabrina Oliveira

Sabrina Oliveira was introduced to Utrecht University through an internship at the department of Pharmaceutical Sciences (2004) during her studies at the Faculty of Pharmacy of Coimbra University (Portugal). After graduation, she obtained an individual doctoral grant from the Portuguese Foundation for Science and Technology (FCT) to return to this department to do her PhD research on Targeted Cancer Therapies (2004-2008). She then worked as a postdoc on the development of tracers based on nanobodies for optical molecular imaging, in the group of Cell Biology, Department of Biology (2008- 2010) and the Department of Pathology from the University Medical Center Utrecht (2010-2012). In 2012, she was awarded a VENI grant from the Netherlands Organisation for Research (NWO-STW), giving her the opportunity to start her own research line, which focuses on rendering photodynamic therapy more selective to cancer cells by using nanobodies. In 2016, she has received a Starting Grant from the European Research Council (ERC) to continue her line of research. In July 2016, Sabrina was appointed Assistant Professor, with a shared position between Cell Biology (Department of Biology) and the Pharmaceutics group (Department of Pharmaceutical Sciences).

Dr. Imran Rizvi

Prof. Theresa Busch

Dr. Sabrina Oliveira

Dr. Masayuki Nitta

Dr. Masayuki Nitta

After graduating from Kumamoto University School of Medicine in 1994, Dr. Nitta followed the path to become a neurosurgeon. After four years of clinical training, he advanced to graduate school (Kumamoto University School of Medicine) and studied the divisional stages of brain tumors, chromosomal instability, and the mechanism of treatment resistance. In 2003, he was a postdoctoral researcher at Harvard Medical School, Massachusetts General Hospital, Department of Neurosurgery, Dana-Farber Cancer Institute. There, he conducted cancer research focused on malignant brain tumors. In 2006, Dr. Nitta received a research grant from the American Brain Tumor Association.

After returning to Japan in 2010, he was enrolled at Tokyo Women's Medical University (Neurosurgery Department) where his team introduced PDT photodynamic therapy in 2014 as a revolutionary new treatment for malignant brain tumors, having performed the largest number of operations worldwide. He is a council member of the Japanese Society of Brain Oncology and Pathology.

News from the POLYTHEA Training Network

by [Prof Luis Arnaut, Department of Chemistry | University of Coimbra]
Edited by [Pilar Acedo and Huang Chiao (Joe) Huang]

The European Training Network POLYTHEA: "Design and photo-optimization of photosensitizers for human health and food security applications" is an international doctoral school financed by the European Union´s Horizon 2020 - Marie Sklodowska-Curie Actions. This network gathers seven distinguished European universities, four biotechnological companies and one Research Institute. Located in different countries (France, Germany, Greece, Ireland, Netherlands, Poland, Portugal, Scotland, Switzerland), this international network will train ten PhD students.

POLYTHEA multidisciplinary environment aims at creating links between expertise in organic chemistry, photochemistry, photophysic, photomedicine and knowledge/technology transfer. The main goal is to train a new generation of creative and entrepreneurial experts in photodynamic therapy, mainly for the treatment of cancer and microbial diseases. The ten outstanding PhD students enrolled within POLYTHEA will have enhanced career perspectives through an international, interdisciplinary and intersectoral mobility combined with an innovation-oriented mind-set.

FOR MORE INFORMATION

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WEBSITE: WWW.POLYTHEA.EU

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Resources and Opportunities

by [IPA]

Looking to reach photobiologists and related professionals on a regular basis?

Put your message in their e-mail inboxes with IPA triennial e-newsletters. IPA Newsletter reaches more than 400 members with member news.

Contact Vandana Grover, PhD (ipasecretary@internationalphotodynamic.com).

Opportunities

International Photodynamic Association (IPA) Newsletter:

Get Ready for the IPA Congress

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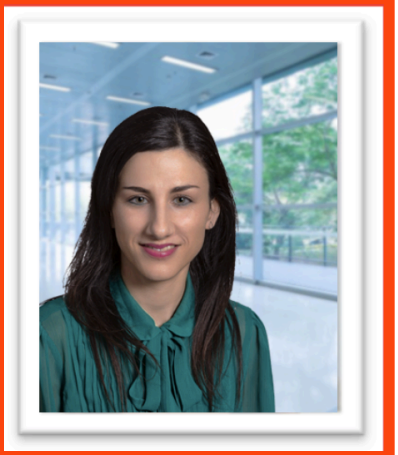

WISHING YOU A HAPPY SUMMER!