ASP NEWS

Fall 2020 **vol. 49 (3)**

IN THIS ISSUE

President's Note

Dear ASP colleagues and friends,

I am delighted to serve as President of the American Society for Photobiology (ASP).

Let me start by introducing and thanking executive, regular and associate council members:

- Mauricio Baptista
- Theresa Busch
- Regina Discipio
- Shobhan Gaddameedhi
- Yu-Ying He
- Huang (Joe) Chiao Huang
- Shakeela Jabeen
- Masaoki Kawasumi
- Verónica Bahamondes Lorca
- Jon Lovell
- Sherri McFarland
- Paul O'Mahoney
- John Roque III
- Tadeusz Sarna
- Martin Schnermann
- John-Stephen Taylor
- Caradee Wright
- Xiaojing Yang
- Youngjae You
- Shiyong Wu

I also wish to thank those who have served the ASP:

- Carlos Crespo
- Richard Davis
- Scott Davis
- Thierry Douki
- Damilola Fajuyigbe
- Doug Learn
- Imran Rizvi
- Bryan Spring
- Georg Wondrak

As president, I am avidly promoting the ASP, with some committee restructuring and a focus on engaging photoscientists from a wide variety of disciplines.

One goal is to develop new strategies of promoting membership and increasing the visibility of the ASP. I am seeking a more pan American membership, by broadening the participation of colleagues in Latin America and Canada. With Andrés Thomas, Verónica Bahamondes Lorca, and John Roque III of the *ASP Membership Committee*, input has been collected from colleagues in Argentina, Brazil, Canada, Chile, and Mexico. We have been active in this vein, especially of seeking the membership of young faculty and students to foster their influence and involvement in the ASP.

The *ASP Online Resources for Educators and Students Committee* is led by Huang Chiao Huang and Caradee Wright, with a strategy to update ASP resources and develop innovative programs to engage students and professionals. Relatedly, Ruedi Birenheide is assisting with an update to our main website.

A new *Monthly Webinar Series* chaired by Masaoki Kawasumi and Shobhan Gaddameedhi has been launched. The webinar is held on the first Thursday of the month at 1:00 pm Eastern time, with illuminating themes to encourage interaction among photoscientists. Invited speakers will deliver live webinars, which run about 45 minutes with time for Q&A.

The *Publications Committee* headed by Martin Schnermann and Youngjae You has been active in developing ways to promote the journal. We have taken an approach to encourage manuscript submissions to *Photochemistry & Photobiology*, which we hope will be effective. The *Sponsorship Committee* is also active and being chaired by John-Stephen Taylor. Another effort afoot is to facilitate award opportunities for ASP members. I am working with Xiaojing Yang of the *Awards Committee* to increase knowledge of the awards sponsored by the ASP and encourage members, in particular graduate students and postdocs, to apply to the awards available through the society.

Outside of my activities with the ASP, I serve as a co-chair of the Committee of Concerned Scientists, and as an associate editor of *Photochemistry & Photobiology*. In my academic position, as an organic chemist at Brooklyn College of the City University of New York, I teach sophomore classes that have many pre-med students who are eager to excel. My research group focuses on fundamental aspects of photochemistry, including the control and amplification of reactive oxygen intermediates.

With a closing intended photochemistry pun, I have reached an *excited state* and am committed to serving you in this leadership role in the ASP. I have enjoyed participating in the Society for many years, as it means a great deal to me. Please feel free to contact me with any questions you may have.

Alec Greer, Ph.D.
President, American Society for Photobiology
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http://academic.brooklyn.cuny.edu/chem/agreer/FirstPage.html

Presidential Research

Recent results in my laboratory include the use of particles and materials as a way to deepen our understanding of reactive oxygen intermediates. One result in Figure 1 shows that the photochemical cleavage a peroxide molecule produces radicals at the air/solid interface of a nanoparticle. The capture of the radicals is monitored with phosphorus trapping molecules and NMR spectroscopy. A second result in Figure 2 is an accomplishment in sorting out light/dark processes that are intertwined. Deconvolution of competitive light and dark processes offer mechanistic insight into a singlet oxygen priming mechanism (Figure 3). Not to be afraid of the dark—as a bad joke—we are *de*lighted that the process needs no lights.

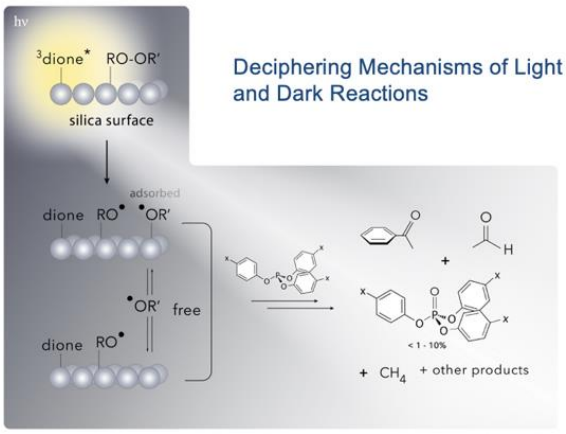

Figure 1. Natural and artificial particles can bear surface free radicals, in some instances persistent free radicals, but are challenging to study. The use of phosphite traps and ^{31}P NMR can offer advances to the field. Our studies include interchangeable non-volatile (adsorbed) and volatile (free) radicals via light-driven and subsequent dark processes.

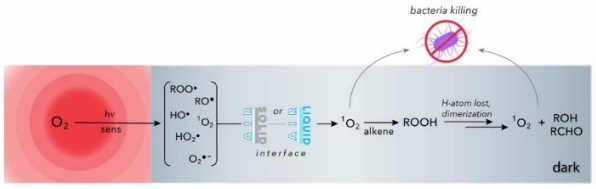

Figure 2. Schematic showing that complementary light and dark reactions arise in *separable* processes. We focus on light-dependent reaction of singlet oxygen, and light-*in*dependent reaction of hydroperoxides.

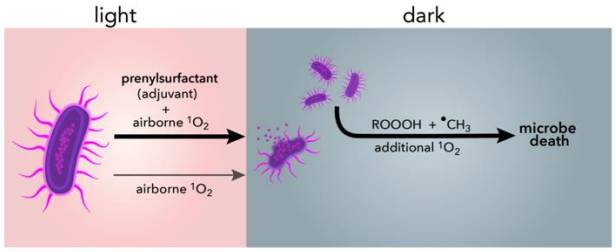

Figure 3. Singlet oxygen priming that enhances microbe inactivation by initial exposure to $^1O_2$. It is proposed that the exogenous prenylsurfactant adjuvant converts to hydroperoxide (with H• loss via Fe^{2+}) and on the basis of peroxyl radical dimerization is expected to form hydrotrioxide, CH_3•, and additional $^1O_2$ to account for the dark toxicity.

- Alec Greer, Ph.D.

We need YOU!

Please submit content (science highlights, suggested links, personal stories, etc.) to ASP News.
Email: jflovell@buffalo.edu

ASP 2020 Awards

We are pleased to announce the following 2020 ASP Awardees:

• ASP Lifetime Achievement Award
Al Girotti

• ASP Research Award
Douglas E. Brash

• ASP Young Investigator Award
Indermeet Kohli

• Editor's Student Research Award.
Brennan Ashwood, for *Photochemical and Photodynamical Properties of Sulfur-Substituted Nucleic Acid Bases.* Ashwood, Pollum, and Crespo-Hernández. Photochem Photobiol, 2019, 95, 33-58

• Photocite A Award.
Masahiko Taniguchi and **Jonathan Lindsey**, for *Database of Absorption and Fluorescence Spectra of >300 Common Compounds for use in PhotochemCAD.* Photochem Photobiol, 2018, 94, 290-327

•Photocite B Award.
Maurício Baptista, **Jean Cadet**, Paolo Di Mascio, Ashwini Ghogare, **Alexander Greer**, Michael Hamblin, Carolina Lorente, Silvia Cristina Nunez, Martha Simões Ribeiro, Andrés H. Thomas, Mariana Vignoni, and Tania Mateus Yoshimura, for *Type I and Type II Photosensitized Oxidation Reactions: Guidelines and Mechanistic Pathways* Photochemi Photobiol, 2017, 93, 912-919

•Please visit the ASP website for further information.

Meet a Photobiologist

Sherri McFarland, PhD, UT Arlington

-How did you get interested in Photobiology?
-My background is in chemical synthesis and spectroscopy. I started my PhD making optical chemosensors and to understand these, you need to understand the photophysical properties of these, so that is what I further studied. I then got involved with biochemistry at my first university position in Nova Scotia. That's when I started working with photodynamic therapy, in particular with cancer therapy as a long term goal.

-How did you get involved in the ASP?
I first got involved in 2014 when Alec Greer invited me to give a talk at the San Diego meeting. I felt like I arrived and was friends with everyone already. I was won over. The sessions were full of exciting research, and I learned a lot about photobiology outside of my area.

-How is your role as Secretary of the ASP?
It is tough to follow in Doug Learn's footsteps as secretary, as he was exceptional at the job. I am learning. I have enjoyed being in the council and learning about the organization and contributing in a meaningful way. I try to take good notes and keep the meetings on time.

-What are your thoughts on translational research for developing photosensitizers for human clinical studies?

My overwhelming thought is my surprise at just how much is involved that has nothing to do with actual scientific development. There is so much involved to advance a molecule to human clinical trials. I'm working with two photosensitizers that are in clinical trials; one that is a ruthenium complex for bladder cancer, and another natural product extract for a dental product.

Do you have advice for students who want to work on research commercialization?
-It seems lots of universities have opportunities to practice commercialization. Try to get experience with those initiatives or internships or similar experiences. Doing the translation work is so removed from the science we're used to, so it is a good idea to see what you like.

How do you see the future of photobiology?
-My comment is limited to cancer research, but I think it has a bright future. There are unmet needs that we can address. PDT has a lot to offer in niche areas where other treatments are not options. For example, there are needs PDT could address in bladder cancer, brain cancer, head and neck cancer, and certain forms of lung cancer.

. –We caught up with Dr. McFarland on Zoom

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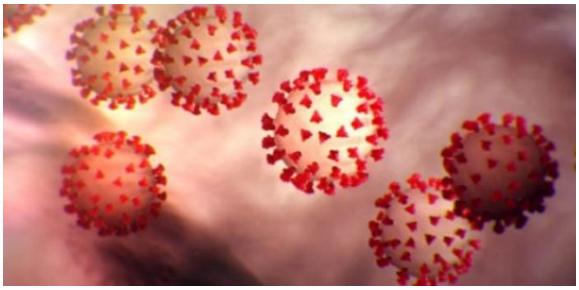
Sunlight Inactivation of SARS-CoV-2



Sunlight was found to inactivate severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes coronavirus 2019 (COVID-19) in a new controlled environment assessment.

The rise of aerosols in the transmission of COVID-19 has been something researchers and the medical community are looking to investigate more closely.

Michael Schuit from the National Biodefense Analysis and Countermeasures Center, led a team of investigators in a study looking at the effect of simulated sunlight, relative humidity, and suspension matrix on the stability of SARS-CoV-2 in aerosols.

Both simulated sunlight and matrix significantly affected the decay rate of the virus, according to the investigators. Their findings were published in The Journal of Infectious Diseases.

"The present study provides the first data on the influence of relative humidity, simulated sunlight, and suspension matrix on the survival of SARS-CoV-2 in aerosols and suggests that sunlight may be an important factor influencing the risk of

aerosol transmission of disease," investigators wrote.

For the purposes of the study, 2 different environmentally-controlled rotating drum aerosol chambers were used to expose SARS-CoV-2 aerosols, and were controlled for levels of temperature, relative humidity, and sunlight.

"These data, in conjunction with studies on the epidemiology of COVID-19, aerosol sampling studies in clinical settings, and studies on the infectious dose of SARS-CoV-2, may be useful to better understand the potential for this virus to spread via the aerosol route," the investigators concluded.

Source: John Parkinson, Contagion

Micro LED needle patches enable PDT to treat deepest skin cancers

CEA LETI and Inserm-Lille University Hospital develop 750µm LED needle patches to reach interface between epidermis and dermis.

Although it is already used to treat certain skin cancers, photodynamic therapy (PDT) cannot reach the deepest lesions. But now, a new technology – the micro needle patch, developed and patented by CEA-Leti and Inserm, both based in France – is said to overcome this limitation.

Its developers say the LED-needle patch technology could reach the market "within three to five years." The Inserm OncoThAI unit is part of Lille University Hospital and Lille University.

Skin cancers due to overexposure to the sun are rising sharply, say the scientists. The WHO has reported two to three million cases per year. These cancers are sometimes treated by local ablation therapy and PDTwas invented to avoid this comparatively extreme type of treatment.

Typically in the PDT procedure a cream is applied to the skin containing an active ingredient that attacks and destroys the tumoral cells under the effect of certain wavelengths of light.

But this technique is not efficacious against deep lesions, say the CEA-Leti and Inserm team. The partners have overcome this limitation by developing a patch with micro needles measuring between 400 µm and 750 µm in length. These needles reach the interface between the epidermis and the dermis.

While the concept of the patch may seem simple, it has taken several years to define its characteristics: the choice of polymer and active ingredient, the development of a "clean" collective manufacturing process, the spacing and shape of the needles, which must not be deformed when applied to the skin, despite their tiny size.

The small size of the needles means that the treatment is painless, which reduces patient anxiety. But the scientists add that such patients will likely have to wait for another three to five years for the clinical trials of the new patch to be completed.

Source: optics.org

Upcoming ASP Events

ASP Webinars

We are excited to announce the webinars for November and December! These are free for everyone. They will also be recorded and put behind the ASP member wall within a couple days after the webinars. Be sure to register now for these exciting sessions.

November Webinar

Speaker: Russell N. Van Gelder, MD, PhD

Thursday, November 5, 2020 at 1:00–2:00 pm Eastern Time (10:00–11:00 am Pacific Time)

Professor and Chair, Boyd K. Bucey Memorial Chair Department of Ophthalmology, University of Washington School of Medicine (Seattle, WA)

Title: Non-visual opsins in retinal and extraretinal photoreception

Registration link: https://register.gotowebinar.com/register/4227699584926717708

December Webinar

Speaker: Cristina Flors, PhD

Thursday, December 3, 2020 at 1-2pm ET

Title: Nanoscale imaging of amyloid photodynamic damage

Institution: Madrid Institute for Advanced Studies in Nanoscience (IMDEA Nanoscience). Calle Faraday 9, Madrid 28049, Spain.

Registration Link: https://register.gotowebinar.com/register/2048468638186415116

2021 ASP Symposium

Our 2021 meeting will be a symposium in celebration of Theresa Busch's 20th anniversary at the University of Pennsylvania at 11-1 & 2-5 pm on June 8, 2021. More details to follow.

ASP 2022