ASP NEWS

Summer 2017 **vol. 46 (3)**

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President's Note

Dear ASP members and friends,

It is my pleasure to extend my warm greetings to all of you. Hope you are having an enjoyable and fruitful summer 2017.

I wanted to thank everybody for your participation in the recent ASP council member election process. I am happy to report that three new American Society for Photobiology Councilors have been elected from 2017-2021:

- **Dr. Tadeusz Sarna**
  Jagiellonian University, Poland
- **John-Stephen Taylor**
  Washington University, USA
- **Dr. Andrés Thomas**
  INIFTA, CONICET-UNLP, Argentina

We look forward to a fruitful interaction, particularly in preparation of our Society's Biennial Meeting, Tampa, Florida, May 2018. I would also like to express my gratitude to those individuals who will be rotating off council by the time of the ASP summer council meeting scheduled for August 10, 2017:

- Dr. Nihal Ahmad, University of Wisconsin;
- Dr. David Kessel, Wayne State University;
- Dr. Jonathan Lovell, SUNY Buffalo.

Let me also remind you of an exciting upcoming event that ASP will participate in during the course of 2017, the 17th Congress of the European Society for Photobiology (ESP), Pisa (Italy), September 4-8, 2017; for details see: pisa2017.photobiology.eu

I am looking forward to interacting with many of our members at this outstanding event that will also feature an ASP-ESP joint symposium on 'Photobiology and

photochemistry in aquatic environments', an event taking place on Tuesday, September 5.

I very much hope that you share my excitement about these upcoming activities. Feedback and suggestions etc. are always welcome.

Best regards,

GEORG

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Meet a Photobiologist

Dr. Tianhong Dai
Assistant Prof., Wellman Center

1. How did you become interested in science?

I guess I am a part of China's scientific rise over the past few decades. China was calling for the best scientists to solve some of the biggest problems at the time and I was a part of it. I choose to study mechanical engineering after about two years of conducting my own investigations, speaking with other students, and consulting my parents and teachers. I love that engineering is cross-disciplinary and can be applied and made useful in everyday life. As a mechanical engineer, I now work at the interface of physics–biology.

2. How did you get involved in antimicrobial blue light for treatment of microbes?

When I joined the lab of Dr. Michael R. Hamblin at the Wellman Center for Photomedicine at Massachusetts General Hospital in 2006, I was involved in the projects of antimicrobial photodynamic therapy (aPDT), which were funded by the NIH and DoD at that time. When I started doing aPDT, I encountered few challenges, including the limited delivery of photosensitizers to microbes and the lack of selectivity of photosensitizers in killing microbes over host cells. Moreover, for some applications, such decontamination of biological materials (blood products), the use of photosensitizers is not even appropriate. A one point, I stumbled on finding that the simpler anti-microbial blue light (aBL) approach is efficient in killing microbes without using exogenous photosensitizers. The antimicrobial effect of blue light is due to the excitation of naturally occurring endogenous photosensitizing chromophores, such as porphyrins, flavins, etc.

3. Can you tell us about something from your work that is exciting to you right now?

Before I started the research of antimicrobial blue light, there were already some studies of aBL in vitro. What is exciting right now is that we are studying the effectiveness of aBL in treating wound infections in vivo, in different murine models, and we can dramatically reduce the microbes by over 99%. To my knowledge, we are the leading group studying of aBL therapy for infections. My research has now been recognized by both the society and Wellman Center for Photomedicine, and my research is supported by NIH and Wellman funds (e.g., MMPP grants). We are also very excited about our projects

combining aBL and other antimicrobial drugs to overcome antibiotic resistance and to re-sensitize drug-resistant bacteria conventional antibiotics.

4. What do you enjoy about running your research lab? Can you give some advices to students?

I enjoy running an independent lab, in which I can continue to expand my research topics. Of course, I enjoy the progress in the research findings made by my team and seeing my students succeed. I always make sure students are truly interested in their research topics. Second, persistence is very important. Education, talent, and genius all mean very little when one lack persistence.

5. What do you like to do in your spare time?

Besides spending time with my family, I really enjoyed watching the news, listening to music, and socializing with friends

.-We caught up with Tianhong in Boston

Present ASP Leadership

With the most recent ASP election, the current ASP leadership landscape is now as follows:

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We need YOU!

Please submit content (science highlights, suggested links, personal stories, etc) to ASP News. Email: jflovell@buffalo.edu or Huang.Huang-Chiao@mgh.harvard.edu

Antimicrobial PDT

On July 24 Vanderbilt scientist Eric Skaar, Ph.D., MPH, summarized his group's latest paper in a tweet: "If S. aureus is going to drink our blood like a vampire, let's kill it with sunlight."

"That thing has been retweeted so many times," said Skaar, the Ernest W. Goodpasture Professor of Pathology in the Vanderbilt University School of Medicine. "It's one of the most popular tweets I've ever put out about our research."

No wonder. Staphylococcus aureus (staph) is the leading cause of hospital-acquired infections. Antibiotic-resistant strains of the bug, like MRSA, can kill.

Staph needs iron to grow. "It breaks open the blood cells and grabs the hemoglobin and pulls the iron out," Skaar said. Other Gram-positive pathogens probably do the same thing. "But the S. aureus systems are by far the most well studied," he said.

Now Skaar and his colleagues have found a new way to destroy these microbial vampires.

Just as daylight strips Dracula of his power, they have shown that an enzyme-activating small molecule they developed, when combined with "photodynamic therapy," can kill bacteria in mouse models of skin and soft tissue infections.

The molecule, called '882 for short, activates a bacterial enzyme called CgoX, which in turn induces accumulation of a photoreactive molecule called CPIII. When struck by light of a certain wavelength, CPIII produces reactive oxygen species that kill the bacterium.

"Small-molecule activation of CgoX represents a promising strategy for the development of light-based antimicrobial therapies," the researchers concluded this week in the Proceedings of the National Academy of Sciences.

Photodynamic therapy — light combined with a photosensitizing chemical — is used to treat certain cancers and skin conditions including acne. But "it's

never really taken off as a treatment for infection because you kill the human cells too," Skaar said.

"Now we have a molecule that only targets the bacterial enzyme in the pathway so you can selectively make bacteria photosensitive," he said.

Another unique aspect of the study is the use of '882, one of only about a dozen synthetic small molecules known to activate, rather than inhibit, an enzyme.

The molecule was identified through Vanderbilt University Medical Center's high-throughput screening facility and developed in collaboration with the lab of Gary Sulikowski, Ph.D., Stevenson Professor of Chemistry in the College of Arts and Science.

The researchers are now working with E. Duco Jansen, Ph.D., professor of Biomedical Engineering, and the Vanderbilt Biophotonics Center in the School of Engineering to develop technologies that can deliver light to sites of infection.

-source: Vanderbilt.edu

ASP NEWS
Published Quarterly by the American Society for Photobiology
www.photobiology.org

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Upcoming Photobiology Events

International Congress on Laser Medicine and Surgery, Nov 9-11 2017, Florence, Italy www.laserflorence.eu

17th Congress of the European Society for Photobiology, September 4-8 2017, Pisa, Italy. pisa2017.photobiology.eu

Photosensory Receptors and Signal Transduction Gordon Research Conference, March 4-9 2018, Barga, Italy. grc.org/programs.aspx?id=12955

ASP biannual meeting, May 12-15 2018, Tampa, FL. photobiology.org/2018minisite

PDT and Photodiagnosis 2018, September 19-22, 2018, Munich, Germany. http://pdt2018.com/