eYE on eSP

Newsletter of the European Society for Photobiology

Summer 2018, Issue 8

School's in for summer

The 5th edition of the ESP Photobiology School was held in Bressanone (Italy) from the 11th to the 16th of June 2018 in the premises of the University of Padova.

The 51 postgraduate students attending the School came from 13 countries and a variety of backgrounds from environmental photobiology to biophotonics, and the faculty found them both attentive and inquisitive.

The School gave the students the chance to showcase their work in a poster session and in a 3-minutes flash presentation session. The poster prize was won by Szilvia Krekic of the Hungarian Academy of Sciences for her work entitled "Integrated optical investigation of the dried Photoactive Yellow Protein film's photocycle in controlled humidity environments".
The prize is sponsored by the ESP and is a travel fellowship to attend the ESP congress in Barcelona at the end of August in 2019.

As usual, the School had a packed schedule, so despite the afternoon rain, everyone enjoyed the mid-week break, which featured a walk to the Abbazia di Novacella, a visit to the library of the Abbazia and its winery.

50 students took and passed the exam. On successful completion of their postgraduate degree they are entitled to receive the ESP supplement to their PhD degree.

The ESP will train a new cohort of early career photobiologists in the next edition of the School in 2020.

In this issue

The first Giulio Jori Fellow reports on her visit to Scotland

Justyna Łabuz is the first recipient of the Giulio Jori Research Fellowship, which she used to visit the group of Prof John Christie in Glasgow.

Justyna obtained her PhD in biology from the Faculty of Biochemistry, Biophysics and Biotechnology of Jagiellonian University, Krakow (Poland) with a thesis entitled: "Light signaling pathways controlling chloroplasts movements in Arabidopsis thaliana and their functioning in different environmental conditions".

Justyna, what made you apply for the Scholarship?

I have been working on phototropins, plant blue light photoreceptors, since my PhD. However, my research has been mainly on the physiological level. I was seeking an opportunity to learn new techniques connected to the biochemistry of the photoreceptor. The Giulio Jori Research Scholarship emerged as an excellent opportunity for me. I worked with light, I was still young enough to apply for the award and I had a dream to visit Prof. John Christie's Laboratory so I decided to give it a try.

Why did you choose that particular group?

I really appreciate Prof. John Christie's scientific work and research interests. He has worked on phototropins since their discovery and he has established many experimental protocols related to photoreceptor photochemistry and enzymatic activity. I knew that visiting his laboratory would mean exciting possibilities to gain practical laboratory experience, but would also be a great opportunity to exchange ideas, work on problematic issues and receive guidelines for future work.

Can you tell us more about your project?

Phototropins are UVA/blue light photoreceptors which control processes involved in photosynthesis optimization such as phototropism in seedlings and chloroplast movements in leaves. Two phototropins (phot1 and phot2) are encoded in the genome of the model plant, *Arabidopsis thaliana.* They share highly redundant functions. The objective of the work is to understand the molecular bases of phototropin cooperation during signaling related to chloroplast movements. In Glasgow I learned how to purify phototropins from *Arabidopsis* microsomal membranes and to assess their activity *in planta*. I also used an *in vitro* transcription-translation system to obtain functional phototropins to facilitate their biochemical characterization. The challenging part was performing phototropin kinase activity tests using radiolabeled ATP [γ-^{32}P]ATP and bulky ATP analogs under dim red light. I also received training on how to express phototropins in insect cells and how to carry out co-immunoprecipitation of phototropin. After returning from Glasgow, the physiological importance of phototropin transphosphorylation on chloroplast movements in *Arabidopsis* was studied in Krakow by investigating

plants with inactivated kinase domains. The preliminary results obtained suggest that phototropin transphosphorylation is important for eliciting chloroplast movements, at least in non-saturating light conditions. Further evidence is needed to confirm this phenomenon *in vitro* and *in planta*.

What will you remember of this visit?

I met very kind people in Scotland. I got a warm welcome on arrival in the laboratory and the members were very helpful and supportive. I learned that wet and rainy weather is temporary so there is no need to worry. Eventually the sun will be back and the difficulties will vanish. I spent my best day in the Highlands, hiking on the Cobbler. The weather was great as well as the scenery of beautiful grassy beige mountains. I could also admire Scottish Blackface sheep and Highland Cattle. Scotland is full of picturesque castles, haggis and neeps. I could not resist: I bought a beautiful tweed handbag!

How do you think this Scholarship will influence your career?

The visit was extremely important for me. I met new people, who are specialists in my field and can give me advice. I will continue the research at Jagiellonian University in Poland in collaboration with the University of Glasgow, thanks to the project funding I received from the National Science Centre in Poland entitled "Dissecting the molecular basis of phototropin signaling to chloroplast movements in *Arabidopsis thaliana*".

Recommended reading

The RSC Comprehensive Series in Photochemical and Photobiological Sciences will soon release three books to the collection.

The book "Microalgal Hydrogen Production" edited by Michael Seibert and Giuseppe Torzillo surveys the state of the art of the exploitation of hydrogen production using microalgae, including methodologies and new approaches. The book examines the issues that need to be addressed before this approach to hydrogen production can be implemented on large scale.

"Light in Forensic Science", edited by Giorgia Miolo, Jaqueline L. Stair and Mire Zioh, gives an overview on the light-based analytical techniques adopted in investigative analysis. The book is conceived to be a reference text for students and researchers alike.

In "Optogenetics", the editors Sophie Virz and Takeaki Ozawa offer an overview of the tools and methodologies adopted in optogenetics and a report on its more recent applications outside the field of neurosciences.

The Series has more books in the pipeline: the titles will soon be announced.

Massimo Trotta, Series Editor

The Congress of the Italian Society of Photobiology crosses borders

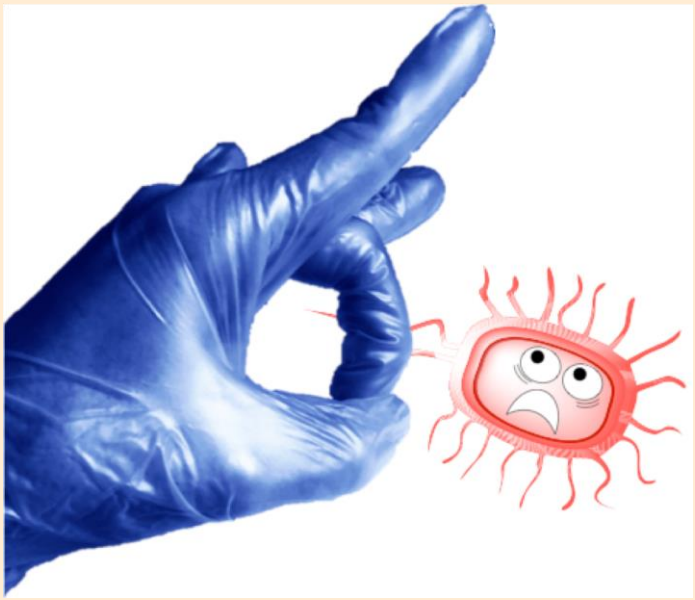
The SIFB-ALPE ADRIA Meeting on Photobiology was held from the 20th to the 22nd of June 2018 in Palazzo Garzolini di Toppo Wassermann at the University of Udine (Udine, Italy). Originally intended to be the annual Congress of the Italian Society for Photobiology (SIFB), the meeting was jointly organised by scientists from Italy, Austria and Slovenia. Adding an international flavour to the organisation was inspired by the geographical location of the city of Udine, which sits in the middle of the Alpe Adria region that covers parts of the Italian regions Friuli Venezia Giulia and Veneto, Austria, Slovenia and part of Croatia. The Congress was organised by the SIFB Executive Committee and the Local Organising Committee included Dr Valentina Rapozzi and Dr Giuseppe Stinco (University of Udine, Italy), Dr Barbara Krammer (University of Salzburg, Austria) and Dr Igor Frangez (University of Ljubljana, Slovenia).

The event attracted 120 delegates from Italy, Austria and Slovenia and excellent speakers reported on progresses in the fields of photosynthesis, environmental photobiology, circadian rhythm (a topic inspired by the recent Nobel Prize), antimicrobial PDT, therapeutic application and molecular bases of PDT. The congress had a dedicated photodermatology day on the 22nd of June (with the participation of SIDeMAST), with symposia on photodiagnosis, phototherapy and laser therapy.

SIFB congresses are run annually and are frequently jointly held with sister societies of photobiology. This happened for example in Bari (Italy) in 2016, when the congress was jointly organised by SIFB and the French Society for Photobiology (SFPB).

The SIFB recently renewed its Executive Committee, which now includes Dr Valentina Rapozzi (President), Enrico Caruso (Treasurer), Antonino Mazzaglia, Greta Varchi, Teresa Orlandi, Francesco Milano and Marina Venturini.

A touch of PACT



Those of us who have worked on the application of photosensitisers to infection control will undoubtedly be aware of the huge gap that exists between "bench and bedside". There have been many excellent photosensitisers produced over the past 25 years, with significantly-increased activity against microbial pathogens compared to whichever lead compound has been employed, but the chances of their clinical adoption remain extremely low.

It was therefore enormously refreshing to see that the launch of the world's first antimicrobial examination glove actually showcased a *photoantimicrobial* glove!

The launch, at the Royal Society of Medicine in London at the end of May was the result of collaboration between a UK technology company, Chemical Intelligence, and the world's largest medical glove producer, Hartalega of Kuala Lumpur. A non-releasing coating of the photosensitiser is applied during the glove-forming process and constitutes the outer layer of the finished item. That this coating is photoantimicrobial was perfectly evident during a very brave, live, broadcast of the microscopic demonstration of the efficacy of the material against a bacterial challenge using Live/Dead staining.

The identity of the photosensitiser has not been released, being subject to patent completion, but its inventor Paul Wight and Chemical Intelligence CEO Rob Gros have clearly made a considerable splash here, where others among us have signally failed. Jealous? Not much... However, this will obviously bring the photoantimicrobial effects more into the medical arena, which is great news!

Mark Wainwright

Dates for your diary

- The Photodynamic Therapy and Photodiagnosis update will be held in Kochel am See near Munich (Germany) on the 18th-22nd of September 2018.
- The IPA World Congress will be held from June 28th to July 4th 2019 in Boston (USA).
- The ESP-IUPB World Congress "Light and Life, 18th meeting of the European Society for Photobiology and the 17th International Congress of Photobiology" will take place in Barcelona (Spain), August 25th-30th 2019.