Haim Treves

Haim Treves is a Senior Lecturer in the School of Plant Sciences and Food Security at Tel-Aviv University, Israel. He leads the Algal Metabolic Diversity Lab which studies photosynthetic metabolism in algae, and its implications for photosynthetic efficiency and growth. Haim is a Features Editor for *The Plant Journal*.

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Tell us about your background. How did you first become interested in plant science and algal metabolism?

I actually studied marine biology, and deep inside I still consider myself to be a microbial ecologist. After becoming fascinated by the amazing world of plankton, I wished to study interspecies interactions in marine or aquatic plankton, and I found my way to the Kaplan lab in the Hebrew University of Jerusalem. I was planning to focus on the interactions between a cyanobacterium and a eukaryotic alga in the Sea of Galilee, while taking on a small side-project on a newly isolated extremophile desert alga (*Chlorella ohadii*). However, life had different plans for me; the discoveries made with this alga were too meaningful for me to ignore, and so it became a main focus during my PhD, post-doc, and recently, my newly established lab (see the full story here*). As for the focus on metabolism, here too my career path was led by my findings. When looking at the data and at the work of my mentors, I found that metabolism was the answer to many questions relating to stress responses, growth, and even biotic interactions.

What is your lab working on currently?

My lab is currently working on the relationship between metabolic rates (fluxes) in central metabolism and photosynthesis and growth rate in photosynthetic cells. Inspired by the fantastic growth rate of *C. ohadii*, we are trying to dissect the reactions and pathways which explain differences in growth rates between different algal cells. This is based on comparative fluxome analyses combined with other approaches such as quantitative proteomics and synthetic biology.

What does a typical day look like for you?

Aside from building my own lab group, I'm also married to a scientist, and we have three young boys. Hence, my day starts with preparing several meals, escorting the kids to school, then enjoying some quiet work time during the train ride into Tel-Aviv. The rest is quite dynamic and varies depending on whether I'm needed to guide an experiment, write a grant proposal or a paper, or teach. I do my best and usually manage to get back home in time to be with my family in the afternoons, but this doesn't always work out.

What do you most enjoy about your work?

At the moment, I still feel a bit in transition from being a post-doc to starting my own group. As a post-doc, I greatly enjoyed designing and building new experimental setups, and also seeing new data for the first time (which in my field sometimes takes months so requires patience). Now as a new group leader, I try to stay involved with the former as much as I can, but I do accept, even if reluctantly, that I am now second in line to witness new and exciting data and results. However, I do enjoy most of what I am doing in my new position, especially everything related to science or teaching. I still get much enjoyment from inspiring my students and getting them on board with why their findings are indeed exciting.

What do you find most challenging?

While I find guiding young scholars to be very rewarding, it can be difficult to find the balance between being critical of students' work while keeping them motivated and part of a team. I think that's especially challenging because each student is a different person and can respond very differently to criticism.

Left: image credit TAU photography service.

* https://microbiologycommunity.nature.com/posts/green-gold-from-the-desert

What is your lab hoping to work on in the future?

The group is at a very early stage, but in addition to the methodologies we are currently developing, I hope to extend our work much further into the field of synthetic biology, both in algae and plants, to provide a more translational aspect. Specifically, I hope to study genes of interest in algae to better describe their roles in the growth of photosynthetic cells, with the ultimate aim of exporting useful genes into model and crop plants for improving growth and photosynthetic performance.

What advice would you give to aspiring scientists in this area?

Firstly, choose your mentors carefully as this will greatly affect your career. While there is no perfect recipe for success, I would try to find someone who is well established, and therefore more confident (and thus not intimidated by unconventional new projects). Being well-funded is of course also very important to enable one to pursue new directions. Collect as much information about potential labs as you can by speaking to everyone possible, starting with the potential mentor, their lab members and alumni. However, remember to trust your own intuition and experience, you are usually the one most familiar with the system you're working on after all, and bear in mind that if you ask the opinion of 10 scientists, you will likely receive (at least) 12 different answers!

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Who are your scientific heroes?

I think that we live in easy times for many aspects of science. We have so many tools to test our hypotheses and to make new discoveries. In this respect, my heroes are not specific scientists, but many of the scientists of one to two generations ago who had to navigate towards their discoveries with much less data and much more scientific intuition - whether it's Calvin, Benson and Bassham with the route of carbon in photosynthesis; or Franklin, Watson and Crick with DNA structure. Those were real giants, and I'm truly humbled by the almost prophetic way they made the discoveries that basically wrote the textbook we teach and learn from today.