

ASCB Workshop in Tanzania Trains Educators

Outreach to international scientists and educators is part of the ASCB's mission, carried out through the International Affairs Committee. A major effort in this mission is a series of African Workshops, begun in July 2008. In January 2010 members of the ASCB from the U.S. and Canada, along with colleagues from the University of Ghana and the Muhimbili University of Health and Allied Sciences (MUHAS), offered the latest course in this series, a workshop on teaching cell biology.

The ASCB Workshop on Teaching Cell Biology was held at the MUHAS campus in Dar es Salaam, Tanzania, and built on the previous experience of the workshop leaders in the ASCB course in Accra, Ghana, in 2009 (see November 2009 *ASCB Newsletter*). The workshop was supported by a grant from the Carnegie Corporation of New York and by a gift of a research microscope from Stanford University. Most importantly, 10 instructors from U.S., Canadian, and African universities devoted their time and energy to the lectures, lab practicals, and small-group sessions with students.

The workshop was attended by 24 students, representing different regions of Tanzania, and different career levels in science research and teaching. Selection of the 24 participants was by application, with an effort to enlist a broadly representative group of students who would be positioned to implement elements of the workshop curriculum in their own teaching.

Transmitting Basic Knowledge

The Tanzania workshop was designed to focus on college-level cell biology education. The important elements of this workshop were lectures on basic cell biology topics, "tool talks" about experimental approaches to addressing cell biological questions, lab practicals illustrating the principles of cell biology, and journal clubs based on published cell biology research. Group discussions of professional development issues facing scientists in Africa enriched the curriculum-based content.

The workshop took place over two weeks of intensive work and study. Each day began at 8:30 am with a cell biology topic lecture. Each



Selection of the 24 participants was by application, with an effort to enlist a broadly representative group of students who would be positioned to implement elements of the workshop curriculum in their own teaching.



Students participated in lectures, lab practicals, and paper discussions.

day ended at about 9:00 pm with an evening presentation by faculty on recent research from their labs. The one deviation from this busy schedule was a class trip to the historic island of Zanzibar, a short ferry ride from Dar es Salaam.

The morning lectures focused the activities of the day on one topic in cell biology. Each lecture was designed both to educate the workshop students, and to present a fully formed lecture that they could use wholly or in part in their own teaching. The lectures followed a logical progression, beginning with cell organization, energy production and use, and biosynthesis of nucleic acids, proteins, and membranes. This was followed by cell signaling, the cytoskeleton, cell cycle regulation, and cell division. The last set of morning lectures were on cell motility, cell polarity, and cell–cell interaction. Follow-up lectures on the tools of modern cell biology built on this foundation of knowledge; in these lectures workshop participants were exposed to the methods and experiments used to derive the information presented in the morning lectures. These tool talk topics included using genetics to probe cell biological processes, the importance of model organisms in research, protein-based and gene-based approaches to function, and the use of RNA interference in mammalian cells to interfere with gene expression.

Discussing Research and Approaches

The lectures were complemented by small-group journal clubs in which students met with workshop faculty for in-depth discussions of research papers. The journal club papers were linked to the lectures such that there was a progression from basic lecture, to more advanced presentation of experimental approaches, to dissection of those experimental approaches in the scientific literature. As a final exercise, each journal club group was assigned to prepare a presentation on the complete results of one of the papers; these presentations marked the end of the workshop. The preparation of the presentations required group effort and a plan for how to convey information to the rest of the workshop participants. This was just as one might do in preparing materials for a course.

Illustrating Concepts

Lab practicals formed the other essential pedagogical element of the workshop, complementing the lectures and journal clubs. As for the morning lectures, the lab practicals were designed both to illustrate



Course participants were from Tanzania, Ghana, Canada, and the U.S.

important concepts in cell biology and to provide lab modules that the students could use in their own teaching. In keeping with the theme of integration linking all elements of the workshop, the lab practical topics were chosen to build upon information learned in recent lectures. For example, the first lab practical was on microbial growth and metabolism; the practical used the production of CO₂ gas and ethanol by a culture of yeast cells to demonstrate energy production by fermentation. Other lab practicals demonstrated molecular biology manipulations with DNA and protein and microscopic examination of stained fixed cells and of live cells in which active transport mechanisms were visible. In all cases the lab practicals were designed to be carried out with the limited resources available to most of the students in their teaching environments. For example, the production of gas in fermentation was detected by a balloon fitted to the top of a plastic soda bottle culture vessel—low technology, but very effective! In addition to the wet lab practicals, the students participated in a virtual lab exercise based on a set of structure/function experiments for a hypothetical protein. Such virtual exercises allow use of experimental data that might not be accessible in a resource-limited teaching lab.

Advancing Professional Development

The last element of the workshop was a set of informal lectures and discussions on issues of professional development relevant to the workshop students. This included discussion of ethics in science and teaching, the importance of avoiding plagiarism and of presenting representative data, appropriate statistical analysis, and practice in science writing. One of the most useful sessions was devoted to discussion of issues facing scientists and educators in sub-Saharan Africa. This was revelatory for both the visiting faculty, and the students, who came from many different professional situations in Tanzania.

One of the most useful sessions was devoted to discussion of issues facing scientists and educators in sub-Saharan Africa.

Evaluating Response

In addition to the formal workshop elements described above, the workshop offered many opportunities for interaction of faculty and students at breaks, lunch, dinner, and social events. From these interactions it was clear that the students were deeply appreciative of the time, effort, and financial support expended in carrying out this workshop. We evaluated their perceptions of the workshop directly with a questionnaire administered on the final day, and also used real-time evaluative tools in, or before and after, certain lectures. The high regard the students had for the workshop and the faculty is a harbinger of the positive mentoring interactions that are likely to occur in the future. We also

created a Facebook page for the course (www.facebook.com/group.php?gid=288665825115). This has become an effective means to keep up with the activities of the students. Encouraged by the success of this workshop, we look forward to continuing interactions with the growing group of students who have participated in the ASCB Africa workshops, and to future efforts to engage African scientists in the teaching and research of cell biology. ■

—*Tim Stearns, for the workshop faculty: Richard Asmah (Ghana), Liz Conibear (Canada), Martha Cyert (USA), Steve Doxsey (USA), Solomon Gebre (Tanzania), Triscia Hendrickson (USA), Dick McIntosh (USA), Joy Power (USA), and Tim Stowe (USA)*



AAAS Mentor Awards

The American Association for the Advancement of Science is seeking nominations for its 2010 Lifetime Mentor Award and Mentor Award. These awards honor individuals who have demonstrated extraordinary leadership to increase the participation of underrepresented groups in the science and engineering PhD workforce.

Nominations are due by July 31, 2010. Information can be found at www.aaas.org/aboutaaas/awards/mentor/index.shtml. ■

Did You Know...?

- You still have time to vote for next year's ASCB President-Elect and four Council members.
- The President-Elect will serve as President in 2012 and Past President in 2013.
- The term of office for all positions is three years.
- This year the Council, as empowered by the ASCB Bylaws, has segmented the ballot to ensure continued diversity on the Council. Two international nominees will run against each other for Council, and two industry/biotech candidates will run against each other; *all* eligible voters (regular, postdoctoral and emeritus members) are invited to vote for one of the nominees in each category, along with two of the remaining four nominees.
- Also included in the ballot is a proposed change to the ASCB Bylaws to eliminate the requirement for sponsorship of membership applications.
- The deadline to cast your ballot is **June 30**. Go to www.ascb.org and click on the "Members Only" icon to preview the ballot and/or cast your vote today! ■

New! ASCB Offers Group Registration

Want to bring your entire lab or department to the ASCB's 50th Annual Meeting and submit just one payment? Visit www.ascb.org/meetings and register today! ■