Grant-writing workshop recap

BY MARION B. SEWER

T
two years ago, the American Society for Bio-
chemistry and Molecular Biology Minority Affairs
Committee embarked on an initiative to identify the
perceived barriers encountered by faculty members
from groups that are underrepresented in the sciences
and by faculty members at minority-serving institutions.
Although the committee identified several barriers,
including an opaque review process, lack of a support
network, a leaky pipeline of minority talent and a lack
of initiatives directed at underrepresented minorities,
the underlying issue common to all participants in the
working group was the lack of formal mentoring (1).

To address this issue, the MAC held a mentoring
and grant-writing workshop in June in Arlington, Va. Our
initial plan was to invite 15 to 20 assistant professors
who were in the first four years of tenure-track positions
and to pair them with ASBMB members who had been
successful in obtaining federal funding. However, in
response to unexpected enthusiasm from the commu-
nity at large and the overwhelming number of applica-
tions, we invited 32 faculty members to participate in
this inaugural endeavor.

In addition to selecting minority faculty members
and faculty members at minority-serving institutions,
we selected nonminority applicants at research-intensive
institutions and at primarily undergraduate institutions.
This strategy enabled us to have a diverse cohort of
assistant professors from various institutions, including
the University of California, Berkeley; Grand Valley State
University; the University of Michigan; the University of
Southern Maine; Jackson State University; California
State University-Fullerton; the University of Richmond;
and the University of Texas at El Paso. Mentors included
students and postdocs, take tours of shared resources
and resubmitting an application.

On the first day, you’ll give your 60-minute public
seminar, being sure to finish in 45 to 50 minutes
on for questions. On the second day, you’ll be in
the conference room for a 60-minute chalk talk.

Because chalk talks are not generally open to post-
doctoral fellows, you’ve never seen one, but you’ve
heard that great candidates do not always give good
chalk talks.

What’s a chalk talk?

A chalk talk is your opportunity to present your forward-
looking research program to potential colleagues. They
will have seen your seminar on the first day, so your
research accomplishments will be fresh on their minds.
They will be wondering how you plan to organize
your laboratory, what types of experiments you plan to
do first, what your funding plans are, what your relation-
ship is with your current principal investigator, who you
think your major competition is and how well you have
thought out your research plans in case things don’t
work out the way you think they will.

Do you have to use chalk?

Generally, no, though you should ask.

Channel your inner PI

Never interview as though you are a postdoc with only
your two hands. Project your inner principal investiga-
tor, who is capable of defending a progressive research
plan to successful colleagues and who appears capable
of directing a small research group.

Though your plans probably require another two to
three people to get off the ground, if you describe plans
for your first eight trainees, you are likely to come off as
far too ambitious (and expensive) to hire.

Organizing your presentation

Spend the first few minutes on a summary slide or two
to remind the audience of your major findings. Don’t
assume a good memory or great insights into your
experimental system.

The next slide is an outline of a couple of fundable
directions in which you plan to take your work. You may
have three or more ideas, but you won’t have time to
show more than one or two, and you should not show
your third best idea during this hour. Your transition
to independence will require intense focus and many tacti-
cal decisions. You do not want to look scattered. Deter-
mine your best project(s) in advance and practice your
chalk talk with faculty members of diverse backgrounds.

As soon as you have sketched out the one or two
projects you plan to launch, you might state that you’d
like to spend the next 30 to 35 minutes on project 1
and the remaining time on project 2.

The next best slide is a bulleted list of the specific
aims in your first project. Here, candidates with fund-
ing that will extend into their next positions have a huge
advantage. These candidates can list the aims of their
R02 or R01 or American Heart Association grant. Such
aims are always easier to defend, because the candi-
dates have defended them already to a review panel
and because faculty will feel that one of two major risks
has been taken off their hands. The first risk is that a
new hire might fail to obtain external funding for the
research program. The second risk is that, even if start-
up and other funding is in place, the project may not
work or may work and have limited scientific impact.
Faculty will interject freely during your presentation,

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Demystifying the chalk talk

BY CHARLES BRENNER

Congratulations! You’ve succeeded as a gradu-
ate student, changed institutions and obtained first-author publications. You’ve obtained funding for
your postdoctoral fellowship or even for your transi-
tion to independence. You’ve identified some schools
that are looking for faculty members in your area and
have developed a brief, compelling research plan. Your
referees are enthusiastic and prompt. You were person-
able and prepared during a phone call or Skype with
the search committee chair, and you’ve been invited to
a two-day campus interview. There, you will have
meetings with members of the search committee and
other members of the faculty, have lunch with graduate
students and postdocs, take tours of shared resources
and give two presentations.

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What, how and why is problem-based learning in medical education?

BY JOSÉ M. BARRAL AND ERA BUCK

What is problem-based learning? Problem-based learning, or PBL, is a pedagogical practice employed in many medical schools. While there are numerous variants of the technique, the approach includes the presentation of an applied problem to a small group of students who engage in discussion over several sessions. A facilitator, sometimes called a tutor, provides supportive guidance for the students. The discussions of the problem are structured to enable students to create conceptual models to explain the problem presented in the case. As the students discover the limits of their knowledge, they identify learning issues – essentially questions they cannot answer from their fund of knowledge. Between meetings of the group, learners research their learning issues and share results at the next meeting of the group.

How do faculty members participate in this process? Faculty members often participate as facilitators. Indeed, the role of the facilitator and the nature of the problem are key to successful implementation. Facilitators must be supportive rather than directive. They ask questions to assist students with identifying the limits of their knowledge, monitor the group process (encouraging participation) and provide a framework for constructing models of understanding. Content expertise on the part of the faculty may be helpful but is not considered necessary for effective facilitation. Deeper understanding of the topic may allow the facilitator to guide student discussions to be more comprehensive. It also may increase the challenge of maintaining a nondirective role. Problems presented in cases are constructed at a level of complexity to activate students’ existing knowledge and require integration and application of new knowledge. Cases contain contextual information so that the patients become more real to the students and therefore more memorable.

Why are medical schools incorporating PBL? PBL has become popular in medical schools that have undergone curriculum reforms incorporating multidisciplinary-system-based courses rather than discipline-specific ones. For example, students may learn biochemistry as it relates to organ systems of the human body while they are solving problems presented in clinical cases. This approach provides relevance, encourages self-directed learning, targets higher-order learning and engages students in ways that result in better long-term retention of content than traditional, lecture-based courses.

Can you give me an example of how the process works? During a traditional, lecture-based system, students learn the basics about the developmental and cell biology of erythrocytes (their lineage, shape, size, absence of nucleus, etc.); the biochemistry of hemoglobin (cofactor requirements, protein quaternary structure, cooperativity and allosterism, etc.); and the various mutations that result in disease states (sickle cell anemias, thalassemias, etc.). When asked about the phenotype of a sickle-cell hemoglobin carrier, a student who learned these concepts in a traditional, lecture-based environment might reply that there is no phenotype, unless the carrier is living in a region with malaria, in which case the carrier may be better able to resist the disease because of heterozygous advantage (classic concepts learned in genetics). However, if a group of students are presented with a case of a patient undergoing a sickle-cell crisis and are prompted to consider the many aspects of the disease, including the implications for family members, they might arrive at a different answer. They may come to the realization that the phenotype of a carrier could include the presence of some elongated cells in a smear of venous blood, particularly after exercise (which appears to occur in the majority of cases). In this manner, knowledge integration leads to critical consideration of how a phenotype is defined and how this indeed can depend on the variable being studied (a concept clearly generalized beyond the hemoglobinopathies).

What student skills should we encourage for PBL-focused medical education?

Self-directed learning: Students who demonstrate adequate performance in PBL activities are capable of applying their knowledge to think critically. They must be trained to be able to use information rather than merely capable of remembering it. Students in PBL-based curricula increase the level of self-direction they bring to learning. The more self-direction they develop as undergraduates, the more likely it is that they will become independent learners as practicing professionals. Lifelong learning uses a set of skills that develop over time and require practice.

Reflection: Some of the critical skills can be encouraged and practiced in college classes. These include self-assessment, group learning and active learning. Students need opportunities to identify their strengths and weaknesses and figure out what it is that they do not know or thoroughly understand. They need to be encouraged to ask good questions. By encouraging students in formulating good questions, we empower them to identify their knowledge gaps.

Teamwork: Students also must develop skills necessary for learning in groups. They must be able to learn from peers and teach peers, moving readily between those roles. They need to be able to assist each other in integrating and applying knowledge to a given problem. These skills are acquired through active learning. Projects and lab work often promote these skills.

In summary, students need opportunities to assess their knowledge, identify and remedy knowledge gaps, and integrate and apply knowledge to real-world problems as part of a team.

José M. Barral (jmbarral@utmb.edu) is an associate professor in the department of neuroscience and cell biology and the department of biochemistry and molecular biology at the University of Texas Medical Branch in Galveston, Texas. Era Buck (erbuck@utmb.edu) is a senior medical educator in the Office of Educational Development and an assistant professor in the department of family medicine at the University of Texas Medical Branch in Galveston, Texas.