

nature chemical biology

Catalyzing collaboration

Facilitating interdisciplinary collaboration is essential for the success of chemical biology.

As Europeans celebrate the 50th anniversary of the signing of the Treaty of Rome, the impact of the European Union on economic and social policy across Europe has emerged as a topic of considerable debate. Though the European Union faces continuing challenges, the diversity of talent, resources and assets possessed by individual European nations suggests that an integrated European Union offers immense potential benefits for member nations and the international community. The success of the 'European project' depends primarily on the ability of EU governing bodies to facilitate this large-scale collaborative effort. Expanded European cooperation is likely to change the landscape of scientific collaboration among EU countries and enhance interfacial fields such as chemical biology.

Collaborations are essential for the success of chemical biology research. Within traditional chemistry and biology laboratories, the scientific objectives are more closely matched to the educational backgrounds of the researchers; thus less direct collaboration is required to advance all aspects of a given project. In contrast, chemical biology laboratories require the application of knowledge and techniques from across chemistry, biology and allied disciplines; therefore students and postdoctoral researchers, who are frequently from multiple educational backgrounds, must collaborate to advance interdisciplinary projects.

Although collaborations within a single laboratory offer many advantages, not all investigators are able to fully integrate chemistry and biology research within a single laboratory. Thus, collaboration between research groups with similar scientific interests but different research expertise offers an attractive option for chemical biologists. Such collaborations may also permit more rapid progress and offer fresh insights that may not be available from traditional disciplinary approaches. Such mutually beneficial collaborations are already prevalent in chemical biology, as reflected in the observation that 75% of the original research papers published in *Nature Chemical Biology* in 2006 were from authors across multiple academic departments or institutions. International collaborations among chemical biologists are increasingly common: 32% of 2006 research papers in *Nature Chemical Biology* were contributions of international research teams.

Despite their numerous benefits, collaborations also can be fraught with potential challenges. Many senior scientists recommend that, during the early stages of new collaborations, scientists should engage in an open dialogue to establish guidelines for the ongoing partnership. Investigators should outline the scope of the project and agree on practical matters including how the project will be funded and how author order will be determined on joint publications. Establishing the ground rules for collaboration in its early stages remains one of the most effective ways to avoid problems later in the partnership.

Even with upfront agreements, chemical biology collaborations may face unique challenges because they often bring together disparate fields of chemistry and biology (for example, organic synthesis and neurobiology).

We occasionally hear about strained collaborations in which chemists feel that they are being used as reagent suppliers while biologists feel that they are being exploited as technicians. To avoid such conflicts, investigators should identify ways to integrate the technical and intellectual contributions of the partner laboratories and ensure that each group's contributions are viewed as equally valuable. Regular joint group meetings offer opportunities for participating scientists to discuss techniques, present results and analyze data. Sabbaticals offer investigators the opportunity to develop close research partnerships. Informal 'exchange programs', in which students or postdoctoral researchers work in a collaborator's laboratory for short periods, greatly enhance dialogue between laboratories and expand each group's investment in a joint project.

Chemical biologists also must balance their collaborative efforts with their laboratory's core projects. Though maintaining equilibrium over one's commitments is essential for all scientific managers, striking the right balance is particularly important for new investigators. Young scientists are expected to establish their independent voices during the early years of their careers, and thus many new faculty members see collaborations as a distraction from this primary objective. This perspective may arise in part from traditional expectations of evaluating committees (for awards, funding, tenure and promotion), who often view collaborations in this light. However, chemical biologists should not avoid collaboration; instead they should ensure that their scientific contributions are appropriately acknowledged. 'Author contribution' statements in published papers (see, for example, p. 267) offer one formal alternative to clarify an investigator's contributions to a scientific study. However, given the increased emphasis on interfacial research, the most general solution is broader support of collaboration as a preferred mechanism for scientific investigation.

Though independent investigators will remain central to the collaborative process, universities and governmental agencies are essential participants. Universities and institutes should demonstrate their support for scientific cross talk by creating collaborative facilities and faculties. Research space designed to promote interaction should be a central element of all new science buildings. These research facilities must also be populated with scientists who are encouraged to collaborate and are rewarded for their efforts. Certain funding agencies are taking the lead in supporting collaborations. As reported in this month's Elements section (p. 241), certain EU-sponsored funding programs support collaborations that span multiple European nations. The US National Institutes of Health also offers special programs to encourage interdisciplinary collaboration (<http://nihroadmap.nih.gov/interdisciplinary/>).

Collaboration is fundamentally about bringing individual scientists together to advance the frontiers of science in new ways. As members of a community whose success depends on the integration of chemistry and biology, chemical biologists must champion the cause of interdisciplinary research and demonstrate its utility through their collaborative achievements. ■