loathed by many academic scientists, who describe them as Loch Ness monsters of bureaucracy—with each new Framework Programme, new rules and terminologies tend to appear every five years. The procedures involved in selecting grant rewards have also been considered impregnable and foggy. Suspicions abound of secondary decisions being made in closed rooms in a process very different from classical, quality-controlled peer-review systems. Some of the suggested very large structures in the most recent, 6th Framework Programme have added to scientists' anxieties. These structures would be very difficult to assess from the point of view of quality, competitive advantage, and evaluation of results. The mixture of research and commercial innovations being intertwined in the Framework Programmes has added to the confusion. I believe that the Framework Programmes have played an important part in starting to move European scientists together. Particularly relevant have been the programs supporting scientists so that they can spend time in other European laboratories, but also various collaborative projects encompassing several research groups across many countries. It is, however, my firm belief that the time has come to split the Framework Programmes and to create a more conventional European Research Council (ERC), an organization more clearly under control by scientists.

This ERC should not be used to replace the various national research councils. It should be used to support elite centers, large technical projects, and collaborative research projects using clear peer-review protocols. Likewise, it would support certain special big tech activities, like the European Organization for Nuclear research (CERN), that cannot be developed in an optimal manner at the level of the individual nations. It should be a logical professional and scientific hub for European science. NIH and NSF in the United States could at least in part be considered as role models for how such an ERC should function. In parallel it may be prudent to create a European Innovation Council (EIC) to professionally support the development of results of science and innovations into applications and products. This EIC would take care of the significant application part in the present Framework Programmes. Role models for such an innovation council can be found at the national levels in European countries, i.e., in my own country, Sweden. A logical time frame for the suggested changes could be to introduce them at the end of the 6th Framework Programme.

POLICY FORUM: SCIENCE IN EUROPE

Biomedical Research and International Collaboration

George Radda

There is an undeniable need for improved collaboration and strategic coordination in European research. The challenge is to deliver this in an efficient and effective manner without hampering the creative vision and innovation of the scientists involved. In some quarters, the concept of a European Research Area has prompted the notion that an overarching body, such as a European Research Council (ERC), might take on this role. Is an administrative structure like the ERC truly necessary? In modern biomedical science, networking and working jointly across borders are already intrinsic parts of leading-edge research. Few scientists need encouragement to form alliances with colleagues in other countries, and scientists will choose quality in preference to geography in seeking partnerships. A measure of the extent of international collaborations is that in a survey of research publications by Medical Research Council (MRC)–supported scientists in 1996, 40% cited support from non-UK funders.

Our role as funders of science is to facilitate, nurture, and build collaborations. It is my view that in biomedical research we need a dynamic and flexible system to meet the constantly changing needs of science. This can be achieved if funding organizations of individual countries establish a synergistic and coordinated working relationship to improve collaboration in particular areas where true added value can be achieved.

In the UK, we took a major step forward in cancer research by establishing the National Cancer Research Institute (NCRI). This has been created to coordinate all aspects of cancer research in the UK, from basic research to clinical trials. The NCRI brings together the major cancer research charities, the MRC, and the UK Government's Health Departments with input from the pharmaceutical industry. It operates under a simple administrative structure, which coordinates the activities of the participating bodies, while allowing them to retain their own identities and vigor. The NCRI also provides a focal point for international collaborations in cancer research.

We at the MRC are always ready to explore new initiatives with our partners in other countries in Europe and beyond, particularly in the area of clinical trials. For example, we established a successful collaboration with the US Veterans Association and Canadian Institutes of Health Research, so that jointly we can fund larger, more powerful, and hence shorter, studies than can be achieved nationally. Such interactions also help best practice in trial design and management, and maximize the effectiveness of the investment of the three funding bodies. The first study of this group, the $12 million OPTIMA clinical trial for the evaluation of clinical management strategies for HIV patients, was launched recently.

In Europe, the Pasteur Institute, other French organizations, and the MRC are taking a lead role within the European Community in the development of a broad and coherent response to the ongoing emergency caused in developing societies by the major communicable diseases: malaria, tuberculosis, and AIDS. The aim is to establish a European Clinical Trials Platform (ECTP) to accelerate the development of new clinical interventions against their diseases. Again, the method envisaged is to network the relevant national research programs of key European Union (EU) Member States, in this case in collaboration with developing countries in sub-Saharan Africa.

National research organizations can also participate in cross-border research through their research institutes. For example, MRC Units and Institutes are involved in many international collaborations. In the European arena, these include more than 60 major research and training networks funded by the 5th EU Framework Programme. We believe in nurturing closer links between national centers of excellence in key strategic areas where mutual benefit can be identified, both with partners in Europe (for example, in mouse genomics) and the United States (in cardiovascular research). This follows our view that effective and productive collaboration

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is best facilitated by modifying existing mechanisms to respond to scientific vision from the research community.

How can we link research groups from other countries to national collaborative groups? The MRC has a funding scheme for cooperative groups, where the aim is to bring together a critical mass of independent researchers and their projects to increase productivity. Enabling groups from outside the UK to join cooperative groups might prove effective in opening up science funding in Europe. Mobility of young scientists is an essential part of international collaborations. This is why we contribute to the international European Molecular Biology Organization and Human Frontier Science Program fellowship schemes and hope to make MRC research studentships available to all European Union nationals in the future.

POLICY FORUM: SCIENCE IN EUROPE

European Science

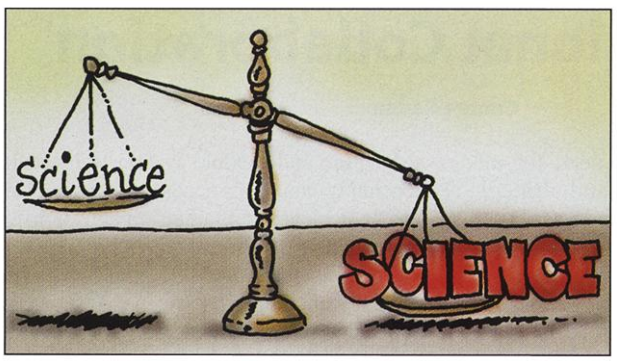
Ernst-Ludwig Winnacker

The global quest for scientific excellence has intensified enormously in recent years. In contrast to its competitors, such as the United States, Japan, or China, which have national institutions and a national culture, Europe is a multitude of nations, cultures, and languages. Now, only a small portion of science takes place at the European level. Accordingly, there are not only different stakeholders responsible for research in Europe, like the European Union, large European facilities, national governments, national research councils, and various national research institutions, but they carry quite different weights. Certainly, many national research councils are already using foreign experts to reduce possible national biases and thereby to set benchmarks for national research against international standards and competition. However, most evaluation exercises identify national, rather than European, pecking order.

The concept of the European Research Area aims at a higher degree of integration in European research by overcoming national boundaries and obstacles. It is driven by the recognition that basic research has intrinsic value, as well as driving technological progress and thus economic development.

However, present funding approaches have several limitations. First, only 4 to 5% of total research and development (R&D) funding in Europe is provided by the European Community within its multiannual Framework Programme, whereas, for example, the national research councils together have 30% or more of these funds at their disposal. Second, although some established European institutions such as the European Organization for Nuclear Research (CERN), European Molecular Biology Laboratory (EMBL), and European Space Agency (ESA) are undoubtedly success stories, they represent the rather small sector of "big science." Science-driven instruments for "small science" in Europe are much less numerous. Third, by virtue of the Treaty, the focus of European Community policy is on strengthening the scientific and technological bases of European industry. Furthermore, in trying to seek regional balance, it cannot, in general, apply the rigorous conditions necessary for identification of true scientific excellence.

So how can we proceed? It seems only natural that the national research councils of Europe are increasingly being challenged to search for new solutions. They operate in close contact with the scientific community, they work on the principles of scientific self-governance, and they have competitive selection mechanisms already in place to identify scientific excellence. They can achieve closer cooperation in several ways. They can, for example, open up their national programs to scientists from other countries; they can run joint, bilateral, or trilateral programs by sharing the respective costs; and they can permit scientists to take grants with them when they accept academic positions in other countries. In fact, such cross-border cooperation has increased in recent years. This is encouraging, but it may not be enough.



In recent discussions of EUROHORCs (*1*), I have proposed that we expand beyond current mechanisms of cross-border cooperation and aim for the creation of a European Research Council (ERC). To me, this would be an important instrument for European research at the independent, nongovernmental level of the national organizations, in parallel to the governmental level of the European Commission in Brussels. As a first step, this can and should be done without setting up a new administration. In my eyes, the European Science Foundation (ESF), the only European-wide body in which all these national organizations in Europe are represented, should be our partner for such a collaborative effort.

Several new approaches have recently been tried or put forward. The EUROCOREs (ESF Collaborative Research Programmes) are European-wide cooperative activities to foster the interaction of national funding agencies within the framework of ESF. The first three thematic priority programs (the origin of languages; continental margins; and self-organized nano-structures) have been set up with the aim of identifying the best performers and/or interactive projects through rigorous international peer review. The identification of themes is strictly bottom-up and is based on truly competitive mechanisms as they have evolved in most research councils. Another activity under discussion aims at the creation of high-level European junior research groups, headed by top-quality junior scientists, who would set up mixed European research groups in a country that is not their own.

I suggest that, for a start, each participating council should contribute roughly 0.5% of its budget into a common pool. Thus, with an amount of about 25 m€, we would be able to initiate joint support for these two activities—European thematic priority programs on the one hand, and top-quality personal grants on the other. With a significant (although by necessity limited) advance, we can open the door to an ERC.

There is also a good chance of support for such activities from the European Union within the forthcoming 6th Framework Programme. Philippe Busquin's vision of a competitive and prosperous European Research Area certainly deserves our concerted effort.

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References and Notes

1. EUROHORCs is the informal group of presidents and chief executives of national research organizations in Europe who meet for consultation twice a year; see http://www.eurohorcs.org/

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