

Europe Is Mostly United but Lacks a Common Support of Young Investigators

EUROPE comprises 46 countries with at least part of their territory inside the geographical boundary of Europe (*i.e.*, Russia, Turkey, Greenland, Kazakhstan). Twenty-seven of these countries, with a total population of approximately 500 million inhabitants, are members of the European Union (EU). According to the combined gross national product, the European Single Market is the biggest market in the world. However, Europe comprises a union of sovereign states, with only partial central control held by the EU. Responsibility for research and education remain mostly under national control. More than 2 decades ago, the EU identified research and innovation as a major contributory factor for economic growth, job creation, prosperity, and quality of life.* The EU is building up research programs in which researchers of all countries are invited to engage. Within Europe, it is recognized that not only industrial but also public funding needs to be substantially increased to come close to the investments in research of other major developed countries (*i.e.*, the United States, Japan) and to remain competitive in the fields of technology and innovation.

For the support of cross-border research, a single European Research Area is being built upon to encourage cooperation between European countries and establish networks for knowledge transfer among leading European researchers. Since 1984, the research and technological development policy of the EU has been founded on multiannual framework programs.† The most concrete manifestation of the EU research and innovation policy is the Seventh Framework Programme (FP7) spanning the years 2007–2013, with a total budget of 50.5 billion Euro.‡ The EU recognizes that Eu-



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rope is short of skilled researchers and aspires to support young academics by improving career opportunities. Cutting-edge research projects, such as the Virtual Physiologic Human or the Human Brain Project, are supported by the EU, but these are designed for experienced researchers and their groups. Young investigators can be involved as part of those groups to obtain high-level research experience.

How this does translate into support of young investigators in the field of anesthesiology? Why is there no EU-wide single program for research in anesthesiology?

One problem for anesthesiology in Europe (and also worldwide) is that this field generally is not recognized to contribute to cutting-edge research for the well-being of patients or solve major issues in health care. One may also claim that anesthesia *per se* is “too safe” to be of any value for funding agencies because of the view that anesthesia does not contribute to the solution or cure of widespread diseases. Nevertheless, there are many unsolved problems with the need for experimental and clinical research within the broad field of anesthesia.

Typically, funding agencies look at anesthesia-related open questions from a broader perspective. Anesthesia treats patients of all ages and with severe comorbidities, but it is widely perceived that it is not the role of anesthesia to cure patients or find underlying pathomechanisms. Thus, the bulk of research funding goes to programs in areas with perceived healthcare impact. Anesthesia may claim to address healthcare problems of general interest (*i.e.*, hypertension, stroke, postoperative cognitive dysfunction, or fetal neurotoxicity), but these are either preexisting diseases or sequelae of therapeutic interventions. However, there are fields in which anesthesia can make substantial scientific contributions. For example, the main target of anesthesia is the brain, and worldwide more than 100 million anesthetic procedures are performed each year. This is a tremendous resource for the investigation of brain function and the underlying physiology or pathophysiology of unconsciousness. This question is not only of interest for discovering anesthetic mechanisms but also for basic science striving to understand brain function. Patient safety and the development of medical technologies are other areas in which anesthesia can make substantial

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* http://europa.eu/pol/rd/index_en.htm. Accessed May 8, 2011.

† http://europa.eu/legislation_summaries/research_innovation/general_framework. Accessed May 8, 2011.

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research contributions. Thus, there are distinct clinical areas where anesthesia can take a leading role. Worldwide, anesthesia leads or contributes to intensive care medicine and pain and emergency medicine. Parallel research contributions explore the pathophysiology and treatment of severe diseases, such as sepsis, neuropathic pain, and trauma.

These and other areas can be identified for future research in which young researchers can be trained to take a leading role. However, the support of young investigators in Europe is as diverse as the different countries. There is no uniform approach to this challenge, and only a few examples can be given.

The European Society of Anaesthesiology (ESA) represents European anesthesia as a single body. It comprises individual memberships and the memberships of 37 national anesthesia societies across Europe, representing approximately 40,000 anesthesiologists. The ESA has identified the support of young investigators as a priority. At its annual meeting (Euroanaesthesia) each year, approximately 900 scientific posters are presented and a variety of research grants are awarded to young investigators.

Since 2010, the ESA Clinical Trials Network has provided an infrastructure to foster multicenter studies across Europe in the fields of anesthesia, intensive care, pain management, and emergency medicine. The ESA as a young society is still building a structure for support of young investigators, the responsibility for which still falls primarily to national societies and governmental funding agencies. The spectrum of support across Europe varies not only in western European countries but also eastern European countries with limited financial healthcare resources. The following are only a few examples of support for young researchers.

United Kingdom

After a report describing the weak research base in anesthesia, pain management, and critical care medicine, United Kingdom funders of research in these areas came together to form the National Institute of Academic Anaesthesia to coordinate grant giving with shared peer review. Funding from the Institute is automatically “adopted” by the National Institute for Health Research, which pays overhead for research in public hospitals. The Institute recognizes the need to identify and encourage young investigators and runs research methods study days and an annual investigators day for sharing research and networking and acts as a clearinghouse for information about fellowships, funding opportunities, and so forth.

The United Kingdom has separate research support structures in England, Wales, Scotland and Ireland. In the largest (English) system, the National Institute for Health Research awards are competitive with Academic Clinical Fellowships to trainees (residents), allowing them as long as 3 yr to gain research experience and develop a competitive grant proposal for a training fellowship for a higher degree while they continue basic clinical training.

A research training fellowship provides as much as 3 or 4 yr support and allows individuals to complete a doctoral degree while continuing 20% of their time in clinical activity. For hospital physicians, this fellowship extends to the end of professional training and leaves them ready to take faculty positions in academic departments. Increasingly, such academic posts are supported through national Lectureship schemes, with the holder embedded in a host department.

The current impediments to enthusiastic junior doctors who wish to take up an academic career are the extended training time necessitated by concurrent academic activity, the highly competitive National Institute for Health Research awards process, and the limited number of fully funded faculty positions. The United Kingdom curricula for anesthesia, pain medicine, and critical care are competency based, and with a sympathetic clinical department and careful choice of rotations, the academic trainee can complete both academic and clinical training without excessive prolongation of training. This works best where good relationships exist between academic and service-focused staff.

Funding in academic medicine in the United Kingdom is tight, and clinical departments face great production pressure. Nevertheless, national coordination and a universal recognition that academic medicine requires robust support has markedly improved the prospects for academic careers during the past few years.

Germany

In Germany, the predominant funding agency for research is the Deutsche Forschungsgemeinschaft (DFG). The DFG is a self-governing organization for science and research in Germany, serving all branches of science and the humanities. The majority of its funding money is received from the German States (Bundesländer) and Federal Governments. It is an association under private law with memberships of German research universities, nonuniversity research institutions, scientific associations, and the Academies of Science and the Humanities. The procedural regulations guarantee science-driven decisions.

The DFG offers individual grant programs as the central form of research funding. A research grant can be used to fund staff, scientific instrumentation, consumables, and travel. Especially for young investigators, the opportunity to engage in scientific networks and special research fellowships is offered. High-level support for young researchers seeking to achieve independence at an early stage in the scientific career is offered by the Emmy Noether Programme, which is granted for a period of 5 yr for establishing and leading an independent junior research group. For researchers who have qualified for professorship *via* the Emmy Noether Programme, the Heisenberg Program is an additional funding tool to promote and maintain young outstanding and highly qualified researchers as they continue their careers and to prepare them for a leading position in science and research. A joint funding program of the DFG with the US National

Institutes of Health was initiated to enable young scientists to pursue research over a period of 5 yr, beginning at of the National Institutes of Health in the United States and continuing at a German research institution. A variety of other programs aimed at young researchers, such as research training groups or international cooperation, are offered by the DFG. § Besides these funding initiatives are accessible to all researchers and scientific disciplines in Germany, the German Society of Anaesthesiology and Intensive Care Medicine (DGAI) offers a variety of funding tools for young researchers. Financial support is provided by a variety of research grants primarily sponsored by industry but independently awarded by the DGAI. As a unique tool for support of young researchers, the DGAI organizes annual meetings specifically dedicated to scientific contributions of young investigators. As another support tool, the DGAI has established a scientific study group (Wissenschaftlicher Arbeitskreis wissenschaftlicher Nachwuchs.) in which young investigators are encouraged to participate, discuss research topics, and establish networks. Specific projects are a mentoring program, preassessment of research grants for DFG proposals, science skill seminars, and a mission vision. || There is also a mentoring program for doctorate and postdoctorate fellows, in which each individual young researcher gets assigned to a senior researcher, who can help with the younger researcher's career. The DGAI has also established an initiative called "young anaesthesia" for involvement of residents in the work of the society and to enhance their influence on discussions and decisions of actual and future topics relevant for the development of anaesthesia.

Italy

In Italy, there are no special programs for support of young investigators interested in anesthesiologic experimental or clinical research. Limited grants from the national or international scientific societies are available. In Italy, the following institutions provide financial support or control for re-

search at the national level: Centro Nazionale Ricerche (the National Research Center), the National Institutes of Health (Istituto Superiore di Sanità). These institutions do not provide direct financial support but organize research and its control. The Agenzia Italiana del Farmaco (Italian Agency for Drugs, similar to the US Food and Drug Administration), whose role is one of control, but the agency also gives additional financial support to research for specific research topics. The government through the Ministero dell'Istruzione, dell'Università e della Ricerca (Italian Ministry of Education, University and Research), which provides direct financial support and control. In Italy, there is no established unique system to support young researchers and investigators.

Other European countries have established or are in the process of building up support programs for young investigators. On a national and international basis, anesthesia has to compete with all other fields of science. Collaborating with other disciplines and establishing research networks is more important than ever for obtaining funding in this highly competitive environment. Individual support is necessary, but the most promising approach for success is to identify cutting-edge topics and collaborate with other researchers, not only nationwide but internationally. The task of all national anesthesia societies in Europe is to encourage young researchers, provide an adequate environment for research, and strengthen and collaborate efforts within Europe. Until now, each European country has followed its own strategy, depending on financial and institutional resources. This is the situation in which the ESA tries to step in to encourage and support young researchers by offering a European platform for research, education, and communication. This is a tremendous task considering the different structural, organizational, and professional backgrounds of the 46 countries represented in the ESA.

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§ <http://www.dfg.de>. Accessed May 8, 2011.

|| <http://www.wakwin.de>. Accessed May 8, 2011.