conclusions in December 2003. The European Parliament and the Council of Research Ministers will then make their decisions as to whether and how to implement an ERC that could be up and running as early as 2005, or as late as 2007. However, the Council still have to approve this new appropriation of funds from within the overall EU budget, which is by no means given. "We must fight with all the support we have," Mitsos told the scientists, to convince the Council of the need to support basic research at a European level. So far, there has been "a remarkable amount of consensus" among the scientists who would use an ERC and the EC as the funding organization, Connerade said, but now "the scientists should get together and say what they need."

These are new tasks for scientists, many of whom are not familiar with this kind of lobbying, but finally seem to have found a case worth fighting for

"It has been the pressure by Denmark and the ERCEG and by you people that has triggered the EC to act," Mogens Flensted-Jensen, Vice Chair of the ERCEG, addressed the scientists, but warned that the momentum gained must not be lost. One early reaction was to draft a document to the EC and the Council that expresses the need for more support of basic research and represents the views of the majority of the scientific communities in Europe on how this could be organized. Other measures discussed included contacting members of the European Parliament and national governments to convince them of the necessity of establishing an autonomous and independent ERC. These are new tasks for scientists, many of whom are not familiar with this kind of lobbying, but finally seem to have found a case worth fighting for. As Federico Mayor, Chair of the ERCEG said, "This is a political issue, so we must follow the political route." But even if the dream of an ERC is not realized, the Dublin meeting highlighted an interesting development in the European research scene: for the first time, scientists from all disciplines gathered and discussed how to engage in and shape European research policy.

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Time for an overhaul?

The French system to fund and organize research faces various challenges in the near future. To keep up with other countries, it has to undergo some fundamental changes

Ever since the French government announced indiscriminate finance cuts in research last year, trimming one-third off every lab budget, the future of public research has become a great concern in France. This measure, aimed at relieving France's growing debt—a violation of the Maastricht treaty, which allows a maximum of 3% public debts—caused an unprecedented furore among French researchers and prompted much reflection on the future of scientific research. Critics feared that the budget cuts would not only hurt research, but also deprive young students of opportunities in research and discourage them from attempting to establish a career in a system that is often defined to be in malaise.

This year's financial perspective for French researchers improved after the Ministry of Research and Technology announced in late September a significant increase in research investment of 3.9% with respect to last year. But the French research system has other problems to address, mostly concerning its structure and organization. Most critics refer to its excessive centralization, its rigidity when it comes to recruiting scientists and appropriation of funds, insufficiencies in technology transfer and last but not least, the declining state of public universities. Indeed, there is an increasing awareness in both the research community and the political leadership of the current imperfections. More importantly, however, Claudie Haigneré, the new French minister for Research and New Technologies, has expressed a will to overhaul the current system and to carry out some pragmatic reforms to overcome its weaknesses.

Even if criticism of the French research system is mounting, the overall picture is not so negative. France's expenditure on research and development (R&D) of 2.13% of its gross domestic product (GDP) in 2001 was clearly above the EU average of 1.9%, compared with 2.7% in the USA and 2.98% in Japan (European Commission, 2002).

Within Europe, France spends a greater share of its GDP on R&D than the UK (1.86%), and occupies a solid fourth position after Sweden (3.78%), Finland (3.67%) and Germany (2.52%). Furthermore, President Jacques Chirac seems to be committed to increasing the spending rate to 3% by 2010, as was agreed among the European heads of state in Barcelona, Spain, in 2002. Two-thirds of the money will come from industry and the remaining one-third will be the government's responsibility (Gannon, *EMBO Rep.*, 4, 117–120; 2003).

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In addition to the input of funding, another useful indicator of a national research system's performance is the output of scientific knowledge—usually reflected by the number of scientific publications and their impact factor, that is, how often they are cited by other articles. According to the Paris-based Observatoire des Sciences et Techniques (OST), the contribution of French researchers to the world scientific publication output from 1997 to 2000 remained at a stable 5.2%, fifth after the USA, Japan, the UK and Germany. In 2000, the impact factor of French publications was 0.94, lagging only behind the USA (1.43), Germany (1.08) and the UK (1.05; *OST Newsletter*, 26; 2003, figures based on ISI data).

From a look at these data, "rather than talk of a declining status we should talk of a system in stagnation," commented Laurence Esterle, Director of the OST, in the institute newsletter (as above). There are many factors that contribute to this standstill. Philippe Kourilsky, Professor at the College de France and Director General of the Pasteur Institute in Paris, one of France's leading research campuses, pointed to the lack of autonomy of public

research institutions as one main problem: "Public research suffers from a rigid centralization." Since the days of Napoleon Bonaparte, French universities have always been considered an extension of the State's administration and thus have not had the freedom of self-management (Postel-Vinay, *Éditions Eyrolles*, p.36; 2002). Kourilsky would therefore like to see the creation of "more autonomous and thematic research campuses, defining their own global scientific strategy and enjoying an independent technical platform and administrative and financial management resources."

"Rather than talk of a declining status we should talk of a system in stagnation."

From his privileged position, Kourilsky prompted that "we also need to lend a hand to public universities, which cannot be kept in their current state." These have always had to deal with the competition imposed by the 'grandes écoles' and other large research institutes, which attract the best students and receive the highest credit and support from research organizations. "This cannot be changed altogether," he warned, but he envisages the creation of legal entities overlapping university and national research organizations, such as the Centre Nationale de la Recherche Scientifique (CNRS), and "a good redistribution of duties and responsibilities within these mixed structures, in a fruitful collaboration."

The second most important factor for success—after sufficient funding—is the human factor, and research performance depends heavily on how this resource is managed. At first glance, French scientists are clearly better off than most of their colleagues in the USA and elsewhere in Europe. Researchers are classed as civil servants, a protected species, who enjoy life-tenure positions and a secure monthly salary, and are recruited through annual state competitions. This type of hiring reflects the tradition of the French economy in which short-term employment is very rare. However, this may not be the best strategy for scientific research, because it results in a rigid system with no clear alternatives between a PhD and a permanent position and does not promote mobility between laboratories. Salaries, set by the State, are not internationally competitive. Furthermore, French laboratories often

prefer to recruit someone they know and thus the rate of 'inbreeding' or 'favouritism' (Soler, *Nature*, **411**, 132; 2001)—the percentage of staff holding positions in the same establishment where they were trained—is 65% in France. This is smaller than Portugal (91%), Spain (88%) and Italy (78%), but far higher than the UK (5.2%) and Germany (1%). Although inbreeding may be good for some areas of the workforce, it is not necessarily good for science. Indeed, even while criticizing the many shortfalls of the postdoctoral system in other countries, and the financial and social burden it creates for young scientists, critics also acknowledge that it is still the best way to manage scientific careers and identify outstanding and brilliant young scientists (Dillon, *EMBO Rep.*, **4**, 2–4; 2003).

Some, however, defend these lifelong contracts for researchers as advantageous. "Having a life-time contract places researchers in a protected and comfortable position and allows them to embark on risky, ambitious and original projects outside the common trend, that otherwise private-funding bodies would not be willing to finance," said Pierre Joliot, Professor at the Institut de Biologie Physico-Chimique, Paris. French researchers, exempt from the 'publish or perish' rule, therefore have the necessary safety to conduct risky but excellent research, without jeopardizing their salaries and basic lab budget.

A further key feature that has drawn criticism is the funding strategy for research. In addition to funds originating from charitable trusts, which are rare and strictly thematic, and money coming from international grant agencies, the majority of financial resources for research in the life sciences is provided by the government through two national research organizations: the CNRS and the Institut National de la Santé et de la Recherche Medicale (INSERM). The money, renewable roughly every four years, comes as a direct appropriation to each research unit—a sub-department consisting of a number of laboratories. This means that the money is thinly spread between individual laboratories. This way of distributing funds is similar to the Spanish Consejo Superior de Investigaciones Cientificas (CSIC) and the Italian Consiglio Nazionale delle Ricerche (CNR) but clearly different from the competitive peer-review system at the

US National Institutes of Health, the British Medical Research Council or the Deutsche Forschungsgemeinschaft in Germany, in which funding is allocated to individual projects according to their quality. Christos Goriadis, research unit coordinator at the Ecole Normale Supérieure in Paris, envisages an ideal system in which elements of the Anglo-Saxon system are incorporated into the French one. "In addition to the default funding allocated equally to all laboratories, a second and large portion of the money could be more flexibly sought by competing researchers from research councils and organizations, based on individual peer-reviewed projects." This hybrid system of funding has been used in Switzerland and Scandinavian countries for some time. In Sweden, for instance, several new national research councils were established in 2001 to strengthen their national system.

[The French system of permanent positions in research] may not be the best strategy for scientific research, because it results in a rigid system with no clear alternatives between a PhD and a permanent position and does not promote mobility between laboratories

In addition, the money distributed every four years in France is normally assigned to the heads of research units, sub-departments that comprise several laboratories with a common research direction, but carrying out different projects. "It would be much simpler if every four years, each lab were to apply for the renewal of their budget instead of receiving an aliquot of the money given to the unit," added Goriadis. "Each lab belonging to a unit has different needs and should therefore have an individual, specific monetary supply." On this issue, Joliot takes a more protectionist stance. "Each country has its culture and its social status and it has found the best way to manage its scientific enterprise," he said. "I cannot say our research system is the best or that it should be imposed on other countries, but it is inherent to our culture and we should be careful when directly transposing into it elements from the Anglo-Saxon system."

Overhauling the French research system to make it fit for the future requires dedicated political leadership. Claudie Haigneré, minister for research since June 2002, is dedicated to bringing about change. A medical doctor, the nation's first female astronaut, and the only woman qualified to bring the International Space Station's *Soyuz* lifeboat back to Earth, she is both sympathetic to the plight of young researchers and aware of the faults of the system. Haigneré plans a radical reform that concentrates on investing more in younger scientists by ensuring their independence and high-quality projects and by overhauling the funding system. She would like to put an end to premature lifetime recruitment by enforcing an interim fixed-term-contract phase of 3–5 years, during which young scientists are offered attractive research conditions and must prove their worth. This initiative is intended to soften up the current rigid system and promote the mobility of young scientists who want to change laboratory after their PhD; the French ministry does not plan to do away with lifetime recruitment altogether, it only intends to delay it. Haigneré has already introduced a postdoctoral system, through which 400 fellowships were granted in 2003 and 600 are to be distributed in 2004 among the CNRS, INSERM and other organizations. However, the duration of these grants is only 12 months with the possibility of a six-month extension, which is a rather short time for ambitious postdoctoral projects.

Overhauling the French research system to make it fit for the future requires dedicated political leadership

As for funding, Haigneré agrees that a more competitive allocation of funds on the basis of peer-review, following the Anglo-Saxon model, could improve the existing system. Things cannot be changed with the stroke of a magic wand, however, and it is certainly going to take time to realize this measure. In the meantime, the French government passed a law last August to facilitate the creation of new foundations devoted to raising funds for fundamental research, and to alleviate the fiscal burden of donors and contributors by reducing the taxes on such donations by 60%.

Despite its weaknesses or imperfections, the French research system is not necessarily in a crisis and can still draw on an outstanding scientific tradition. Pierre and Marie Curie, Louis Pasteur, Jacques Monod, Francois Jacob, André Lwoff and Boris Ephrussi all conducted their research and achieved their success in France. But one cannot rely on tradition alone, particularly in a fast-changing world with increasing globalization, so a genuine, introspective rethinking of the system is clearly needed.

And while many European countries are trying to fix defects in their national research systems, it is also a crucial time for Europe as a whole to consider its goals and responsibilities in the management of science. Change may therefore not just come about from within, but also from the outside with the creation of new European research and funding institutions.

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A second chance for hormone replacement therapy?

Hormone replacement therapy for older women has been vilified after two major studies showed that it increased their susceptibility to various diseases. But scientists maintain that, used differently, it can still help to protect against neurological and cardiovascular diseases

The results of two large-scale studies on the health risks and benefits of hormone replacement therapy (HRT) for post-menopausal women dropped a bombshell of bad news this year. The Women's Health Initiative (WHI) study, sponsored by the US National Institutes of Health (NIH), and the UK's Million Women Study, sponsored by the British Medical Research Council (MRC) and Cancer Research UK, both found that HRT significantly increases the risk of invasive breast cancer. The US study also found higher risks of heart attack, stroke and blood clotting. The NIH took the unusual step of halting the WHI trial and recommended that women stop taking HRT for mild menopausal symptoms. However, many researchers maintain that these studies tell only one side of the story and that HRT, if the right drugs are used with the right regimen in the right patients, can indeed be beneficial to women's health.