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Monkeying around

China, with its freedom from the ethical pressures experienced by researchers elsewhere, is poised to become the go-to country for work on non-human primates.

In China, this is the year of the monkey. And for Chinese science, the rise of research with monkeys promises to make the next few years especially noteworthy. The country has for a couple of years been struggling to implement a major brain project, partly because officials have been trying to work out what its unique angle should be, given that similar efforts are already under way in Europe, the United States and Japan. Now researchers say that the project will be announced soon, and that primate research will feature heavily. It is natural for China to be willing to extend this line of research — and useful for the rest of the world, because elsewhere it is becoming more difficult.

As we explore in a News Feature on page 300, access to abundant non-human primates gives researchers in China a serious advantage in many key areas of preclinical study, as well as in emerging areas of basic science. With their prodigious new-found ability to apply gene-editing techniques in monkeys, for example, Chinese researchers are converting that abundance into prominent publications.

The importance of China is clear from the contrasting picture in Europe. Munich, for example, is one of Germany's main hubs for biomedical research. The large biomedical campus on the outskirts of the city is home to a large number of exciting basic-research centres and successful biotechnology companies. Last week, it announced another splendid addition — a stem-cell centre, due to open in 2017. The centre, which will provide a research and drug-screening platform based on the use of induced pluripotent stem cells, is designed to boost the translation of basic research into medical applications by identifying candidate therapies. But there is a hitch.

CRUCIAL ROLE

The German federal government, like most European governments, is pushing translational research in medicine, and its planning can't be faulted — except for one thing. It has no strategy for the primate research and testing that will be needed to move many candidate therapies into the clinic. There is a reason for that. Primate research in some German centres and elsewhere is under pressure from campaigners and politicians. The Netherlands voted late last month to revisit a 2013 parliamentary question on whether and, if so, how the country could end primate research within a decade — a stance that is sharply at odds with its own heavy promotion of translational research.

This hardening of attitudes comes as researchers and governments alike seem to agree that monkey research has a major role in many fields. That point was made dramatically during the Ebola crisis, when therapies based on monkey studies were successfully rushed into use; and ongoing investigations in Zika might make the point again.

Why does that general agreement not translate into consistent support for the primate studies that will be needed now and in the future to extend crucial areas under investigation, especially in neuroscience? The same government agencies must also consider the views of society at large, which, as our understanding of monkeys' capabilities and commonalities with humans grows, is ever more strongly against research on primates. This is a valid perspective and needs to be balanced with the societal benefits that can be gained only through primate research. Such research is not an all-or-nothing proposal; it is one that requires continuous debate over where the research is warranted. Right now, however, too many politicians in Europe are shunning that debate, taking the easy way out and withdrawing support. This leaves a big gap in the translational-medicine programmes that they support. Researchers in China, who do not face these barriers of cost, logistics, regulations or ethical pressure, have a huge strategic advantage. This will give China's brain initiative plenty of room to thrive and leverage to negotiate research collaborations with researchers elsewhere.

Still, China needs to proceed with caution. Researchers should not just rush, for example, to be the first to tweak some gene in monkeys, even though the growing number of gene-modification tools makes it easy. That these techniques work in monkey genomes has been proved by Chinese groups already. The likely clinical and fundamental breakthroughs offered by these experiments must be well mapped out before new projects start.

"Researchers should not just rush to be the first to tweak some gene in monkeys."

This is especially true for experiments on psychiatric and neurodegenerative disorders, which, from a therapeutic perspective, offer some of the most compelling reasons to experiment with monkeys. There's no use in scientists tinkering with monkey genes to create a biomedical model if the experiment doesn't allow an investigation of how genes affect the cells, circuits and behaviours thought to be implicated in brain disorders. This requires a rigorous comparison of behaviour in the modified monkey and a normal monkey. Because the ultimate aim is to learn about human behaviour and pathology, comparison with the human disease must also be included. In many cases, these will be totally new areas of investigation not just for China, but for researchers around the globe. Few have expertise with the necessary reach. Some have experience in basic systems neuroscience, but little idea of how to approach disease. Others might work on rodent disease models, but have little understanding of primate brain function.

China should consider hiring or collaborating with scientists who are up to speed on both monkey and human behaviour. Many researchers in Europe and the United States who are keen to carry their projects through to the monkey model are sure to be interested. More-structured top-level coordination with the national brain initiatives elsewhere is also worth exploring. Chinese researchers' freedom from animal-rights pressures will probably continue for the foreseeable future, but it is not a given. To maintain that support, and to make it easier for researchers elsewhere to form collaborations, they will have to show that they are abiding by principles that guide the international scientific community — that monkeys should be used only when necessary and in as small a number as possible. ■

Red-tape tangle

Attempts by the European Union to stimulate innovation are stifled by bureaucracy.

The damning report released by auditors last week on the European Institute of Innovation and Technology (EIT) was predictable. Since it was conceived about 10 years ago, the EIT — a €3-billion (US$3.4-billion) mechanism that is supposed to stimulate innovation in areas that are considered to be among Europe's foremost societal challenges — has suffered more than just teething problems (see page 291).

As the auditors pointed out, the EIT has struggled to align business and research communities in sectors such as public health or the development of clean technologies in a way that could address common market failures. The EIT as a whole has still to prove that its existence makes a real difference. To do so, managers must monitor more closely — and demonstrate more plausibly — whether the substantial tax money spent on the EIT triggers the desired effects on innovation.

Creating commercially relevant knowledge through basic research needs incentives. But innovation is not something that technocrats (or bureaucrats) can easily order. Innovation and bureaucracy are in fact not a good match — too much of the latter is one of the reasons why the EIT has failed to meet expectations.

The audit report comes as proposals swirl for yet another European Union innovation body — one to be called the European Innovation Council. The idea might seem inappropriate at a time when top-down approaches to stimulate absent market forces have been weighed and found wanting.

But the EIT's failure is a good occasion to think about what is missing. It's a given that the EU needs to unlock its innovative potential to make its ageing societies fit for the future and create jobs for the next generation. So why are the EU's economic competitors in North America and Asia more able to transform the ideas of academic scientists and engineers into marketable goods and services?

It is not for want of good intent and trying. European universities have long ceased to be academic havens where students and staff ponder the wonders of the world in splendid isolation. Science parks, incubators and technology-transfer offices have become the rule on European campuses. Also, the European Commission's €80-billion Horizon 2020 research programme has a strong emphasis on producing applicable science in partnership with small and large companies. Other schemes — EU Finance for Innovators, Joint Technology Initiatives, European Innovation Partnerships and the EU Innovation Union — likewise intend to obtain the maximum economic return on research money. And yet the quality in question is in short supply. Why hasn't the investment and effort led to greater innovation?

"There are just too many programmes, too many levels, too many forms, bodies and exceptions."

The byzantine complexity of the EU's innovation support is making it less effective than policymakers would like it to be. There are just too many programmes, too many levels, too many forms, bodies, requirements and exceptions. The bureaucratic confusion is not stifling innovation all together — the EU's graphene flagship project and countless small entrepreneurial success stories are sufficient evidence that some things do work very well. But given the EIT dilemma, Europe's leading research universities have rightly reminded policymakers that streamlining and simplifying EU innovation instruments is a better approach to stimulating the sought-after quality than adding another layer of complexity on top of it.

This does not mean that a European Innovation Council — for which the European Commission issued a call for ideas in February — would necessarily be wasted money. But such a council must seek to optimize, rather than add to, the existing portfolio of initiatives and mechanisms. Europe's paradoxical innovation bureaucracy might still benefit from a high-level advisory body comprising competent business leaders, researchers and policy experts. So, incidentally, might the floundering EIT. ■

Expect knowledge

We are gratified when a politician shows that they know about science, but they all should.

"Swans sing before they die —" said poet Samuel Taylor Coleridge, "'Twere no bad thing/Should certain persons die before they sing." Now, not everyone can carry a tune. Neither can everyone act any better than the average block of wood — which is why people at large seem to lend credence to singers, actors and other celebrities when they effuse on subjects that they know nothing about.

No one can doubt the prodigious acting talent of Robert De Niro, but does his turn as the young Vito Corleone in *The Godfather Part II*, or the tortured Travis Bickle in *Taxi Driver*, qualify him to opine on the link between vaccination and autism? Is he talking to me? I repeat: is he talking to me? (Clue for any readers bewildered by this: despite statements made by De Niro last week, there is no evidence for any link between vaccination and autism.)

Politician Sarah Palin has no acting ability, save that which might be parodied by the comedian Tina Fey, yet she has power and influence, which makes her increasingly barbed attacks on the reality of anthropogenic climate change all the more worrying. (Further guide for the perplexed: despite Palin's latest statements on the subject, also last week, yes, anthropogenic climate change is real.)

As the weekend approached and science had its head in its hands at the way it was being treated (again) by the news, salvation of a sort appeared. No less a person than Justin Trudeau, the debonair Prime Minister of Canada, offered an impromptu (and accurate) explanation of quantum computing at a press conference. In response, parts of the Internet have exploded into what can only be described as a nerdgasm. Why the eruption of reaction, one is entitled to ask? Shouldn't we expect all our elected representatives to be so conversant with the scientific issues of the day that explanations of quantum computing by any one of them should barely twitch a cat's whisker?

At this point, one might take a duster to scientist and novelist C. P. Snow's oft-cited 1959 tome *The Two Cultures* and refer wearily to the preponderance of a humanities education among the political class. Yet the most cursory scan of the news headlines shows how important science is to human well-being. Emerging diseases, energy policy, transport, conservation and, yes, climate change and vaccination — almost every sphere of government requires at least some familiarity with science. Especially given that most science funding is still disbursed by politicians on behalf of the public.

The problem is that science, if done properly, rarely comes up with the sound-bite certainties and expedient spin that politicians demand — nor the ability to say one thing while meaning something quite different. So perhaps it is not so surprising that the latest brave attempt by a politician to grapple with science involves the quantum world, where it is possible for something to be both true and false at the same time. ■

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