From inhibitor to drug: mind the gap!

There was a time when academics were reluctant to work on anything that could be commercialized. Applied research had its place, but not in the university laboratory. One reason for the unwillingness to follow up on basic research was a widespread conviction that it is less of an intellectual challenge to turn a promising discovery into a new therapeutic than, say, defining a signal transduction pathway. Furthermore, applied research had a slightly tainted image—it is, after all, about making money. Some remnants of these attitudes still linger in academic circles, but most scientists have realized that there must be a continuous path from the knowledge created in the academic laboratory to the products that cure disease. This is now apparent in grant applications: increasingly, scientists argue that the proposed research project could help to cure a particular disease. And for many, the day will come when results immediately point to a potential new drug or product.

Of course, scientists cannot complete the journey from discovery to drug without help, because there are simply too many skills required for the task. One obvious solution would be for researchers to create partnerships with pharmaceutical companies. They have the skills, experience, chemists, pharmacologists, toxicologists, animal models and patent lawyers to develop a drug and bring it to market—and they have the money to finance such a massive undertaking. But they have also seen many molecules fail to live up to their promise, and understandably have a cautious attitude. They might decide that the potential market is too small to warrant their interest. They may even take the idea but give it such a low priority that it never moves forward. Conversely, they might pay for the invention, but I rarely hear such stories.

An alternative is to target smaller biotech companies, but they have limited

resources—both in terms of finances and manpower—which they must focus on their own products. Indeed, they are often in the same position as the academic researcher, as they must constantly search for new funding to keep their own ideas alive.

Sometimes the solution is to start a new company—an idea much loved by governments expecting new jobs in the high-tech sector—but the problem of funding remains. The intellectual property basis must be sufficiently broad, but it is not always possible for an academic research group to come up with more than one promising idea or prototype. One solution is to combine various concepts by teaming up with other research groups doing compatible work elsewhere. But even with all of this in place, it is still difficult to obtain sufficient funds. Even in countries that have active support systems for start-up companies—including grants, soft loans, professional advice, and the provision of laboratory space—the company itself must secure most of the money needed to fund the various stages of drug development.

Most start-up companies eventually approach venture capitalists, who have the money and expertise to separate over-enthusiastic ideas from winning concepts. But getting involved with venture capitalists also means that, sooner or later, they—‘the money’—will own at least 90% of the company and will decide what it will do, where it will be located and who will run it. This is reasonable from their point of view, but it might not be acceptable to the people who made and supported the initial work and therefore brought the company to life in the first place. By this, I mean the funding agency that provided the research grants, which may be based in a different country than the company; the university or research institute, which is in a weak position to demand a greater share as long as

the compound is still in the preclinical research stage; and of course, the research group, which loses intellectual contact with the project and may not be adequately compensated for its contributions to the whole enterprise.

If this chain of events from discovery to product is not better supported, then scientists’ motivation to sacrifice time and effort to set up a company or establish a working relationship with existing companies will disappear—at a time when new technologies and knowledge could lead to many more ‘Eureka!’ moments. Many investments into basic or frontier research, such as the European Research Council, will be undermined if no attention is paid to the gap between incubator and drug. To prevent this from happening, it is necessary to provide more support for the initial steps of product development, where the gaps between the discovery and its validation need to be bridged. If grants—or even loans to be repaid when the company is successful—are more readily available for the early stages when the input of the academic group is essential, and impartial expert advice is available to lead the management on an optimal path, this will reinforce the intellectual and financial ownership of the product by its originators. Greater government support might also ensure that academic groups and fledgling start-ups are less subject to the whims of ‘the money’, that the development of a product is located more closely to the source of the discovery, and that interactions between industry and academia are strengthened. In any case, it would send a clear signal that inventiveness, know-how and entrepreneurship by scientists are valued as highly as financial investment.

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