**Table 2 Guideline university share of equity taken by selected UK universities[a] (%)**

| University | Guideline university share of equity | Guideline type |
|---|---|---|
| University of Cambridge (RG) | 20[b] | Negotiable[b] |
| Brunel University | 20 | Non-negotiable |
| University of Dundee | 20 | Min. |
| Heriot-Watt University | 24 | Negotiable |
| University of York (RG) | 25 | Negotiable |
| Newcastle University (RG) | 25 | |
| University of Exeter (RG) | 25 | Max.[c] |
| University of Manchester (RG) | 30 | Negotiable |
| University of Leeds (RG) | 30 | Non-negotiable |
| King's College London (RG) | 50 | Max. |
| University of Glasgow (RG) | 50 | Non-negotiable |
| Aston University | 50 | Max. |
| City University London | 50 | Negotiable |
| Northumbria University | 50 | Negotiable |
| University of Reading | 50 | Negotiable |
| University of the West of England, Bristol | 50 | Negotiable |
| Imperial College London (RG) | 50[d] | Negotiable[d] |
| University of Edinburgh (RG) | 50[d] | Negotiable[d] |
| University of Oxford (RG) | 50[b] | Negotiable (rarely)[b] |
| University of Warwick (RG) | 50[b] | Non-negotiable[b] |
| University of Leicester | 51 | Min. |
| Queen Mary, University of London (RG) | 60 | Negotiable |
| Swansea University | 60[d] | Negotiable[d] |
| University of Cardiff (RG) | 60[d] | Negotiable[d] |
| University of Liverpool (RG) | 60 | Non-negotiable |
| University of Nottingham (RG) | 60 | Negotiable |
| University of Sussex | 60 | Max. |
| University of Sheffield (RG) | 60[d] | Negotiable[d] |
| University of Birmingham (RG) | 60 | |
| University of Bath (RG) | 67 | Non-negotiable |
| University College London (RG) | Not specified in policy | |
| University of Bristol (RG) | Did not respond to inquiry | |
| University of Durham (RG) | No official published guidelines | |
| University of Southampton (RG) | Not specified in policy | |
| University of St Andrews | Not specified in policy | |

[a]64% (24 of 37) UK universities researched specified a guideline percentage for the university's share of equity in a spin-out company using university IP in a publicly accessible policy statement or a third-party website ([c]). Anonymous survey respondents from three more UK universities reported the standard share of equity taken by their university from their personal experiences ([b]). Full table with references are provided in **Supplementary Table 2**. The authors have made their best efforts to find the most up-to-date, publicly discoverable, online policy documents. RG, Russell Group. [b]Reported in anonymous survey. [c]Figure kindly provided by TTO, specifying that such guidelines are only available to University of Exeter staff. [d]Specified on third-party website and not part of a publicly available official policy statement.

of use and exclusivity versus nonexclusivity. They also do not always appreciate that agreements can be renegotiated after they are signed. Check your university policy; your university might offer a lower upfront payment in exchange for higher royalty rates or vice versa. In our survey, several bioentrepreneurs mentioned that they were able to negotiate payments and duration for options before fully licensing the technology. In some cases, the upfront payment option had been deferred altogether. Remember to be flexible—several US-based TTOs explained that a company without funds could get an option or license agreement by accepting highly structured milestones in lieu of payments.

However, although there are variations around the basic structure of deals, and negotiations might tilt toward the academic entrepreneurs or the university prolonged negotiations often revert to the mean in the United States. One US-based attorney suggested that variance in deal terms are mainly due to the inexperience of one of the parties involved. So know your averages, but don't be timid about asking for what you need.

**Factors to consider in UK licensing deals.** In the UK, licensing deal equity terms are often perceived as being non-negotiable, though this is not always the case. In fact, many institute policies explicitly state that equity terms are negotiable (**Table 2**), and several of our survey respondents have reported that they were able to discuss terms. One UK-based TTO explained the apparent lack of flexibility this way: "If other TTOs say that they don't negotiate, I think that is because they are scared. They are trying to preserve their position in the negotiations. They don't want to be on public record saying that they are willing to negotiate."

Several UK entrepreneurs we spoke to felt that the non-negotiable, 50:50 split they were offered overestimated the contribution of the university to the venture. Still, this fixed rate does greatly simplify, and thus shorten, the initial negotiation time, the length of which is a major complaint of bioentrepreneurs in the United States. One UK TTO representative stated that "[we want to] actually build a business instead of spending a lot of time upfront negotiating something that isn't actually worth anything." Though one can argue the deal would move even swifter if the TTO took a less aggressive stand (for instance, asking for 5% instead of 50%), which would allow the bioentrepreneur and investor to start the real work of building the company over the coming years, and rewarding them accordingly. Furthermore, a few UK-based bioentrepreneurs highlighted the nonequity-based benefits of their deals, such as increased research funding from the school.

## Concluding remarks

In today's economy, where early-stage ventures grow by matching technology with the unfulfilled needs of markets, university-based bioentrepreneurs have much to contribute. Although many factors are involved in starting a company and bringing a product to market, academic innovators require not just technical expertise, but an understanding of the mechanics, politics, and logistics of TTOs and of the technology licensing process. As we have noted, successful spinouts must clear several challenging hurdles, including finding comparable deal terms for reference, satisfying demanding university conflict of interest policies and presenting a credible business plan to sophisticated investors, busy TTO officials and experienced industry professionals. As one bioentrepreneur who weathered this process cautioned, "It will take ten times longer and cost ten times more than you think."

From our study it is also clear that there are differences in the behaviours of US and UK TTOs. It is difficult to understand the justification of UK TTOs, such as Oxford's Isis Innovation, taking 50% of a company's equity at formation—which after investment can leave

the academic entrepreneur with an extremely low stake from the get-go, for what was likely years of work, and will require many years and millions more to develop. Notably, the regions attracting the most life science investment and with the most successful life science spinouts (San Francisco Bay Area, Boston, and Cambridge UK) had four TTOs (Stanford OTL, UCSF ITA, MIT TLO, and Cambridge Enterprise) that rewarded the academics and investors the most. The data would suggest that TTOs taking less upfront and leaving more to the academic and investors who will actually carry the idea forward pays off in the long term. Simply put: holding a smaller piece of *something* is still more valuable than a large piece of *nothing*.

It is also worth noting that while a discussion on royalties was outside the scope of this study, it was clear from our research that many university TTOs "double dip" and take significant equity and royalty. Several bioentrepreneurs in the UK mentioned that the TTO also sought as much as two-thirds of the royalty stream.

Perhaps more disquieting than the out-sized equity and royalty stakes that universities are claiming is the lack of transparency from many universities on this critical issue. Even private institutions (such as Harvard or Northwestern) are recipients of vast sums of government grants and under a government mandate to commercialize research produced from that money. The government has done this with the public's interest in mind, and surely it is also in the public's rightful interest to know how these assets (funded by the taxpayer) are being allocated. Indeed, even for the universities for whom we have data regarding equity policies, it was often hidden deep within a jumble of legalese. To that end we encourage universities and research institutes receiving public monies to be fully transparent in their equity and royalty policies, and not use these information asymmetries as a bargaining advantage against fledgling bioentrepreneurs.

Moreover, while we did not assess Canadian, other EU (non-UK), or Asian TTOs, these information asymmetries exist regardless of geography. As such, the tools and insight presented here are just as applicable outside of the US and UK.

It is clear that becoming familiar with the technology transfer process is an important part of the technology commercialization process for researchers. In the words of one academic bioentrepreneur, "The only thing I regret is that I didn't get prepared for this process earlier."

*Note: Any Supplementary Information and Source Data files are available in the online version of the paper (doi:10.1038/bioe.2015.2).*

**COMPETING FINANCIAL INTERESTS**

The authors declare competing financial interests: details are available in the online version of the paper (doi:10.1038/bioe.2015.2).


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