

Finance/Funding



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▼ Keeping it real with investors

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Nanobiotech entrepreneurs learned the hard way that there is such a thing as pushing so-called exotic or emerging technologies too hard with investors. Biotech entrepreneurs could learn a thing or two from their experience.

Introduction

One of the most enduring myths about the commercialization of biotech products is that venture capitalists (VCs) are interested in funding only the hottest new science and technologies. Equally widespread is the enduring (and mistaken) notion that biotech entrepreneurs benefit, in the long run, from hyperbole because it fuels the kind of media exposure that whets the appetite of investors.

Experienced entrepreneurs and investors know better. Though bits and pieces of nanotech have played a role, for example, in polymer chemistry and drug delivery for years, it has only just begun to be adopted by companies developing molecular diagnostics and biotech medicines. Entrepreneurs attempting to commercialize products using nanotech have been accused of overselling nanobiotech even though many biotech veterans agree that this enabling technology might indeed substantially enhance the properties and traits of the materials used in everything from imaging and biosensors to medicines and molecular diagnostics.

Still, there is a great deal of misunderstanding, and no clear consensus, about the degree to which nanotech can add value to biotech. True enough, but the lessons learned by nanobiotech entrepreneurs already can be widely applied to any branch of biotech, particularly those associated with controversy like stem cells, medicines made from transgenic animals and drug intermediates developed from genetically engineered plants. This is their advice.

Build a reality-based team

Michelle Dipp & Christoph Westphal

There is nothing fundamentally different about the talent needs of a company developing therapeutics as opposed to any other small business.

Although innovation is most often associated with breakthrough science and technology, the only way a startup can turn that science and technology into a commercial innovation, is with a team of company scientists and executives who can truly enable this innovation.

The life cycle of every startup can be divided into three stages: birth, growth and exit/maturity. During the growth phase, people are much more important than the science because few companies have proof of concept at this stage. The company's value resides primarily in the quality of the cofounders and their idea. It is essential that each member of the team

complements the other and that each and every one of your team embraces the entrepreneurial spirit and a unified vision of the company's course. The CEO is the key hire during this stage, and his/her responsibility is to bring the right people together and to raise money for the startup.

Intellectual property (IP) facilitates the transition from birth to the growth stage. Seed money is required for the initial patent applications and licenses to ensure that the company has a strong IP position. A startup in the growth stage needs a solid business development team led by someone experienced in negotiating deals with large partners. This individual should have not only a deep understanding of the science but also of how the technology can be applied to a therapeutic market.

In the growth phase, the company's head count can quickly reach 15 to 30 simply by filling in the various divisions in science, operations, IP and finance. At this stage, the CEO must be able to maintain the open communication between team members that joined in the birth phase and make sure that the team is growing at a sustainable level. The head of R&D and director-level scientists are hired at this stage. In addition to the CEO, the head of R&D is one of the most important hires a company will ever make as this person will oversee the translation of science into products. It is important to bring in someone who has the experience of taking drugs from the preclinical stage through to the clinic. Regardless of the company's focus, it is essential that your top scientists are recognized in their field as not just pioneers but true leaders with a proven ability to inspire and bring out the best from those around them. Remember, these individuals will be hiring a team of their own, so they need to be not only excellent scientists but also effective communicators and team-builders.

In the exit/maturity stage, timing is everything. Charting a financially rewarding exit strategy requires extensive experience and analysis to determine the optimal course on which to take the company, be it the pursuit of an initial public offering (IPO), a trade sale or the transition into a mature company. When it comes to matching the team to the strategy, one size does not fit all as each path requires a very different management strategy—and often team. That means that a company needs to transition the management team accordingly. The CEO can lay a foundation for innovation, but ultimately it's the output of the team that will determine whether a company meets great expectations.

Labels that help and hinder

James Baker

In this risk-averse investing environment, emerging technology is viewed as just another way of saying 'too much risk.' In fact, entrepreneurs with technology platforms that are labeled 'unusual,' 'unproven,' 'disruptive' or 'controversial,' and are said to have the potential to 'redefine markets,' can expect to find little support from investors unless their management team already has a well-established relationship with investors. Most university-based researchers and medical doctors, at least, who attempt to start a nanobiotech company do not have these relationships; nor do they have a track record of successfully managing companies and providing investors a solid return on their investment.

One way to bridge this gap is to find external validation for the company's technology and development approach, either from large pharmaceutical companies or independent scientists. Unfortunately, in the realm of nanobiotech, data and expertise are not fully formed. I have started two nanobiotech companies. The first employed what was labeled an 'unusual' technology as a therapeutic agent; it also had an unseasoned management team. It was difficult to get validation and explain this technology to investors let alone convince them of its efficacy. Because of this, I could only advance this technology through successful phase 2 clinical trials with the support of angel investors.

The problem with relying upon angels well into late-stage development is that your startup can quickly become less interesting to VCs. The reason is that once a startup has successfully completed the advanced stages of development, its valuation rises and its upside drops for all subsequent investors, as a result. I will likely have to go to the public capital markets at this point to finance late-stage development, either through an IPO or a reverse merger with a public shell.

In contrast, my second nanobiotech is focused on drug delivery. Although the company is less mature, its technology and potential value are much easier to understand, outside validation is easier to come by, and the costs involved in commercialization are easier to define. This company also has the benefit of being managed by experienced business executives who were well known and well regarded in the VC community.

This company was able to attract seed funding from VCs. And by the time the company needs to pursue A-round financing, it will already be viewed as a 'venture-backed' company. And if the company delivers as promised, along the timelines set out in the business plan, it will be labeled in the venture community as a 'smart investment' and a company that has 'performed at ...' or 'exceeded expectations.' A startup can leverage these labels throughout its development cycle. As the company advances from seed-round financing and then on to the A, B and C rounds, these are the labels that matter far more than the labels that are attached to the firm's technology platform.

Analyze this

Chad Mirkin

Nanobiotech and other startups promoting an emerging technology often fail to adequately analyze the true market potential of their product prospects. For some reason, entrepreneurs assume that the novelty of their platform will speak for itself. It won't. You must be able to make the case to investors that your product has advantages over products already on the market, that consumers need and will pay you for your products, and that the market for these products will be increasingly profitable and will grow in a relatively predictable pattern over time.

Consider the medical or biodiagnostic field. There are dozens of new technologies in this field, many based upon advances in nanotech that have been developed over the last two decades for detecting nucleic acid and protein markers associated with many types of neurodegenerative, cardiac and infectious diseases as well as many forms of cancer. Although a new way of detecting such markers might be an interesting and worthwhile scientific advance, before it can form a cornerstone for a successful business, one must identify what differentiates it from the rest of the pack and how it can solve a key problem created or not addressed by other competitive technologies.

Before getting started, look at analytical benchmarks. What does the new system offer in terms of sensitivity or selectivity? Does increased sensitivity or selectivity make a big enough difference in the markets one is targeting to drive the adoption of a product based upon them? Will the ultimate product be a stationary system or a portable one? What will its cost be? If there is a cost advantage, is it an incremental or market-changing one? In the future, it is going to be increasingly difficult to displace existing technologies and products with new ones that do not offer clear therapeutic and cost advantages.

There is nothing particularly daunting about developing a key advance using nanobiotech. My colleagues and I proved this with two startups, NanoInk and Nanosphere. Within two years, NanoInk commercialized the NScriptor, a system for performing Dip Pen Nanolithography (DPN is a way of routinely fabricating nanostructures on the sub-100 nanometer length scale). Today, NScriptor is being sold around the world.

Nanosphere developed a variety of products for using nanoparticle probes for doing high sensitivity and selectivity nucleic acid and protein diagnostics. The company has a platform system called the Barcode Assay that can do both protein and nucleic acid diagnostics. It can detect protein markers at concentrations approximately three to six orders of magnitude lower than conventional enzyme-linked immunosorbent assays. This allows the firm to not only compete with existing diagnostic tools but also develop new ones that target markers which cannot be used by conventional tools because of a lack of sensitivity.

Admittedly, the path to product development was somewhat slower for Nanosphere: five years compared to two for NanoInk. The reason is that the development challenges at Nanosphere were substantially higher. Regardless, it was clear to investors from the start that both of these companies were developing products capable of capturing market share, so they felt confident providing the backing that we needed—when we needed it. See [Boxes 1](#) and [2](#).

Box 1: Five myths about nanobiotech

Tim Harper

1. **The old rules do not apply to products developed with nanotech.** Thankfully, savvy investors and the financial media understand that the value of a startup with an 'exotic' technology is still largely determined by the same old variables: the quality of the IP, management team, product and market opportunity.
2. **Investors love emerging technologies that have captured the imagination of scientists and government funding agencies.** This might have been true four or five years ago, but it is becoming less so today. This is not to say that scientific validation and government funding don't matter to investors. They do. But, investors are increasingly less willing to throw money at companies pushing emerging technologies just because other, less experienced stakeholders are telling them to do so.
3. **Nanobiotech products will eventually be subjected to new and onerous government regulations.** There is no reason to believe that this will be the case. Regulators themselves have said as much. However, we can expect the old regulations covering medical devices, drugs and cosmetics will surely be adapted to take account of nanoscale properties of materials, which they do not currently cover adequately. These adaptations will not be tectonic shifts.
4. **The public backlash is coming.** This fear has thus far been overblown even though some prominent 'thought leaders,' academics and environmental groups have been highly critical of all forms of nanotech.
5. **Investors view nanobiotech as a more powerful version of biotech.** Nanotech covers a lot more ground than biotech, but this doesn't mean that investors think nanobiotech will naturally lead to more profitable products.

Box 2: Nanobiotech and capital markets

Charles Harris

The list below includes a few lessons that we have learned about the private and public financing of nanobiotechs.

- Most venture capital investment in nanobiotech startups comes from firms that specialize in life-science or medical companies. There are very few firms that specialize in nanotech, in general—ours is one of the few—let alone nanobiotech, in particular.
- Identification with the word “nanotech,” let alone use of the prefix “nano,” does not make it easier for biotech companies to raise capital. To the contrary, it might actually make it more difficult.
- All else being equal, there is no apparent premium placed on valuations of nanobiotech startup companies at any stage in the lives of the companies.
- Securing additional financial investment for a nanobiotech startup is little different from securing such financing for any other biotech startup. That is, subsequent funding events will be gated by traditional milestones such as progressing through the regulatory-approval process, signing corporate partnerships and the like.
- Misperceptions and uncertainty about the environmental and marketing approval requirements required for developing certain types of nanotech-enabled biotech products might adversely affect fundraising efforts.
- When nanotech promises to enable a biotech company to solve an unmet medical need, the economic potential of the firm's product might counterbalance regulatory uncertainty. And many nanobiotechs do not pose special regulatory concerns. In these cases, a nanobiotech company should be able to attract funding even from top-tier venture capital firms that specialize in life sciences.

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