

2005 Lab Design Handbook

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FINDING SPACE FOR THE START-UP—AND BEYOND

You're taking the leap and starting a science-based business. What features should you seek in your first working lab facility?

By Patricia L. Larrabee

When you're making the transition from full-time researcher to entrepreneur, you must recognize that a new dual role as a company founder and lead scientist necessarily leads to an evolving dual perspective that will impact the decision of where to locate.

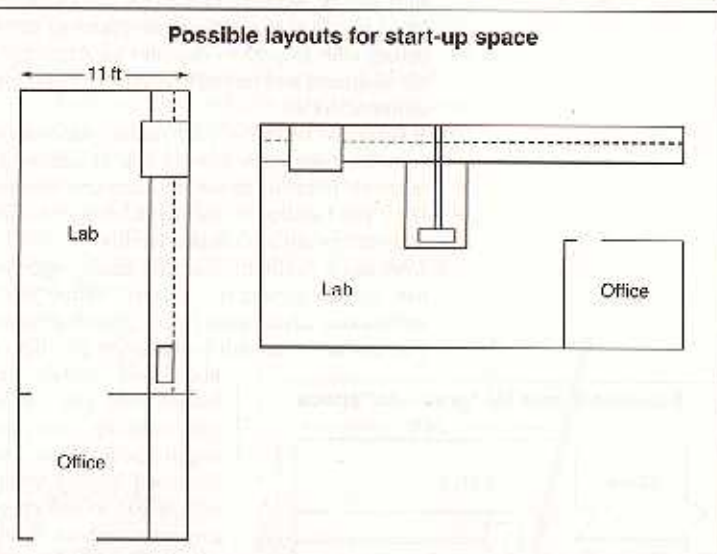
As a scientist, perhaps you're glad to be free to create and develop the technology on your own terms and are excited about the potential rewards that success may generate. The corporate executive in you shares the excitement but balances that enthusiasm with the trepidation that accompanies corporate concerns like financing, cash flow, patentability, valuation, market size, liability, and recruitment of key personnel. Achieving the appropriate balance between these sometimes-competing perspectives will undoubtedly play a role in the future success of your new enterprise.

Scientific "mission"

The purpose of the research work conducted by your firm is that of *translational research*—those activities that follow from a basic discovery to create the strongest possible patent claims; validate or add value to a model; and are essential to the implementation, practice, or commercialization of an invention. This work may involve the design of proof of concept or pre-clinical experiments for new drugs or devices.

To find a facility that will suit the scientific mission of your enterprise, ask yourself the following questions:

- *Are you working with organisms that require any specific biohazard or containment level characteristics?* The answer may narrow the field of possible locations considerably.
- *Do any of your activities require physical separation?* While many researchers believe that tissue culture activities require a separate room, it is important to note that the more important question may be: what is being cultured? The biosafety cabinet itself coupled with good, consistent aseptic technique is often more than adequate to minimize culture contamination at this stage of your technology development life cycle. The facility design should not be driven by this type of "optimal" thinking.
- *What types of chemicals do you expect to use and in what quantities?* If your operation will involve the use of flammables and combustibles, it will be important to select space that includes a fume hood and concurrent chemical storage cabinets to ensure the safety of your scientific personnel.
- *Will your work involve the use of radioisotopes?* If so, consider which isotopes, and investigate the



local regulatory requirements for licensure to handle and store those isotopes.

- *Do you have specific high-purity water requirements?* What volumes do you anticipate using on a regular basis?
- *What type of equipment and instrumentation do you require?* Can you receive access to some of this equipment from local universities, research institutes, or neighboring biotech firms?
- *Will you require emergency power?* Remember, the assets of your new company may well reside in your incubator, -80° freezer, or shaker flasks.
- *Are glasswashing and autoclave capabilities required for your operation?* It is highly unlikely that your start-up activities are sufficient to demand dedicated equipment for these needs. Does the facility itself provide any of these features in a shared arrangement, or can you adopt temporary procedures that minimize the requirement for such capabilities by using sterile disposables?

Business "mission"

The purpose of all the activities conducted by your firm, including translational research activities, is to increase the valuation of the technology and ultimately bring a product or service to market. Biotech businesses require a long horizon and significant investment to achieve these goals, not to mention a little luck! While the initial facility location must meet the bench research needs, it must do so within the framework of the company's corporate development objectives.

Here are some questions that will help you identify a site that supports your business mission:

- *How do your hiring plans impact the amount of space required?* Early stage firms often have

Fig. 1. Two possible layouts for a start-up in an incubator space. Layout A (left) offers 264 ft² of lab and 121 ft² of office space; layout B (right) has 528 ft² of lab and 110 ft² of office space. Both layouts include appropriate fixed casework with epoxy tops, overhead wall cabinets, a 4-ft fume hood, and a vacant wall suitable for the tenant's own equipment.

higher ratios of scientific personnel to general and administrative staff. What proportion of this staff will be working in the labs predominantly? Don't be afraid to test the assumptions of key scientists with respect to standard expectations for lab assistants and research associates paired with senior scientists.

- *What is the impact of your initial space requirement on your cash flow?* Look at scenarios at quarterly intervals as well as three-year forecasts. Have you factored in operational costs associated with occupying a particular facility?
- *How much flexibility does the facility offer your new firm to expand or contract?* While you are enthusiastic about your firm's growth prospects, you are savvy enough to recognize that the road

ahead will contain many bumps that may necessitate reducing your space requirement. Does your proposed leasing situation enable you to reduce your premises without draining termination penalties?

- *Is the initial lease term tailored to match the highly volatile nature of start-up businesses?* Will you be able to extend beyond the initial term and, if so, under what conditions?

- *Does the facility design grant you access to support spaces* such as conference rooms, copying areas, break rooms, storage areas, and so on? If not, make sure these considerations are addressed within the confines of your stated space requirement.
- *Is the operating environment secure enough for the activities your firm will be conducting?* For a biotech enterprise, security includes personnel security, business asset or premises security, information security, and the security of your intellectual property. Similarly, security means maintaining awareness that external groups may not view your firm's work as receptively as you do or as the industry does. Activities such as stem cell research, animal testing, and many other industry segments require proactive design and risk minimization approaches to security.
- *If you are considering a multi-tenant biotech facility, is it designed and managed in a way that recognizes and addresses liability issues of all tenants?* Ensure that mechanical ducting systems negate the potential for cross-contamination with other tenants' lab operations. Ensure that the design, configuration, and procedures associated with the availability and use of shared infrastructure and equipment will not compromise your firm's experimental results.

The biotech incubator

The number of biotech incubator facilities is rapidly increasing as various jurisdictions vie to attract and cultivate firms in this burgeoning industry. If the main objective of the incubator in your region is that of economic development, you will likely find a facility that affords your firm many of the features listed above whether you are wearing your scientific "hat" or your corporate executive "hat." The laboratory suite configuration shown in Fig. 1 represents an attractively designed module that includes installed casework with epoxy tops, overhead wall cabinets, a 4-ft fume hood, and a vacant wall within the main laboratory that is set to receive tenant-specific equipment.

Now that you have a dual perspective rather than your prior science-thinking mindset, it will be important to look beyond the initial facility to determine what your firm will need beyond the start-up stage. Many of the same issues discussed above still apply. However, your science may now require divisional separation based on typical tasks; your equipment needs may now involve automated functions; and the nature of the actual work your firm is involved in may have changed to meet dynamic market conditions.

Development-stage firms or "incubator graduates" share many characteristics. These firms have typically secured at least one round of venture capital funding, employ 15 to 20 people, are positioning to conduct early-stage clinical trials, and occupy about 3,500 ft² of mixed office and laboratory space.

While the "graduate facility" is not yet as prevalent as incubator facilities, the multi-tenant, flexible design and shared infrastructure thinking behind the design and operation of many incubator facilities lends itself to the requirements of these firms as well (Fig. 2). The smart scientist/executive recognizes that this type of space is rarely readily available; thus the executive must plan ahead to secure space to meet the firm's needs.

Take-home lessons

Regardless of whether you're seeking space for a start-up, or pondering a move to a "graduate facility," the following lessons should serve you well:

- Understand that your firm has a facility program life cycle, just as it does a business life cycle.
- Balance design, programming, and finish elements to maintain flexibility for changing operations and financial circumstances.
- Look for solutions that balance your operating and leasing costs with your cash flow position.
- Consider liability and exposure issues, but don't overcompensate with your facility design!

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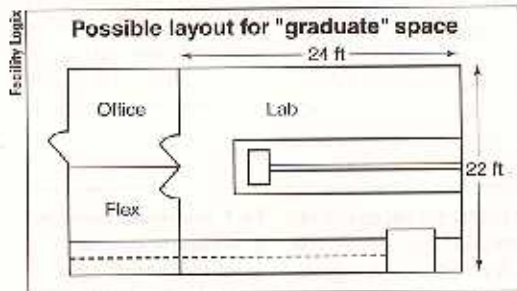


Fig. 2. A layout for a growth-minded enterprise might resemble the one above, which includes 520 ft² of lab space; 121 ft² of office space; and 121 ft² of flex space that can be converted as needed.