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erally been centered around research universities, medical campuses, venture capital sources, public research funding, and a skilled workforce. Much of this activity has taken root in the Boston/Cambridge area, the San Francisco Bay Area, and San Diego, while more recently other municipalities have sought to become competitive in this arena.

### Boston's Success

Biomedical research is not often associated with inner-city locations. However, in the Lower Roxbury and South End neighborhoods of Boston, a viable university and commercial biotechnology presence has been developing over the past 20 years. This "inner-city biotech" development is the focus of this article, which describes successes and lessons learned that can be applied to other inner-city locations interested in participating in this 21st-century industry.

Boston's inner-city biotech story began with the land clearance for the proposed Southwest Expressway right-of-way in 1966. In 1972, community pressure led to the cancellation of the Southwest Expressway, which opened up more than 200 acres (81 ha) for redevelopment in Boston's southwest corridor. By 1980, a new urban industrial park, CrossTown Industrial Park (CTIP), sited on 40 acres (16 ha) in Lower Roxbury, got its first tenant, Massachusetts computer giant Digital Equipment Corporation (DEC).

Meanwhile, during the early 1970s, in the South End neighborhood of Boston, adjacent to Lower Roxbury, the Boston University School

# INCUBATING INNER-CITY BIOTECH

PHILIP S. HART AND WILLIAM J. GASPER

**As Los Angeles tries to develop a biomedical research campus in its inner-city area, it can look to a similar successful project in Boston for guidance.**

BIOTECHNOLOGY, OR BIOMEDICAL research, stands to be one of the growth industries of the 21st century. Biotechnology fosters both the better understanding of biological mechanisms and the improvement and creation of products in a variety of sectors, such as agriculture, food processing, and pharma-

ceutics. Besides "classic" biotechnology—for example, baking bread and brewing beer with the help of yeast—there is also "modern" biotechnology, principally based on the knowledge of gene function; genetically modified organisms (GMOs) are the products of this latest biotechnology. Biotechnology is a body of methods and techniques that employ as tools the living cells of organisms or parts or products of those cells (such as genes and enzymes).

Given the growth of this industry over the past 30 years in both the university and commercial sectors, related land use and development activity has been generated. The nature of this land use and development activity in relation to "modern" biotechnology has gen-



of Medicine (BUSM) strategically solidified its relationships with its two neighboring hospitals, Boston City Hospital and University Hospital. Today, BU's schools of medicine, dental medicine, and public health (collectively referred to as the Boston University Medical Campus or BU Medical) and Boston Medical Center (BMC)—the result of a merger of Boston City Hospital and University Hospital in July 1996—constitute a vibrant academic medical center with an inner-city community focus.

The Community Development Corporation of Boston, Inc., (CDCOB) was organized in 1969 as the economic development arm of the city of Boston Model Cities Program. Once the Model Cities demonstration period ended, CDCOB became an independent 501(c)(3) economic development organization that then turned its focus from making investments in local businesses to developing a long-range economic development strategy of creating an urban industrial park—CTIP—as a way to spur job creation and business development in the distressed Lower Roxbury neighborhood.

In 1984, CDCOB purchased a 50,000-square-foot (4,651-sq-m) paintbrush factory that occupied two industrial buildings just across the street from the DEC plant located at 801 Albany Street for a mere \$60,000. Even with this modest purchase, CDCOB was unable to secure a conventional bank loan for this transaction as the city's downtown banks largely ignored Roxbury. Three years later, with the support of a U.S. Department of Commerce Economic Development Administration (EDA) Title IX grant, CDCOB began the shell and core renovation of the two factory buildings as speculative office and research and development space. BU took note of the activity at these vacant buildings a quarter-mile down the street from BUSM and, seeking to expand its biomedical research space for both BUSM research and educational programs and partnerships/incubation initiatives with biotech companies, partnered with CDCOB to plan and execute the development of an inner-city biotechnology facility at 801 Albany Street in lower Roxbury's CrossTown Industrial Park.

CDCOB's agenda for 801 Albany Street was to continue bringing emerging technologies into this urban industrial park, so BU Medical's interest was timely. The building opened



**In 1987, Boston University partnered with the Community Development Corporation of Boston to plan and execute the development of an inner-city biotechnology facility at 801 Albany Street in lower Roxbury (the present-day facility is shown above). At the lease signing were (from left): Philip Hart, treasurer, CDC of Boston, Inc.; Marvin Gilmore, general manager, CDC of Boston, Inc.; William J. Gasper, associate vice president, Boston University; and John Sandson, dean, Boston University School of Medicine.**

in 1989 as a biotechnology facility. In so doing, CDCOB and BU had to gain approval from the Boston Redevelopment Authority (BRA) to allow BU Medical to locate a facility on the Lower Roxbury side of Massachusetts Avenue from the South End prior to completing the medical campus master plan. BUSM occupied 90 percent of the structure on a long-term lease, which extends to 2014. CDCOB occupied the balance of the building with its corporate offices. From the beginning, BU's concept for this biotech facility was to provide a home for BUSM's Program in Biomedical Laboratory and Clinical Sciences, which prepares students for careers in biomedical technology; additional institutional research/clinical laboratories; and space to support joint venture relationships with biotech companies/commercial laboratories, including incubation of biotech startup companies.

BU's collaboration with CDCOB at 801 Albany Street was a harbinger of BU Medical's "near campus" development of biotech space. Soon after the opening of 801 Albany Street, BU commenced planning for a 35,000-square-foot (3,256-sq-m) biomedical research facility at 609 Albany Street (which opened in 1992) and joined with University Hospital (today, part of BMC) to develop city- and state-owned land at 650 to 700 Albany Street, which was being used for surface parking. These parking lots have since become BioSquare, Boston's only research park devoted exclusively to life sciences research and commercialization.

BioSquare covers 16 acres (6.5 ha) with a planned 2.5 million square feet (232,558 sq m) of laboratory, office, and support space, of which approximately 1.3 million gross square feet (120,930 sq m) have been developed to date, inclusive of three biomedical research buildings and two parking garages with a combined 2,400 parking spaces. The first of these buildings, the Center for Advanced Biomedical Research, opened in September 1993. In addition, construction began in March on the most recent BioSquare project, the \$180 million, 192,000-square-foot (17,860-sq-m) National Emerging Infectious Diseases Laboratories. This project, in which high-containment-level research will be conducted to develop diagnostics, vaccines, and treatments for dangerous infectious diseases, whether natural in origin or introduced through bioterrorism, is not without controversy. In early August, a Massachusetts commonwealth judge ruled that Boston University must file an updated environmental review.



However, construction continues, and the university remains confident that the project will proceed as planned, with a 2008 opening.

Meanwhile, over the past 17 years, significant Boston University and biopharmaceutical company research activity has occurred at 801 Albany Street, much of which relates to diseases that afflict inner-city residents. For instance:

▷ During the early 1990s, BUSM Cancer Center researchers made important advances in the development of new therapies for the two most common genetic diseases in the world, sickle cell anemia and thalassemia.

▷ As of this writing, 801 is the headquarters for the Inner-City Asthma Study and the Inner-City Asthma Consortium, which are conducting investigations and clinical trials regarding interventions for asthma among inner-city children.

▷ School of Dental Medicine research faculty are conducting cutting-edge research on restorative dental materials.

▷ NitroMed, Inc., a publicly traded company, was a tenant at 801 in the mid-1990s, and developed and is marketing BiDiL, a drug that treats congestive heart failure in African Americans.

▷ AdipoGenix, Inc., a startup biopharmaceutical company founded by BUSM faculty members and a current tenant at 801, is focused on the development of novel therapeutics for the treatment of disorders of fat tissue such as obesity and diabetes.

This biotech facility in Lower Roxbury has also met BU's objective of facilitating joint venture relationships with biotech companies and incubating biotech startup companies. In addition to the two companies mentioned above, CombinatoRx, Inc., a publicly traded company that identifies new disease targets and new medicines from combining already approved drugs, was incubated at 801 until it grew out of its space in 2001. In the meantime, the original 40-acre (16-ha) urban industrial park has grown to 75 acres (30 ha) and

comprises office, industrial, retail, public utility, and textile manufacturing uses; the DEC building and adjacent property have been replaced by CrossTown Center, which includes Boston's first black-owned hotel, a parking structure, and two office buildings, with the first one now in construction with BU Medical as anchor tenant; and a planned 265-unit residential complex with first-floor retail space. Also, in contrast to 1984, when CDCOB could not secure a bank loan to purchase 801 Albany, banks are now very active in Lower Roxbury and its surrounding neighborhoods.

### Los Angeles Moves Forward

In Los Angeles, plans are gaining momentum for the development of an Urban BioMed Research Park sited in the distressed East Los Angeles neighborhood near the County-USC (University of Southern California) Hospital. The USC Health Sciences Campus is a major medical campus in East Los Angeles, encompassing Norris Cancer Center, USC/LA Hospital, Doheny Eye Center, USC Medical School, and other university-affiliated centers. The proposed BioMed Research Park would cover more than 1.6 million square feet (148,837 sq m) of space and is to be built in phases over a period of ten or more years. USC is slated to be the major anchor tenant, with current construction plans totaling 585,000 square

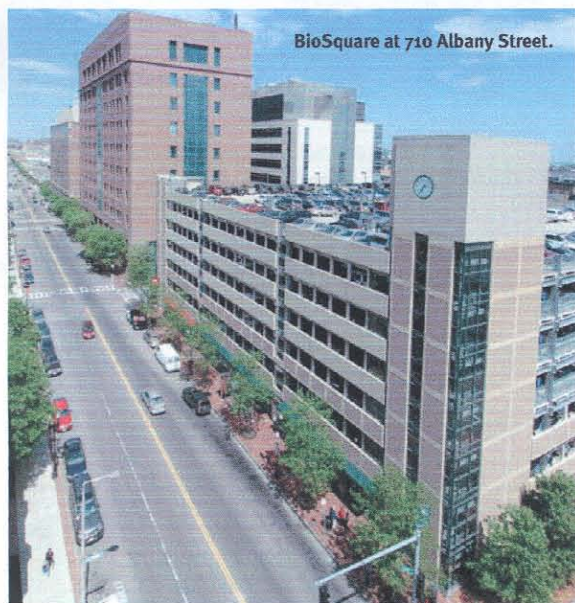
feet (54,418 sq m) in the first five years of the phased development process. USC's commitment to the project has been demonstrated thus far with extensive investment in site preparation, infrastructure, and new medical research facilities.

This East L.A. neighborhood is predominantly Latino; Roxbury is mostly African American. Both of these inner-city neighborhoods, which are 3,000 miles (4,830 km) apart, have public housing and jail facilities within a short distance from major medical facilities governed by important private research universities. The East L.A. site under consideration for this Urban BioMed Research Park comprises over 1,000 acres (404 ha) and its development is to be governed by a city of Los Angeles and Los Angeles County Joint Powers Authority. The first phase of the USC portion of this public/private biomed research park is to be built on a 40-acre (16-ha) site and is to be a stem-cell research center supported by renowned business leader and philanthropist Eli Broad.



Soon after the opening of 801 Albany Street, BU began collaboration on BioSquare, a 16-acre (6.5-ha) research park with three biomedical research buildings and two parking garages. The laboratory at 670 Albany Street opened in November 2005 (top), and in March construction commenced on the National Emerging Infectious Diseases Laboratories facility (bottom), scheduled to open in 2008.



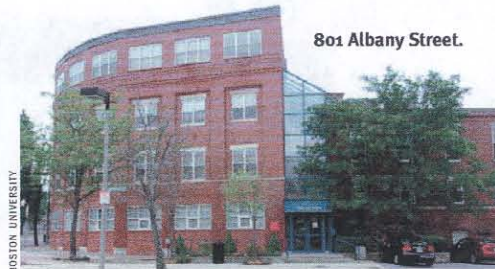


BioSquare at 710 Albany Street.

Compared with the Boston/Cambridge area's biomedical industry, Los Angeles's is relatively young, with more than half its companies having started during the last 15 years. Despite the youth of the industry in southern California, its future there is bright, as numerous economists and political leaders see biotechnology as a key growth engine for the 21st century. With a recent \$3 billion stem-cell ballot initiative approved by the voters in November 2004, the state of California has become one of the strongest supporters of the biosciences industry in general and stem-cell research in particular. It is expected that Los Angeles's biomed industry as a whole will benefit from this initiative.

Indeed, Los Angeles already has a large base of biomedical research activity, including its universities as well as private research institutions. Thousand Oaks, California-based Amgen—the largest U.S. biotech firm, with over 7,000 employees worldwide and \$3 billion in annual revenues—is the cornerstone of the commercial biotechnology industry in the L.A. area. (Amgen opened its first Massachusetts research facility at BioSquare in 2000, taking advantage of BioSquare's facilities, collaborative environment, and access to biomedical support services, until it moved to an Amgen-owned facility a few miles away.)

Southern California has a number of other major manufacturers of pharmaceuticals and



801 Albany Street.

medical devices, but it has not produced other strong biotech companies. The metropolitan Los Angeles area falls well behind the San Francisco Bay Area and the San Diego area in venture capital, initial public offerings, and fast-growing biotechnology companies. Similarly, Los Angeles lags well behind the Boston/Cambridge area on these same measures.

With both the more mature inner-city biotechnology activities in Boston as with the embryonic work in L.A., private research universities with medical centers are at the root of this effort. Given the location of this university medical presence in two needy urban neighborhoods—Lower Roxbury and East Los Angeles—it is critically important for each university to provide local residents with the education necessary to move into the biotech industry. This is why the BU program in Biomedical Laboratory and Clinical Sciences, which has been located at 801 Albany Street from the very beginning, bears replication in the L.A. Urban BioMed Research Park. Indeed, this program has brought much recognition over the years to Boston University and to 801 Albany, as a result of CityLab and CityLab Academy, two highly successful educational programs.

CityLab is a biotechnology learning laboratory that provides access to state-of-the-art laboratory facilities and curriculum in biotechnology for middle and high school teachers and students. With support from federal and private funding agencies, tens of thousands of students and teachers have attended workshops held at 801. The ten-year-old CityLab Academy, based at 801 Albany Street, is a nine-month biotechnology skills training and education program designed for economically and academically disadvantaged students. It is offered on a full scholarship basis for eligible high school graduates interested in pursuing a career and further education in biotechnology. Upon successful completion, graduates are

provided with assistance in securing entry-level biotechnology jobs.

## Lessons Learned

What lessons can be learned from the inner-city biotech success story in Boston that can be applied to Los Angeles and other municipalities interested in attracting and/or devel-

oping this 21st century industry? These lessons include the following:

- ▷ *Vision.* In Boston, the visionaries included Boston University and the Community Development Corporation of Boston.
- ▷ *Location, Location, Location.* Normally, suburban locations are regarded as more ideal sites for biotechnology development. Boston and now Los Angeles are angling to tell another story about ideal locations for such activity.
- ▷ *Be Flexible.* Be prepared to change direction if the initial plan is not working.
- ▷ *Collaborate.* Work with and not against federal, state, and local officials and agencies, as well as the local community; view them as partners. This lesson is going to be particularly important in East Los Angeles as USC, the city of Los Angeles, and the county of Los Angeles endeavor to jointly plan and develop a major urban biomed research park in a challenged neighborhood.
- ▷ *Be Reasonable.* Be reasonable and fair, particularly in negotiating financial terms with partners, tenants, contractors, consultants, etc.
- ▷ *Communicate Well.* Poor communication will bring confusion into every phase of the project.
- ▷ *Know Your Customers.* Understand the needs and desires of your tenants/occupants and do your best to satisfy them. This includes your university researchers doing sponsored research as well as the commercial biotech and commercial laboratory tenants.
- ▷ *Be Patient.* Remember—it is a marathon and not a sprint to the finish line.

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