

**Report of the
University of Missouri – Kansas City
Life Sciences Task Force**

November 20, 2002

The UMKC Life Sciences Task Force

The UMKC Life Sciences Task Force was formed by the Chancellor of the University of Missouri – Kansas City, Martha Gilliland, to help the University define its strategic goals as they relate to the Kansas City region’s life sciences initiatives, to identify specific actions that might be taken in support of those goals, and to delineate the resources that will be required to implement those goals. The members of the Task Force are:

Dr. William Danforth (chair)	Chancellor Emeritus, Washington University
Dr. Steven Ballard	Provost, University of Missouri–Kansas City
Dr. William Neaves	President and CEO, Stowers Institute for Medical Research
Dr. Robert Morantz	Neurosurgeon, formerly Associate Professor of Neurosurgery and Clinical Professor of Radiation Oncology at the University of Kansas School of Medicine
Dr. Phillip Sharp	Institute Professor and Director of the McGovern Institute for Brain Research and Center for Cancer Research, Massachusetts Institute of Technology

Table of Contents

Executive Summary	1
I. Introduction	2
II. Opportunities and Challenges	3
III. Life Sciences Research	5
IV. Education.....	7
V. Potential Economic Impact	8
VI. Resource Requirements	8
VII. Possible Sources of Support	10
VIII. General Conclusions	11
Appendices	
Appendix 1: Life Sciences Meeting Participants	
Appendix 2: Table 1: Total Private Gifts for Selected Institutions	
Appendix 3: Table 2: NIH-funded Researchers at Regional Institutions – FY 2002	
Appendix 4: Table 3: Estimated Incremental Costs of Life Sciences Initiative	

EXECUTIVE SUMMARY

The convergence of a number of factors, including the establishment of the Kansas City Area Life Sciences Institute and the generous investment in life science research by Jim and Virginia Stowers, has created a unique opportunity for the Kansas City region to develop significant strength in the life sciences. We understand that the people of UMKC, the civic leadership of Kansas City and the Governor of Missouri are all committed to this goal, for they recognize both the need to build research capacity and the opportunities for economic development. The Task Force applauds Kansas City's goals. We conclude that Kansas City's aspirations are reasonable and that great progress can be made, but this progress will require strong academic science centered at UMKC.

Achieving excellence in life science at UMKC will depend on:

1. Strong scientific leadership. An able scientific leader must be recruited and given the authority and the responsibility to build life sciences at UMKC.
2. Focus. All efforts must be focused on a very few areas with the goal of achieving world-class programs.
3. Resources. Building strength in the life sciences is expensive. Both the State of Missouri and the private sector must be enlisted if the goals are to be met.
4. A commitment to work together with partners within the University and in the greater Kansas City area to share ideas, and resources for the good of the entire enterprise.

All four of these tasks are critical for success. Strong scientific leadership is an essential. Without focus the money will accomplish little. If key people are not willing to work together toward common goals, turf wars and power struggles will sink the project. Without adequate resources little can be done. It will not be easy to accomplish these tasks, but we believe it within the capability of Kansas City and UMKC to do so.

Finally there are cart and horse problems. It will not be possible to attract top scientific leadership without the expectation of resources; resources will not be forthcoming without confidence in the scientific leadership. The Task Force has confidence that the community has the creativity to work out solutions to such challenges.

Some might conclude that the task is too difficult or the costs too high. We conclude that the task is challenging, but within the capability of Kansas City and UMKC. The goal is noble. It should be pursued with vigor.

I. Introduction

The Kansas City area seeks to become one of the leading centers of biomedical research in the country. Its various research and civic institutions have embarked on an ambitious course to achieve national prominence in the life sciences. The University of Missouri-Kansas City (UMKC) has been an active participant in efforts to develop and expand the region's biomedical and biotechnology capabilities. UMKC understands, and we agree, that strong academic science at UMKC is essential if the ambitions of the region are to be realized. Accordingly, the University is committed to achieving excellence in the life sciences, recognizing that to be successful, it will have to call upon significant new investments from the community of Kansas City and the State of Missouri. Kansas City can become an important life sciences center, but no one institution can do it alone. Success will come only from partnering with other institutions and with strong support from the community and the State.

In May of 2002, UMKC's Chancellor, Martha Gilliland, formed the Life Sciences Task Force and asked it to develop a plan to define strategic goals for UMKC's leadership position in the region's life sciences initiatives, identify actions to support these goals, and delineate resource requirements that will aggressively implement these goals. To fulfill this charge, the Life Sciences Task Force conducted two site visits at UMKC, meeting with the deans of UMKC's health and life science related schools, University leaders, and faculty members involved in the life sciences to gain a better idea of the current state of life sciences research at UMKC and of some of the issues affecting biomedical research at UMKC. A list of the individuals with whom we met is attached as Appendix 1.

An interim version of this report was provided to UMKC's internal life sciences working group (the "Millennium Committee") to allow UMKC's deans and faculty an additional opportunity to discuss, debate, and elucidate issues, and provide the Task Force with input and information. The Millennium Committee's comments on the interim draft were taken into account as we prepared our final report.

During the course of its two visits, the Task Force spoke with many faculty members. Based on these exchanges, and on our own experiences at other research institutions, we were able to make certain judgments and recommendations. These, together with our estimate of required resources, are set out below. We recognize that we cannot appreciate fully the complexity of UMKC's academic enterprise and culture on the basis of just two visits. As a result, our report lays out a broad vision for UMKC's research enterprise, but does not make specific recommendations for research focus areas or administrative structure.¹

¹ The Task Force addressed only the challenge of developing the academic research strength of UMKC. It did not address other needs necessary for Kansas City to develop commercial activity that might build on research in the life sciences.

II. Opportunities and Challenges

UMKC is a comprehensive public university with six professional health/science schools (Medicine, Dentistry, Nursing, Pharmacy, Biological Sciences, Arts and Sciences, and Interdisciplinary Computing and Engineering) as well as the College of Arts and Sciences in which life science research also takes place. UMKC also has formal affiliations with four Kansas City hospitals conducting biomedical research. Thus, the basic building blocks for a strong life sciences research program are in place – well established life science and biomedical research programs and access to diverse patient populations. The recent convergence of certain additional factors provides UMKC with an unprecedented opportunity to achieve national prominence in the life sciences.

In 1999, Kansas City's life sciences community came together to form the Kansas City Area Life Sciences Institute (KCALSII) whose mission is to lead Kansas City's transformation into a center of excellence in life sciences by serving as the coordinating body for the region's life sciences research initiatives. The KCALSII was an outgrowth of work done by the Kansas City Development Council and the Civic Council of Greater Kansas City, both of whom recognized the economic importance of developing the life sciences industry in Kansas City, and its formation is a tangible expression of support for life sciences research by the region's business, industry and government leaders. To date, KCALSII's main role has been to facilitate and coordinate funding for collaborative research programs among its eight stakeholder institutions.² The KCALSII is tangible evidence of the Kansas City community's commitment to life sciences research.

The establishment of the Stowers Institute for Medical Research with an initial gift of a \$50 million endowment (which, through additional gifts from the Stowers, has now grown to over \$1.5 billion) by Jim and Virginia Stowers provided Kansas City with an opportunity in the life sciences which it otherwise would not have. The Stowers Institute is an important catalyst for elevating life sciences research in Kansas City, and KCALSII's other stakeholder institutions – UMKC, the University of Kansas, the University of Health Sciences, the University of Kansas Medical Center, Children's Mercy Hospital, Saint Luke's Hospital and the Midwest Research Institute – are all contributing to the growth of life sciences in Kansas City. With the proper spirit and enough financial support (see below) each of these institutions can enhance the others; the whole can be greater than the sum of their parts. The reasons for this are obvious to those who have observed other research settings. Modern biological science is complex, and scientists pursuing complicated problems must have available potential collaborators in related disciplines. While UMKC has an impressive pool of potential collaborators across a variety of disciplines, its access to researchers at other institutions increases the size and depth of this pool. Ideas, equipment and technologies can be shared. Common investments can be made. Moreover, it is hard to overemphasize the importance of proximity. Data can be shared electronically around the world, but face-to-face contact sparks new ideas and the easy sharing of approaches and technologies.

The academic research enterprise relies, to a great extent, on graduate students. Collaborative graduate programs between institutions can increase research and education opportunities for students, making those programs more attractive to prospective applicants.

² The eight stakeholder institutions are UMKC, the University of Kansas, the University of Health Sciences, the University of Kansas Medical Center, Children's Mercy Hospital, Saint Luke's Hospital, the Midwest Research Institute, and the Stowers Institute for Medical Research.

Financial support for life sciences research at the federal level has been strong and is likely to continue to grow, thereby expanding research opportunities in the life sciences. The National Institutes of Health, for example, is on track to achieve a doubling of its budget between fiscal year 1998 and fiscal year 2003, and as more federal funds are made available for biomedical research, UMKC's funding opportunities also increase. In addition, Missouri's Senators have been successful in securing federal research funding for UMKC, which in FY2002 amounted to \$2,350,000.³ It should be noted, however, that no institution can build itself on federal funds alone. Federal research grants are awarded on a competitive basis; that is they go to the institutions with the best scientists, the best equipment and the best facilities. It requires the expenditure of institutional money to get federal research grants.

Unfortunately, the favorable funding environment at the federal level is not mirrored at the State level. While we understand that Kansas City leaders and the Governor of the State of Missouri, and many legislators are committed to the development of strength in the life sciences, the State's fiscal difficulties have, among other things, resulted in a ten percent reduction in Missouri's higher education core budget and an inability to make awards under the Missouri Life Sciences Research Capacity Contracts program this year. There may, however, be some cause for optimism. On September 18, 2002, Governor Bob Holden allocated \$1.7 million in State funds to UMKC as planning money for the construction of a life sciences incubator.

State universities increasingly are raising funds from private sources. In fiscal year 2001, ten of the top twenty institutions, as measured by total annual giving, were public universities.⁴ While private resources will never be sufficient alone to support world-class research, private support is a necessary component of a robust research program. UMKC's endowment was approximately \$180 million as of June 30, 2001, and its total annual giving in FY2001 was approximately \$15 million. A comparison of these figures with comparable numbers from other public institutions is shown on Appendix 2. It is clear that UMKC's current endowment and annual giving numbers do not match its aspirations.

III. Life Sciences Research

UMKC's commitment to achieving national prominence in life sciences research and playing a leadership role in KCALSI initiatives will require a significant effort on the part of UMKC, and a substantial infusion of new resources. We believe these efforts and resources should be focused on the three or four research initiatives that are most

³ These federal awards are as follows:

FY2002 \$350,000 To help create the Institute for Biomedical Research to conduct Alzheimer's and AIDS research (Senator Carnahan)

FY2002 \$1,000,000 To build new facilities and acquire new equipment for the Center for Molecular and Cellular Bioengineering Research (CISBD) (Senator Bond)

FY2002 \$1,000,000 Planning funds for Life Sciences Initiative (Senator Bond)

FY2003 \$1,000,000 Cardiovascular Proteomics Initiative (Senator Bond)

⁴ According to the Council for Aid to Education/VSE Survey 2002, the following public institutions are in the top ten: Indiana University Bloomington, University of Wisconsin at Madison, University of California at San Francisco, University of California at Los Angeles, University of Washington, University of Minnesota-Twin Cities, University of Michigan, Ohio State University, University of California at Berkeley and Michigan State University.

likely to succeed, building on existing research strengths at UMKC and elsewhere in the Kansas City area. While an approach that spreads resources more broadly could benefit directly more of UMKC's current faculty members, it will not achieve UMKC's goal of national leadership in the life sciences. In order to build world class research programs, UMKC must develop both a critical mass of researchers in each research area and the infrastructure to support their work. Because resources are constrained, it is not possible in the near term future to do this broadly across a wide spectrum of research areas. We do not imply that other areas of excellence will not or should not flourish. They should and they can. We do say that to achieve national prominence, UMKC must target its investments.

Rapid advances in the life sciences and the convergence of life sciences, computational sciences and information technology are transforming research in the biological sciences. Three areas of life sciences in particular -- bioinformatics, genomics, and proteomics -- are driving much of the current excitement. With the completion of the initial sequence of the human genome, there is now an unprecedented opportunity to understand the genetic and molecular basis of diseases. This, coupled with new imaging tools and information technology, dramatically enhance our ability to recognize and diagnose diseases and understand the molecular mechanisms underlying diseases. We will not make recommendations as to specific areas for research focus for UMKC because the scientific leadership in the community should define the programs so that they take full advantage of specific strengths and opportunities. In regards to scientific leadership, an external scientific advisory committee could provide valuable input for these decision, and we recommend that UMKC establish such an external scientific advisory board, reporting to the Chancellor, to provide ongoing guidance on life sciences research initiatives and programs, and to monitor progress toward both institutional and regional goals. Because the advisory board would be comprised of prominent scientists and educators from outside UMKC, it would be able to draw on the experiences of other institutions and suggest implementation approaches or program modifications.

In order for UMKC to achieve its research and education objectives, it must immediately focus on developing strong life science leadership and on recruiting additional research faculty. With respect to leadership, UMKC must recruit an individual to provide a vision and scientific direction for life sciences research as well as effective external relations and promotion of life science initiatives. One individual could fill both of these roles, but responsibility for scientific direction and for external relations also might be divided among two or three individuals. In any case, life sciences leadership must draw together UMKC's various departments and professional schools in a way that encourages collaboration in both research and teaching, build research strength in the life sciences, and advocate on behalf of research programs both within and outside UMKC. This new life sciences leadership must include a nationally visible researcher or research leader who would have credibility with bench scientists, university administrators and state and federal government officials.

UMKC's scientific leader must be given the resources and authority to develop areas of scientific research. This necessarily includes the ability to recruit and reward faculty and allocate resources. A variety of administrative structures could provide this authority, and a major challenge for UMKC will be to examine its current administrative structure and consider how it might be adjusted to optimize the ability of the life sciences leadership to achieve UMKC's goals.

As mentioned above, UMKC also must recruit new faculty researchers if it is to achieve national prominence in life sciences research. Given what we know of UMKC

and of other research institutions with which we have been affiliated, we estimate that an additional 40 to 50 researchers must be recruited over a 5 to 10 year period to augment UMKC's current faculty strengths. This will provide the critical mass of researchers necessary to develop a small number of mutually supportive centers of excellence that, together with other Kansas City strengths, will achieve University and regional goals.⁵ The outstanding scientists to be recruited will enrich the research and education environments at UMKC, particularly in those areas targeted for special focus under the new life sciences initiative. These new researchers also will allow UMKC to fully capitalize on the opportunities presented by UMKC's proximity to its community partners in developing mutual research strengths and goals.

To provide some context for the 40 to 50 new researchers we recommend, we note that a comparison of the current number of externally funded UMKC life sciences researchers, and of the average total NIH-funding level for those researchers, lags behind the numbers of such researchers at other academic institutions in the region. This is shown in Appendix 3. Recruiting outstanding junior and established researchers, as we suggest, will help correct this discrepancy.

In addition to further developing its own research strengths, UMKC must continue to leverage its relationships with its external life sciences partners, e.g., the other KCALSI members, to help build strong research programs. While collaboration should not be an end in itself, it is often an effective means of addressing complex scientific questions. For Kansas City to build a strong presence in the life sciences, scientists will have to be willing to work cooperatively and productively with others, and share ideas, criticisms, equipment and educational programs. This also will make UMKC more attractive to potential sources of research funding who often place a premium on collaborative and/or interdisciplinary research projects. For example, the Missouri Life Sciences Research Capacity Contracts RFP states that "Because proposed projects should be designed to enhance the research capacity of the State as a whole ... proposals that involve collaborations among two or more institutions and/or multidisciplinary collaborations will be given higher priority in the award process." The scientific enterprise benefits from a culture of collaboration across schools, departments and other institutions. Openness to these types of relationships, especially those with institutions closest by, will facilitate progress at UMKC and in the larger community.

IV. Education Programs

As mentioned above, the academic research enterprise relies to a large extent on its graduate students who conduct research, contribute new ideas and teach undergraduates. To attract the strongest students, UMKC must expand and strengthen its existing graduate education program. In addition, we recommend the establishment of an inter-institutional life sciences graduate program in conjunction with Stowers and the University of Kansas, as a complement to the graduate programs that already exist within UMKC. Such a program would provide expanded research opportunities for potential students, and allow co-branding with Stowers and the University of Kansas Graduate School and Medical School, all of which would likely be attractive to potential students.

⁵ Before the exact number can be determined, UMKC must identify the research areas in which it intends to focus, and then determine the new resources that will be required to build world class programs in those areas.

Graduate students are the life blood of a vibrant academic research enterprise. If UMKC is successful in recruiting the new faculty members that we recommend, we estimate that UMKC ultimately will need to recruit an additional 20 graduate students each year (one graduate student for every two new faculty members). These students are likely to participate in the inter-institutional program described above.

Finally, we note that UMKC's other professional schools, e.g., law and business, would also benefit from a stronger life sciences program, since UMKC is likely to develop a curriculum linking the life sciences to other professional schools. For example, UMKC might establish a multidisciplinary course on entrepreneurship in the life sciences at the Business School, or one on life sciences patent and intellectual property law at the Law School. This would provide for workforce development in the life sciences by taking advantage of potential synergies among UMKC's various schools and departments, and would be a tangible example of how a strong life sciences program can have implications for education far beyond the specific disciplines involved in the research effort.

V. Potential Economic Impact

One can view the potential economic impact of strong life sciences in two ways. The first looks solely at the direct economic impact of increased research funding and expenditures. The second looks at the potential economic development associated with a strong research program. With respect to direct economic impact, we estimate that each new faculty member recruited by UMKC under the life sciences initiative we envision will generate an average of \$500,000 of external funding annually once they are well established in their labs.⁶ Based on this estimate, if 50 new faculty members are recruited, ultimately they will generate \$25 million a year (in current dollars) of external research funding. This will lead directly to new jobs associated with increased research activity, and to increased tax revenue.

Perhaps more significantly, a higher level of life sciences research activity will serve to make the region more attractive for life sciences companies. This can result in companies locating in the Kansas City area. In addition, increased opportunities for commercial activity will arise from the spin off of technology and intellectual capital from university research. While it would be difficult to quantify the impact of this commercial activity, we note that the impact of the biotechnology industry on the U.S. economy is significant. The industry has been growing rapidly, more than tripling in size from 1992 (\$8 billion in revenue) to 2001 (\$28 billion in revenue).⁷ In 2001, U.S. biotechnology firms directly employed 179,000 workers⁸, and those firms' purchases from other companies and spending by their employees are estimated to have generated another 340,000 jobs.⁹ In Massachusetts alone, biotechnology companies employed over

⁶ The \$500,000 estimate seems reasonable in light of the average NIH funding shown in Appendix 3, which do not take into account funding from sources other than NIH.

⁷ Ernst & Young annual biotechnology industry reports. 1993-2002.

⁸ Ernst & Young annual biotechnology industry reports. 1993-2002.

⁹ Calculated using multiplier of 2.9 which was employed by Ernst & Young in "The Economic Contributions of the Biotechnology Industry to the U.S. Economy" May 2000.

30,000 workers in 2001.¹⁰ If the Kansas City area is able to increase the level of its life sciences research in a meaningful way, the potential economic impact resulting from increased commercial biotechnology activity will not be trivial.

VI. Resource Requirements

Meeting UMKC's life sciences goals will require a sustained financial commitment to fund new positions, students, facilities, equipment and infrastructure. A financial plan is shown in the Table 3 attached as Appendix 4. This financial pro forma is only a first estimate. If such a plan goes forward, many of the numbers will change upward or downward, but overall, the Task Force believes that ten years from now the steady state annual expenditures for the life sciences should be in the neighborhood of \$20 million.

While this plan is ambitious given the history of the institution, it is not at all large considering the aspirations of the University and the Kansas City community. It is important to recognize that the resource requirements we describe below are in addition to, and not in substitution for, the current general support for UMKC's programs, or for the currently anticipated future growth in that support.

As described earlier, we believe UMKC must recruit between 40 and 50 new scientists over a 5 to 10 year period to achieve its life science goals. UMKC has estimated the average cost of salary and benefits for each new faculty member at \$149,000 and the average start-up package at \$610,000. Thus, the costs associated with these additional faculty members are shown on the third, fourth and eleventh lines of the table in Appendix 4.

To attain life sciences goals UMKC must enhance its recruitment of top quality graduate students. We estimate that for every two new faculty members, one additional graduate student will be recruited each year. We further estimate that each such graduate student will have to be funded from sources other than training and research grants for approximately two years, with an annual cost per graduate student of \$35,000 (consisting of a \$25,000 stipend, \$6,000 for tuition, and the remainder for benefits). The added cost for these students, and for expenses associated with enhanced recruiting efforts, is shown on line five of the table in Appendix 4.

Finally, UMKC's infrastructure needs are equally important, since recruiting scientists will depend on the existence of adequate space and equipment and systems. The ability to increase significantly this budget would certainly strengthen the position of UMKC in competing for sufficient numbers of able people to mount a strong national program. UMKC has current plans to build a 186,000 gross square foot Health Sciences Building that will provide critical teaching and research facilities. The building will be part of a complex of buildings that include the School of Medicine, School of Dentistry, Truman Medical Center, and Children's Mercy Hospital on the Hospital Hill campus. Funding of \$30.5 million has been approved by the Missouri General Assembly, although the Governor has not yet released the funds. The University has raised approximately \$5 million of the \$8 million in private funding necessary to fully fund the building project. Phase II of the Health Sciences Building, consisting of a 140,000 gross square foot addition, will accommodate additional life sciences laboratory space and an animal laboratory center. UMKC has estimated the cost of constructing Phase II at \$35.2

¹⁰ Information obtained from the Massachusetts Biotechnology Council.

million. UMKC has received a \$1 million federal grant for planning purposes for this addition. Completion of the two phases of the new Health Sciences Building will be necessary to accommodate the needs of the 40 to 50 new faculty members contemplated by this report.

Contemporary biomedical research relies to an increasing extent on the availability of suitable animal models of disease. UMKC's 30 year old animal facility at Hospital Hill is inadequate to produce and house genetically modified animals or support the current needs of UMKC researchers. It must be renovated and upgraded if UMKC researchers are to remain competitive and new researchers are to be recruited. While Phase II of the Health Sciences Building contemplates an animal laboratory center, it is not clear when (or if) Phase II will be constructed but under the most optimistic scenario, this facility would not be completed for six years. Accordingly, it's critical that the existing animal facility be renovated expeditiously. The University engaged an architectural firm that specializes in animal facilities to develop a plan for expanding and modernizing the facility. The project would enlarge the space from approximately 8,200 gross square feet to approximately 11,500 gross square feet and reconfigure the floor plan to increase the capability to house and care for transgenic mice. The cost of the remodeling is estimated at \$6,000,000.

Information resources constitute a strategic intellectual asset essential to the achievement of the University's research goals. The University must assure that access to information and the tools to manage it are readily available to researchers. This is especially important in the life sciences because of the vast amounts of data being generated by contemporary research projects. To remain nationally competitive, researchers must have access to appropriate databases, the latest publications and other essential information, and the University must assure that the information infrastructure is sufficiently robust to support the management and access to these vital resources. The network infrastructure in UMKC's buildings is obsolete and unable to meet the demands of life science researchers. Some of these buildings (e.g., the Biological Sciences Complex and the Medical School) require extensive modification and investment to bring their network distribution infrastructure up to contemporary standards. These modifications will involve building renovations, upgrading the fiber-optic backbone and other physical components of the network.

Both the computing hardware and software systems will need to be upgraded for the University to be competitive in life sciences research. For example, we are told that the new hardware and software for genetics research must be acquired. The rapid pace of technological developments in this field poses particularly difficult challenges for those institutions that wish to remain at the forefront of research. We therefore recommend that UMKC develop a plan for continuous assessment of its information technology and resource needs.

VII. Possible Sources of Support

It is evident from the foregoing that a large infusion of resources into UMKC will be necessary if Kansas City is to develop its research capacity and its future economic potential, and if it is to full take advantage of the location of the Stowers Institute in Kansas City. It is also evident that those public universities who have built scientific strength have done so because of private as well as public support. (See appendix 2 for examples of private support to public universities. We believe that the resources could be available, but only with substantial private funding on the part of the Kansas City region and public funding from the State of Missouri. In addition, UMKC should be

asked to reallocate some of its funds for this goal.

There are a number of ways that the financial support could be put together. What follows is one example or scenario that seems to us possible provided that the community and the State are committed to the project. We suggest it, in part, because of the great wealth in the Kansas City foundations.

- The major foundations in the Kansas City region pledge 0.5 percent of their assets per year for five years toward the capital required if UMKC is to take advantage of its opportunities. We envision that such a commitment could bring approximately \$250 million that might be used in the following manner: \$50 million to pump-prime research in areas of increased focus. Pump priming would include start-up funds for new faculty, equipment to attract and retain outstanding scientists, and renovation and upgrade of physical facilities to accommodate new activities. Many, but undoubtedly not all, of these costs are included in the costs shown in Table 3. The remaining \$200 million could be used for a permanent endowment. This \$200 million, invested for the long term, would be expected to generate approximately \$8 million per year in income. There is enough wealth in Kansas City to achieve such a goal if the region believes that life sciences are key to its future. A commitment of twice that magnitude by the major foundations would assure more rapid progress provided leadership, focus and a cooperative spirit is present.
- The State of Missouri add between \$10 million and \$15 million per year to the budget of UMKC for building the life science capacity.
- UMKC make the building of this capacity a priority for the next five years; they must continue that support and enhance it in critical infrastructure areas and activities, such as additional library resources, strengthening grants management and the office of technology transfer, etc.

Clearly such funding would require the total commitment of the giving, business and political communities of Kansas City and of UMKC itself. In our view such a commitment is necessary for success.

VIII. General Conclusions

Kansas City has an opportunity to develop significant strength in the life sciences, capitalizing on the already large investment in the Stowers Institute. The Life Sciences Task Force believes that building first class academic science at UMKC is a necessary component of making the most of that opportunity.

We have made recommendations as to how UMKC should proceed, outlined four elements necessary for success: scientific leadership, focus of effort and resources, adequate financing, and commitment to work with partners. In addition, we have estimated the financial costs of success and provided one scenario of how these costs might be met.

The Task Force applauds the initiative of UMKC and Kansas City to build the life sciences. We believe the goal is worthwhile and is difficult, challenging, and, with great effort, achievable.

Appendix 1

Life Sciences Meeting Participants

Deans/Vice Chancellors

- Betty M. Drees, Interim Dean, School of Medicine
- Nancy M. Mills, Dean, School of Nursing
- Robert W. Piepho, Dean, School of Pharmacy
- Michael J. Reed, Dean, School of Dentistry
- William P. Osborne, Dean, School of Interdisciplinary Computing and Engineering
- William T. Morgan, Interim Dean, School of Biological Sciences
- Frank E. Horton, Interim Dean, School of Biological Sciences
- Ronald A. MacQuarrie, Vice Provost, Research/Dean, Graduate Studies
- Patricia N. Long, Vice Chancellor, Student Affairs and Enrollment Management

Faculty

- Antonio S. Artigues, School of Biological Sciences
- Marilyn Yoder, School of Biological Sciences
- John Laity, School of Biological Sciences
- Bibie M. Chronwall, School of Biological Sciences
- Lawrence A. Dreyfus, School of Biological Sciences
- Paulette Spencer, School of Dentistry
- Alan Glaros, School of Dentistry
- Sarah Dallas, School of Dentistry
- Jian Q. Feng, School of Dentistry
- Deepankar Medhi, School of Interdisciplinary Computing and Engineering
- Vijay Kumar, School of Interdisciplinary Computing and Engineering
- Deendayal Dinakarpandian, School of Interdisciplinary Computing and Engineering
- Ralph A. Kauffman, School of Medicine
- Richard Derman, School of Medicine
- Paul Cuddy, School of Medicine
- Ashim Mitra, School of Pharmacy
- Vincent Lau, School of Pharmacy
- Mary Christina Hines, School of Nursing
- Peggy A. Ward-Smith, School of Nursing
- Jana Pressler, School of Nursing
- Wei Ji, Geosciences, A&S
- Reginald Bassa, Political Science, A&S
- Charles Wurrey, Chemistry, A&S
- Zhonghua Peng, Chemistry, A&S
- David Van Horn, Chemistry, A&S
- David Wieliczka, Physics, A&S
- Keith Haddock, Psychology, A&S
- Gerald Carlson, School of Biological Sciences
- Lawrence Dreyfus, School of Biological Sciences
- Alfred Esser, School of Biological Sciences
- Edward Gogol, School of Biological Sciences
- Tatiana Karpova, School of Biological Sciences

- Steve King, School of Biological Sciences
- Michael O'Connor, School of Biological Sciences
- Kirill Popov, School of Biological Sciences
- Sully Reed, School of Biological Sciences
- Ann Smith, School of Biological Sciences
- George Thomas, School of Biological Sciences
- Jakob Waterborg, School of Biological Sciences
- Gerald Wyckoff, School of Biological Sciences

External Community

- William P. Duncan, President, Kansas City Area Life Sciences Institute (KCALSI)
- John Bluford, CEO, Truman Medical Center
- Robert E. Krumlauf, Scientific Director and Senior Scientist, Stowers Institute for Medical Research

Appendix 2

Table 1: Total Private Gifts for Selected Institutions

Institution	Endowment as of June 30, 2001¹ (in millions of \$)	Total Giving FY2001² (in millions of \$)	Capital Campaign³ (in millions of \$)
Institutions that include a Medical School:			
UMKC	\$180 ⁴	\$ 15 ⁴	None reported
UM-Columbia	\$354 ⁵	\$44	None reported
St. Louis University	\$819	Not reported	None reported
Washington University, St. Louis	\$3,952	\$122	\$1,258 of \$1,300 (as of 8/31/02)
University of Kansas	\$832 ⁶	\$80	None reported
Ohio State University, Columbus	\$1,112	\$211	\$1,230 (completed 6/30/00)
University of Michigan, Ann Arbor	\$3,614	\$218	\$1,400 (completed 8/1/98)
University of Utah	\$341	\$146	\$766 (completed 6/23/00)
University of Alabama at Birmingham	\$234 ⁵	\$54	\$300 of \$350 (as of 6/4/02)
University of Iowa, Iowa City	\$636	\$96	\$526 of \$850 (as of 6/24/02)
University of Wisconsin	\$1,075	\$292	None reported
University of Illinois System	\$898	\$149	\$1,527 (completed 12/31/00)
Indiana Univ. Purdue Univ. Indianapolis	(see Indiana Univ.)		\$625 of \$700 ⁷ (as of 4/30/02)
Medical Schools:			
Univ. of Texas Southwestern Med. Ctr., Dallas	\$645 ⁵	\$90	\$172 of \$450 (as of 4/9/02)
Institutions without a Medical School:			
Purdue University	\$1,217	\$131	None reported
Indiana University, Bloomington	\$923	\$301	\$431 (completed 9/1/00)

¹ As reported by *The Chronicle of Higher Education* at <http://chronicle.com/stats/endowments>, unless otherwise noted.

² As reported in the Council for Aid to Education Voluntary Support of Education (VSE) Survey for 2001 (published 2002), except as otherwise noted.

³ As reported by *The Chronicle of Higher Education* at <http://chronicle.com/money/campaigns.php3>.

⁴ As reported by the University of Missouri-Kansas City.

⁵ As reported in the Council for Aid to Education Voluntary Support of Education (VSE) Survey for 2001 (published 2002).

⁶ Kansas University Endowment Association.

⁷ As reported by the University of Indiana Foundation at http://www.campaign.iupui.edu/about/campus_camp.html#totals.

Appendix 3

Table 2: NIH-funded Researchers at Regional Institutions – FY 2002

Institution	# Faculty Receiving NIH Grants and Awards	Total Amount of NIH Funding (in millions of \$) (000,000)	Total NIH Funding/ # NIH-funded Faculty (in thousands of \$) (000)
Institutions that include a Medical School:			
UMKC	35	\$10	\$293
UM-Columbia	115	\$37	\$323
St. Louis University	73	\$27	\$371
Washington University, St. Louis	496	\$335	\$675
Ohio State University, Columbus	245	\$99	\$405
University of Michigan, Ann Arbor	611	\$319	\$522
University of Utah	268	\$116	\$432
University of Alabama at Birmingham	339	\$196	\$577
University of Iowa, Iowa City	310	\$149	\$480
University of Wisconsin	439	\$217	\$494
University of Illinois, Urbana-Champaign ¹	264	\$106	\$401
Indiana Univ. Purdue Univ. Indianapolis	207	\$97	\$467
Medical Schools:			
University of Kansas Medical Center	73	\$38	\$523
University of Colorado Health Sci. Ctr., Denver	319	\$163	\$510
Univ. of TX Southwestern Med. Ctr, Dallas	263	\$151	\$574
Institutions without a Medical School:			
Purdue University	89	\$29	\$321
Indiana University, Bloomington	84	\$21	\$255

SOURCE: NIH Office of Extramural Research, *NIH Extramural Awards by State and Foreign Site – FY 2002* (<http://grants.nih.gov/grants/award/state/state02.htm>)

¹ The Medical College at UIUC has a relatively small graduate program. Each year only 25 medical students from the undergraduate program remain in Urbana-Champaign to complete their MD degree.