Scientific Research Vision for Restructuring and Investment at TUSM

Executive Summary

The Research Vision Committee (RVC) (member list included in the Appendix) was charged by Harris Berman, MD, Dean of Tufts University School of Medicine (TUSM) to address ways to best position TUSM to do strong biomedical research in the competitive environment that exists and is likely to exist for the foreseeable future. The group was asked to include reduction in the number of basic science departments in their plan because TUSM is unable to invest in more than one or two departments in the foreseeable future. Dr. Berman's initial charge and additional clarifications presented to the RVC are included in the Appendix.

The committee unanimously recommended that any plans for reorganization include a significant investment in TUSM. The hope is that a new organizational structure that reduces the number of basic science departments will allow TUSM to maximize its research efforts and contributions such that future investments in research could be targeted more effectively.

In keeping with the charge, and given the current financial constraints, the RVC has proposed two plans for strategic re-structuring and faculty realignment that it hopes will position TUSM for immediate and sustainable growth in research, discovery and the creation of innovative, advanced therapeutics for unmet clinical needs. The committee unanimously agreed to present two plans because some members favored one approach while others felt a second approach would best serve the school. Considering the medical school's existing strengths and in recognition of the current financial climate, these visions for TUSM aim to enable and strengthen strategic partnerships across Tufts University and affiliated institutions. The goal of both plans is to both focus and enhance the vibrant biomedical research program that exists at TUSM and insure that it remains sustainable in an increasingly challenging environment. The RVC recommendations also have the potential to catalyze robust and newly found opportunities in discovery and therapeutic innovation.

The realignment of faculty proposed by the RVC takes advantage of nationwide and local opportunities. The Director of the National Institutes of Health, Dr. Francis Collins, has signaled translational biomedical science that embraces basic research is central to the NIH mission. He has formed a new National Center of Advanced Translational Science (NCATS) to emphasize the commitment to this area thereby creating new funding opportunities. TUSM is situated in the heart of the Boston and Cambridge biotechnology and pharmaceutical industry and Tufts is home to the internationally recognized Center for the Study of Drug Development (CSDD). The RVC recommendations will increase the potential for faculty to work across discipline-specific lines and position our faculty to take full advantage of these opportunities.
Based on the charge delivered to the RVC, we recommend the following reorganization plans to Dean Berman:

1) Re-organize the current TUSM basic science departments around either three or four basic science departments assuming appropriate funding is provided by the university to enable effective development of a consolidated and reinvigorated research enterprise.

2) Re-organize the current Departments of Anatomy and Cellular Biology, Molecular Physiology and Pharmacology, Pathology, and Biochemistry to incorporate them within a new three or a new four department structure. Faculty members should be reassured that restructuring will not jeopardize pre-existing tenure contracts.

3) Consider different models for how the school and the basic science faculty should be re-aligned. For example, in the three department model, the departments would be: i) Molecular Biology and Microbiology; ii) Neuroscience; and iii) Molecular and Cellular Medicine. In the four department model, the departments would be: i) Molecular Biology and Microbiology; ii) Neuroscience, and two new departments; iii) Cancer Biology and Molecular Therapeutics; and iv) Molecular and Cellular Medicine.

4) Provide significant investment in the new department(s) by providing funding to allow space renovation, recruitment of a new chair(s) and the ability of the new chair(s) to recruit a minimum of nine new faculty members.

5) Develop and provide seed funding for faculty-driven inter-disciplinary institute initiatives that involve collaboration across Tufts University and TUSM affiliates, which are subject to institute-specific milestones.

6) Evaluate a new budget model that allows the chair to obtain a pool of funding in proportion to either the department's indirect costs and/or salary savings.

7) Re-energize advancement-based fundraising activities around the departments and institutes.

8) Evaluate the possibility that a Department of Medical Education would strengthen the teaching mission of the School of Medicine.

In considering these ideas, the RVC recommends that the faculty be engaged to obtain their input into the future of the school. In the following pages we provide the logic behind these recommendations and discuss what we perceive to be some of the advantages and disadvantages of certain models.
I. Prologue
The Neuroscience and Microbiology Departments have both received investment support and new chairs in the recent past. As a result, these departments are well positioned and moving forward. Unfortunately, areas of research encompassed by the other four basic science departments have not received significant institutional funding for many years. This situation needs to be remedied. Given that it is not fiscally possible to invest in each of the other four departments on the same scale as was done for Neuroscience and Microbiology, the RVC was charged with addressing ways to best position TUSM to do strong research and science in the competitive environment that exists and is likely to exist for the foreseeable future. In addition, the group was asked to consider the organizational structure that would allow TUSM to maximize its research efforts and contributions such that future investments in research could be targeted more effectively.

II. Recommended RVC Guiding principles
The RVC mandate calls for a structural reorganization plan aimed at positioning the medical school for immediate and sustainable growth. Towards this goal the RVC recommends the steps outlined immediately below be taken.

II.1. TUSM basic science faculty must be actively engaged and empowered by the re-invention process. The faculty and administration are the major stakeholders in any reorganization plan. As such, the RVC recommends that the senior administration engage faculty with drafted reorganization plans, which have been delivered for consideration, but remain open to additional ideas.

II.2. University and school leadership should significantly capitalize the strategic re-invention and re-structuring plan. A robust capitalization plan must be linked to any TUSM re-structuring. Based on prior and ongoing recruitment activities it is anticipated that a package is required to support: (i) space renovation; (ii) the recruitment of an external chair; (iii) recruitment of additional faculty; (iv) seeding the launch of faculty-driven research institutes. In the absence of such a school-specific financial commitment and university-driven capitalization plan, the RVC believes that medical school re-structuring will not be successful, and should not proceed.

II.3. Strategic re-structuring should be linked to university advancement’s efforts focused on enriching the medical school’s research enterprise. RVC strongly recommends that a new model be created to support and sustain a robust faculty and university advancement-based partnership aimed at driving the medical school’s renewal plan(s).

III. Recommended Reorganization
During its discussions, the RVC identified areas of research strengths as well as areas of opportunities for the future. The committee recognized the importance of Neuroscience, and Molecular Biology and Microbiology as existing strengths to be maintained, and identified Cancer and Drug Discovery and Molecular Therapeutics as additional strengths that cut across several themes related to Molecular and Cellular Medicine, both of which are potential growth areas for the future.
The RVC considered several models of reorganization and decided to present two in this report. Some members thought that the three department model was most appropriate while other members felt that the four department model would be better. Both views are presented as are perceived strengths and weaknesses of each. Note that the names of departments used herein are for the purposes of this document and other names might be adopted. We also understand that modification of these two models is possible.

Lastly, the RVC recognizes that some members of current departments may align with the existing departments of Molecular Biology and Microbiology and Neuroscience, perhaps creating sub-divisions within these departments. In this instance, a strategic decision will have to be made by TUSM and Tufts University as to whether to support these areas.

### III.1. Three department model

**Department of Neuroscience**

**Department of Molecular Biology and Microbiology**

**Department of Molecular and Cellular Medicine**

### III.1A. Departments of Neuroscience and Molecular Biology and Microbiology

The Departments of Neuroscience and Molecular Biology and Microbiology are the strongest basic science departments in the School of Medicine. They have the greatest extramural support for research and are recognized for excellence worldwide. The committee recommends that these departments continue to receive the investments already promised to them. These departments address medically relevant problems and it is anticipated that there will be continued and significant funding opportunities in these areas. If they continue to be as successful as expected after the ongoing investment has been fully utilized, a mechanism will need to be created to maintain the high quality of the faculty by recruiting additional young scientists.

As part of the departmental restructuring, faculty whose research concentration and focus is aligned with either Neuroscience or Molecular Biology and Microbiology should be offered the opportunity to join these departments. Historically, both departments have succeeded because of highly focused research activities. To enhance the probability of faculty from other departments finding a new department home in one of these two departments, the leaders of both departments should embrace the opportunity for some broadening of their respective research agendas.

### III.1B. Department of Molecular and Cellular Medicine

Faculty who are not engaged in Neuroscience or Molecular Biology and Microbiology would form a new department at TUSM. In addition, faculty from Neuroscience or Molecular Biology and Microbiology could choose to join the new department. In recognition of the medical school’s existing research portfolio, creation of a Department of Molecular and Cellular Medicine would represent a unique and integrated foundational strength for the future of TUSM.
Because of the importance of drug discovery for the future of the next generation of new medicines, and in recognition of the core strength in drug development at Tufts, the department should nucleate a drug discovery unit that would serve all investigators and interact synergistically with other departments at TUSM.

It is predicted that a Molecular and Cellular Medicine Department would bolster existing collaborations and stimulate the formation of new basic and translational research opportunities. Faculty members joining this department would participate in shaping the overall direction and research themes. Such initiatives could lead to the development of innovative molecular and cellular medicines for unmet clinical needs. Furthermore, faculty members working in drug discovery could nucleate a new Institute of Therapeutics that would provide expertise and resources to TUSM, the Health Science campus, Tufts University and affiliated institutions.

The Department of Molecular and Cellular Medicine should be the beneficiary of a substantial investment to make it a significant presence in Boston, nationally and internationally. A new Department Chair should be recruited to build the department and should be provided with nine recruitment packages to energize and create a vibrant and renowned department. New recruitments focused on molecular mechanisms of human pathogenesis, in domains linked to therapeutic innovation, could help shape the focus of the new department. Specific milestones, linked to achievement in the first round of recruitments, would be in place and guide future recruiting efforts. Opportunities for the new chairperson to expand the efforts beyond the initial school investments would also exist. Additionally, and importantly, the newly created chair position should be considered a naming and gifting opportunity for prospective donors. The group, together with a university-wide initiative would be strongly positioned to leverage funds from the local biotechnology and pharmaceutical connections in Boston and Cambridge as well as from opportunities at the NIH NCATS.

### III.2. Four department model

Department of Neuroscience
Department of Molecular Biology and Microbiology
Department of Cancer Biology and Molecular Therapeutics
Department of Molecular and Cellular Medicine

### III.2A. Departments of Neuroscience and Molecular Biology and Microbiology

Because there is overlap in the three and four department models, we do not provide a discussion of the Neuroscience and Molecular Biology and Microbiology Departments here. We refer the reader to the discussion provided in section III.1A above.

### III.2B. Department of Cancer Biology and Molecular Therapeutics

A major component of the mission of the RVC was to identify significant scientific strength(s) at TUSM that could be leveraged to have a major impact following restructuring. The committee identified cancer biology and drug discovery as one such area and the four department proposal acknowledges this by proposing to create a new Department of Cancer Biology and Molecular Therapeutics.
TUSM is fortunate to have an impressive strength in cancer research with approximately 15 current faculty members focused in this area, many of whom have international recognition and substantial funding. Cancer is also a major area of research focus at Tufts Medical Center (TMC). The Tufts Cancer Center and its Cancer Biology Program are highly regarded both internally and externally, and have been a significant area of investment at TMC and some of the affiliated hospitals. The president of the American Association of Cancer Research (AACR) Boston section is based at Tufts and the Breast Cancer Working Group has been recently re-energized. In addition, there are a number of faculty members working on drug discovery/molecular therapeutics with an interest in the cancer area who represent a significant and unique strength for the school. A new department of Cancer Biology and Molecular Therapeutics would effectively leverage these strengths.

Currently the faculty members focused on cancer biology are spread among the existing Departments of Anatomy and Cellular Biology, Pathology, Biochemistry and Molecular Physiology and Pharmacology. These faculty members and those working on drug discovery would nucleate the new department. In addition, all present faculty members associated with the Molecular Oncology Research Institute (MORI) and those doing cancer research in other schools at Tufts would be granted secondary appointments in this department. Thus, the department would transform the visibility and impact of cancer research and molecular therapeutics at Tufts. This new unit would also facilitate a more multi-disciplinary approach, so that innovations in engineering, biomedical engineering, chemistry, and other areas can be brought to the “war on cancer” and to the development of therapeutics.

The creation of a new Department of Cancer Biology and Molecular Therapeutics would have several immediate and long-term benefits. The combined strengths would bring to prominence cancer research at Tufts, enhancing our recognition in the cancer research community and showcase this major research strength at the university. It would foster interactions between faculty members across the Health Science Campus, the University at large and in our affiliated hospitals, thereby facilitating the translation of new findings in the area of cancer biology in a manner not currently possible. Furthermore, faculty members working in drug discovery could nucleate a new Institute of Therapeutics that would provide expertise and resources to the other three departments (i.e., those in existence after re-organization) at TUSM. Lastly, the department would provide immediate opportunities for cancer-targeted fundraising and might be more competitive for larger cancer-focused grants such as a SPORE if appropriate clinical scientists were in place at TMC.

Although, not essential for its success, the location of this department could include the 15th floor of 75 Kneeland Street and other floors in this facility (if necessary) on the Boston campus if interested faculty members to create more physical cohesion. In addition, faculty members on the Medford campus who might want a presence in this department could be given laboratory space in MORI on the 15th floor of 75 Kneeland or elsewhere on the Boston campus.
The recruitment of a physician scientist would be beneficial to launch this department. However, the number of total recruitments needed for this department may be fewer than those needed for the second department (see below) proposed in the four department model.

### III.2C. Department of Molecular and Cellular Medicine

Faculty who are not engaged in the areas of focus of the other three departments should be invited to create the fourth department at TUSM. This department would include faculty studying the mechanisms underlying human disease and follow the general outline described above for the Department of Molecular and Cellular Medicine in the three department model (Section III.1B). This unit would receive resources and recruitment packages to allow creation of a vibrant and renowned department.

### IV. Pros and cons of the department models

Some of the perceived strengths and weaknesses of the three and four department models are provided below. Rather than being exhaustive, this list is provided as a starting point for further discussion.

#### IV.1. Potential advantages of reorganization

- The school needs to invest in areas of research as faculty members begin to retire but resources must be used in the most effective way.
- Reduction in the numbers of departments permits focused investment to augment the research enterprise while supporting the existing activities of a majority of the existing faculty.
- Reorganization has the potential to foster new collaborations and re-invigorate existing collaborations, and could stimulate new grant applications, especially larger applications involving multiple investigators.
- Some cost savings will be realized through consolidation.
- Both models provide enhanced opportunities for fund-raising.
- New departments will be able to take advantage of the existing Tufts CSDD, as well as the new NIH NCATS Institute and the Boston and Cambridge Biotechnology and Pharmaceutical landscape.
- Translational opportunities within Molecular and Cellular Medicine will synergize with existing translational efforts in the Departments of Neuroscience and Molecular Biology and Microbiology and across TUSM, Tufts University and affiliated institutions.
- Faculty members working in drug discovery could nucleate a new Institute of Therapeutics that would provide expertise and resources to the investigators at TUSM, TMC and Tufts University and affiliated institutions.

#### IV.2. Potential disadvantage of reorganization

- Reduction in the number of basic science departments might stimulate concerns about the health of TUSM, both within Tufts and across the larger academic community. Some members felt that reduction to three departments would be
perceived as more drastic than reduction to four departments; others felt that the actual number of departments to emerge following reorganization was less important with respect to perceptions about decreasing the number of departments.

IV.2A. Potential advantage of a three department model
- Investment in Molecular and Cellular Medicine will allow funds to be targeted to one area, without diluting the resources that are required to recruit a leader of international reputation. The importance of significant recruitment packages is evidenced by the recent searches for the chairs of Neuroscience and Molecular Biology and Microbiology.

IV.2B. Potential disadvantage of a three department model
- The three department model might result in two small departments (Neuroscience and Molecular Biology and Microbiology) and one large department (Molecular and Cellular Medicine). This problem would be overcome if the existing faculty and chairs of the Departments of Neuroscience and Molecular Biology and Microbiology invited a significant number of faculty members who are currently in other departments to join their departments. If there were still concern about the size of Molecular and Cellular Medicine, the department could have research sub-divisions.

IV.3A. Potential advantages of a four department model
- It may be possible to have a similar number of faculty members in each of the four departments.
- This model capitalizes on existing strength in cancer biology and the potential to recruit an internal chair.

IV.3B. Potential disadvantages of a four department model
- Dilution of investment over two new departments may make recruitment of two Chairs more difficult.

V. Institutes/Centers
The RVC recommends some investment in research-focused institutes or centers, which would pull in faculty members across departments and across the various schools at Tufts University and affiliated hospitals and research institutes. These new institutes/centers would provide important avenues for interdisciplinary research and new fundraising opportunities. While the institutes/centers would not hire new faculty, they could serve as research-directed guides for recruitment by departments. To facilitate these institutes it would be important to provide them with resources. The RVC discussed funding levels that ranged from $50,000 to $500,000 for each institute.

Further discussion is required to identify those research areas that can be fostered and enhanced by the institute/center concept and the appropriate investments for each one. Regardless of scale the investment, the committee feels that investment should be provided only as institutes successfully reach milestones. The goal is that the Institutes
will become financially independent within five years. An advantage of the institute approach is that institutes can be readily formed and dissolved based on measures of success and failure. Institutes should be formed and their directors appointed for renewable-term periods, and renewal should require satisfactory external review.

The members of the RVC feel that all faculty members should be engaged in discussions about possible institutes. Faculty groups should be empowered to develop clear plans for institute initiatives and that objectives and milestones must be part of such plans. For investment to occur, a clear milestone-driven path to financial independence should be required. Because institutes will likely be made up of faculty from two or more schools of Tufts University, discussions with university leadership related to the mechanisms by which institutes will be resourced will be important. The institutes should also be an important part of the fund-raising efforts of the Development Office.

VI. Budget modification to support the long-term health and growth of departments
Once initial investments in departments have been exhausted, there is the potential for departments to be unable to change and thus they will stagnate. The RVC recommend that a different budgeting approach be evaluated which allows each chair to obtain a pool of funding in proportion to either the department's indirect costs and/or salary savings. The chair may then use these funds to support bridge funding when faculty members fall between grants as well as to stimulate new projects/initiatives within his/her department and/or between more than one department and institute. In this manner, the chair can stimulate new research avenues and decide which projects to support based on the probability that they will be able to bring in more external support for research. Importantly, funds could also be “banked” so that the department can obtain the necessary funds for future recruitments.

VII. Summary
The RVC stresses that the goal of any plan should be to revitalize the research effort of the school, to maximize new funding possibilities and to foster the creation of a research enterprise suited for the 21st century. No reorganization plan can accomplish these goals if it is not significantly funded at the outset. These are challenging economic times, and to transition to a research enterprise that can compete favorably in this highly demanding fiscal environment, TUSM will need to focus investments.
Appendix
RVC Roster

Deborah Powell, MD, Co-Chair Dean Emerita, University of Minnesota School of Medicine
Naomi Rosenberg, PhD, Co-Chair, Dean, Sackler School, Vice Dean for Research, TUSM
Philip Haydon, PhD, Professor and Chair, Neuroscience, TUSM
Ira Herman, PhD, Professor, Molecular Physiology & Pharmacology, TUSM
David Kaplan, PhD, Professor and Chair, Biomedical Engineering, TUSE*
Richard Karas, MD, PhD, Professor of Medicine, TUSM & Chief Scientific Officer, Tufts MC
Charlotte Kuperwasser, PhD, Associate Professor, Anatomy & Cellular Biology, TUSM
John Leong, MD, PhD, Professor and Chair, Molecular Biology & Microbiology, TUSM
Gail Sonenshein, PhD, Professor, Biochemistry, TUSM
Donald St. Germain, MD, Associate Vice President for Research and Director, Maine Medical Center Research Institute, Professor of Medicine and of Physiology and Neuroscience at Dartmouth Medical School
Christine Wanke, MD, Professor of Medicine, TUSM
Henry Wortis, MD, Professor and Chair, Pathology, TUSM

*Dr. Kaplan was unable to participate in committee deliberations for most meetings and did not review the final report.
Charge from Dean Berman - March 28, 2012

Goals: Build and support strong science at the medical school. I am seeking transformative change for several reasons:

- The way science is done is changing with a move toward work done in multidisciplinary teams. The effects of change will likely be felt more strongly as time passes. We need to position TUSM for these changes, not play catch-up after the world changes around us.
- Because of limited resources – including NIH and other funding sources – only stellar programs will likely survive nationally. Basic science disciplines are important but discipline lines are blurring.
- Resources to support the type of enterprise we have had in the past are not sufficient. Sustaining six strong basic science departments is beyond our capacity and limping along with six until some wither due to attrition and retirements doesn’t really position the school well for the future.

Expectations: Develop recommendations that are truly transformative. These need to include departmental consolidations and mergers. Nibbling around the edges of these issues by proposing small changes such as came out of the retreat – more seminars, mini-sabbaticals, shuttle buses, joint hires, sharing equipment etc. – are not the kind of transformative change that is needed.

- We need you to put your department and institutional allegiances aside and think of yourselves as representing the medical school as a whole. Advocating for particular departments or institutions will not be helpful.
- Think about how to interface with research at our affiliated institutions and across Tufts.
- Look at how other medical schools that are moving away from Flexner-based departments have organized, and how that has worked.
- Consider incentives that will stimulate the acceptance of change

Communications: “Transparency while preserving confidentiality”

- The Committee should communicate on a regular basis with faculty and seek faculty input.
- The group should agree on what is communicated. It will be important to maintain confidentiality so that committee members feel free to discuss ideas openly and to think outside the box without fear that these ideas expressed by individuals will be shared outside the committee.
Clarification and Recharge from Dean Berman - July 23, 2012

I need you to give me a plan for a research organization that reduces the number of basic science departments at TUSM to accommodate the focused research effort of the future.

**Rationale for reducing the number:**

- The current organization is built around the ideas of Flexner and is outmoded.
- The current organization is built around the need for basic scientists to teach particular disciplines in medical school 100 years ago and does not reflect the changes in medical education.
- We need an organization that promotes strong research along with graduate education - these are the primary missions of the basic science departments moving forward.
- Tufts University does not have the luxury or the resources to sustain a broad, unfocused biomedical research effort and is very unlikely to have these in the future.
- An infusion of dollars can have a dramatic positive impact as witnessed by changes made in Neuroscience and those underway in Microbiology.
- There is no possibility of four more investments of the needed magnitude to rebuild the remaining basic science departments, leaving two choices: let them dwindle, or take positive action to create a strong science base.
- Support to jump start a new department is critical but will need to be staged with some monies available at the outset with additional, committed investments to be made as the new unit becomes established.
- The new unit(s) will require recruitment of a new chair(s) and suitable packages to attract a strong candidate(s).
- Development efforts need to be focused on areas that resonate with donors, and we need to develop a good “sales pitch” – a great case for supporting focused research at Tufts.
- This investment needs to be made in the context of a new organization that considers as broad a range of faculty as possible.
- President Monaco endorses these ideas and supports reduction in the number of departments.

In conclusion, I need you to provide the vision for the focus of the new unit(s), and to create a structure that supports the new vision.