October 25, 2013

Dear ICOC Board Member,

Please find attached the formal Scientific Advisory Board (SAB) Report for August 2013.

Also attached is Management's response to the SAB recommendations.

We recommend the report and commentary to you for implementation and will provide a process for selection of primary grants for your consideration.

Sincerely,

Alan O. Trounson, PhD
President, California Institute for Regenerative Medicine

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CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE 2013 SCIENTIFIC ADVISORY BOARD REPORT

October 7th, 2013

1. Introduction

In 2004, the voters of California authorized the issuance of $3B in state bonds over ten years to support stem cell research ranging from basic to clinical, with a primary mission of bringing therapies and cures to patients with few therapeutic options. The California Institute for Regenerative Medicine (CIRM) was established to manage and oversee distribution of funds on behalf of the citizens of California. The first grants were awarded in 2006.

CIRM management recently revised the CIRM Strategic Plan (2012) and is seeking further guidance from the SAB on how to best achieve these outcomes.

2. Purpose of Scientific Advisory Board review

The SAB was established in response to the recommendation of an IOM panel charged by CIRM with reviewing of the agency's operations. In late 2012, the 13-member IOM panel, made up of experts in stem cell research, business and finance, law and bioethics, and research administration produced a set of recommendations aimed at ensuring that "all aspects of CIRM's operations are functioning at peak performance". One recommendation was for CIRM to establish an external SAB, made up of experts in the "scientific, clinical, ethical, industry, and regulatory aspects of stem cell biology" to be appointed by and report to the president. The IOM panel believed that a single SAB as opposed to multiple advisory boards would be best positioned to provide integrated advice to the president on strategic priorities for future RFAs, innovation projects, and the research portfolio.

3. Meeting Agenda and Process

CIRM president Alan Trounson asked the SAB to convene in order to consider the following high-level questions relating to CIRM's strategy during its next cycles of funding.

i. **CIRM is completing the allocation of funds provided by the California bond initiative and seeks advice on the best use of the remaining funds from this cycle of funding. How can we best maximize the impact of CIRM in regenerative medicine with the remaining funds, which at this time is approximately $600 million dollars, to be allocated in projects to be completed by approximately 2021?**

ii. **What unique priorities does the SAB recommend for CIRM for the next four years, consistent with the goals and objectives of the 2012 Strategic Plan?**

On August 24, the SAB convened a one-day meeting with CIRM staff and a closed session of the SAB to draw up a set of recommendations. The SAB also requested a closed-session, one-hour teleconference with several CIRM grantees (Irv Weissman, Rusty Gage, Owen Witte, and Larry Goldstein).
Prior to the meeting, the SAB was provided with a document summarizing the following: 2012 Strategic Plan Update, Scientific Programs, Collaborative Funding Program, Industry Engagement, and other ancillary information.

4. Recommendations

Overview

The SAB recommends that in order to achieve focus the CIRM must prioritize funding. This will take advantage of investments already made, and increase the momentum towards developing therapies that will bring about the cures for chronic diseases and injuries envisioned by the voters of California when they approved Proposition 71. For this to happen, and for stem cell research to continue to advance at its current pace in California, future potential investors and supporters of stem cell research must perceive a tangible benefit to human health, and this can only happen through a clear success at the stage of clinical proof of concept. It is important that this occurs during the currently projected lifespan of CIRM, so that deserving projects and resources are positioned in the strongest way possible to attract future investments after expiration of the current CIRM funds.

We believe this goal has a strong chance of success, as long as CIRM advances the most promising clinical candidates "at speed", which will require careful assessment and prioritization of the portfolio, and clear communication with Grants Working Group reviewers and members of the ICOC as to criteria for prioritizing projects for funding. The potential of a clear success at clinical proof of concept stage and clear relevance to the remit of CIRM should be the chief consideration. As Ellen Feigal highlighted in her presentation, therapeutic candidates that can be readily evaluated by surrogate markers, where there is clear mechanistic basis relating to stem cell activity, and are both already funded by

CIRM, and on track to clinical trials through an FDA-regulated pathway would be considered for the priority status. We would expect that a limited number (ie 6-8) of such projects would be prioritized, and funds set aside to ensure they can proceed to phase 1/2a clinical trials as rapidly as possible, without financial impediments or the need for financial modeling. Each development project is associated with significant risk of failure and hence very rigorous prioritization criteria are needed to ensure that projects which progress are those with the highest likelihood of success. Lack of focus at this stage is a significant risk for the Institute if it is to achieve success in the clinic. Funding of these projects from CIRM should not be a constraint.

Although the choice of priority projects should be based on science alone, it is important that the projects also reflect the mission of CIRM and have a strong stem cell component to them. In the cancer area, for example, there should be an effort to support cancer stem cell work where the projects are competitive and where some aspects of target/cancer stem cell regulatory mechanisms were being explored.

The SAB is optimistic that given the robustness of the current CIRM disease team pipeline, and the momentum of the field of cell therapies as a whole, a clinical proof of concept can be achieved in one or more settings with CIRM projects within the next three years.

In addition to the broader questions posed by CIRM executive staff above, in advance of the meeting CIRM executive staff provides a list of more detailed questions to guide the discussion. These questions, and our comments and recommendations are provided below.

Specific Recommendations

i. **Training grants and shared laboratory funding build infrastructure and future capacity for regenerative medicine. The current training grants and shared laboratories are due to cease in the next few years. However, there is strong support for these from California institutions and advice is sought from the SAB on whether to continue or cease this program. Please advise us whether there are particular opportunities or areas of unmet need in training that could be accomplished in the next 4 years.**

   We recommend that CIRM continue to bolster training programs at all levels. Training for high school students and undergraduates will help develop a work force of trained individuals who might otherwise have no exposure to scientific research, and which will be valuable as cell therapies burgeon. It also provides a means of providing funding and CIRM visibility in parts of the state that don't receive substantial grants.

Training programs for PhDs and MD/PhDs will be of continued importance, particularly since reduction in NIH funding is leading to a scarcity of scientists interested in and qualified to conduct academic, clinically-oriented biomedical research. Thus CIRM should continue to support programs such as the New Faculty Physician Scientist Translational Award, and doctoral- and post-doctoral training programs.

There was not a clear consensus on the success of the Research Leadership Awards, which are aimed at attracting established leaders in stem cell research to the state of California. Some members of the SAB felt that the program had been less successful than it might have been had larger grants been available and said that it did not compare favorably with a similar program in Texas, which awards twice as much per grant. All SAB members felt that the recruitment of eight distinguished scientists was, however, an important accomplishment. On balance it was felt that, if the program provided an opportunity to recruit even a few major figures to California it would be worthwhile and should be continued.

The SAB does not, however, recommend continued funding of the seventeen Shared Laboratories that provide facilities and training. During the years of the NIH funding ban for research using embryonic stem cell lines these facilities provided an essential safe-haven for research that otherwise would have been banned. Since the ban has been lifted, the importance of these resources to the mission of CIRM and achieving sustainability of earlier investments is not as compelling. These resources should operate on a revenue-neutral basis through recharge mechanisms, and gain other needed support from the host institutions.

ii. The 2012 Strategic Plan Update emphasizes movement from the bench to bedside, which, in fact, is how the CIRM's scientific programs have evolved, with increased emphasis on funding research in the clinic as opposed to basic and early translational research. Nonetheless, CIRM is still strongly supporting the engine of discovery, so please discuss whether there are particularly important areas of opportunity in the next four years for a) basic discovery and b) early translational research.

The SAB recommends continued support for basic research. However, whereas in some RFAs, CIRM restricts funding to only projects using human cells, the SAB feels this approach is too prescriptive, and doesn't take into the account the benefits that model organism research can offer, and the major advances that have been made using these models. For example, studies of isogenic cell therapies or cancers that arise in model organisms (such as mice) are important to complement the insights that can come from xenograft studies of human cells transplanted into mice. For basic research grants,

CIRM should fund the best science within its mission, regardless of the system the applicant scientists propose to use.

For more translational projects, some members of the SAB thought CIRM should focus on ES cells, where California has already shown leadership and accumulated expertise through activities in the biotech sector, such disease teams for type I diabetes and macular degeneration. Japan is making a strong push in the iPSC area and it could be difficult for California to be perceived as a leader. Others thought a broader approach would be most effective in terms of maximizing successes and taking advantage of the broad range of projects and expertise in the state. But all agreed that clinical projects should be carefully selected so they are strong in terms of their mechanistic basis, and have a strong chance of success.

The SAB recognizes the difficulty in obtaining the very best external reviewers for the evaluation of CIRM programs. Reviewer fatigue is a common phenomenon throughout the academic community but, despite this, the CIRM must continue to work to bring in the best possible external advice. Compromise here leads to lack of trust in the community and sub-optimal decision making. The SAB felt that a key component of obtaining excellent people is to identify and remunerate panel chairs substantially to make it worth their while finding other panel members who can produce robust, thoughtful evaluations of the programs they are considering. Long term commitments to chairs and panel members and scheduling of review meetings 1 to 2 years in advance also enhance their engagement. The CIRM already funds its reviewers well, but consideration should be given to enhancing this, particularly for the chairs, if there are difficulties in recruiting the very best individuals to the panels.

iii. What is your advice on how to better engage the private sector to partner with CIRM, to enable the translational and clinical development programs further opportunities to continue towards clinical proof of concept, and if successful, towards FDA approval and commercialization? Should CIRM funding support California cell manufacturing capacity for large-scale phase 3 studies to begin in 2-5 years? What types of costs and facilities would be necessary and is it reasonable to fund these without private-public partnerships?

The SAB had a very positive view of the interactions between CIRM and the commercial sector. There has emerged an impressive array of commercial entities that had benefited from CIRM support, with one company receiving very substantial support for a particularly promising program. Although there was some discussion about the need for leveraged funding for successful grant applications from the commercial sector, the advantage of this approach is that it externally validates the quality of science and the likelihood of success if it has drawn resource from venture capital or other risk capital investors. For

the prioritized portfolio of projects, it is important that leveraging matched funding should not feature until after phase 2a when successful programs should readily obtain external support.

One significant advantage of these strategic partnerships is that it may be in this setting that powerful proof-of-concept evidence of these new technologies will first be obtained, delivering on one of the major objectives of the CIRM.

The SAB also discussed that, in some circumstances, CIRM investment can be well deployed into academic labs that are advancing programs into the clinic rather than creating spin-out companies. On balance, in California and elsewhere, companies are often created too early and, where expertise is available, the CIRM should be supportive of programs that are being advanced further in an academic setting than would be conventional. One concern noted by CIRM grantees is that ancillary concerns about intellectual property sometimes delay the initiation of projects that have been judged to be scientifically meritorious and distract resources from the science and clinical goals. It will be important for CIRM to be thoughtful about not allowing intellectual property mandates impede the larger mission.

iv. Should we engage our collaborating partners in a major project as a flagship to set the field in motion as we wind down?

The SAB considered this option, particularly around a 'straw man' proposal in cardiac regenerative medicine. Although this notion is attractive and cardiac regenerative medicine is potentially a good, tractable therapeutic area to pursue, the SAB was not enthusiastic about this model. The uncertainty of the science in any therapeutic area would make this a very high risk strategy and, although the current approach of funding development programs in a large number of therapeutic areas is also inappropriate, the SAB was against consolidating the program around a single therapeutic area. Instead, they strongly felt that a small number of programs would provide real focus in this phase of development, but would also increase the likelihood of achieving significant clinical efficacy in proof-of-concept studies over the next few years. If, however, the opportunity arose to participate in a major project in a single therapeutic area in partnership which could provide significant financial leverage to CIRM support this would be an effective use of resource provided it did not constrain progression of the prioritized portfolio.

v. Looking to the future, how would you best make the case that CIRM was a great innovation in public funding of cutting edge science and whether it has delivered, and could continue to deliver in the future, value to the citizens of California and to the field of regenerative medicine?

As discussed above, advancing a project to the stage of clinical proof of concept will be important to making this case to the public. Care must be

taken to ensure that the most promising projects are supported through to this stage by CIRM funding.

The case that CIRM has been transformative in this exciting emerging field of biomedical science seems self-evident to the SAB. The level of activity in this field in California is extraordinarily high and there are many excellent programs being supported by the CIRM that would have failed to be supported given the limited amounts of funding available for this field when CIRM was established. The program has yielded a large number of extremely well trained students and investigators supported directly or indirectly by the CIRM, there is critical mass in a number of the major academic centers around California that has allowed it to compete internationally in this field, and the commercial environment for regenerative medicine in California has thrived as a result of CIRM intervention. When California was one of the few safe havens for hESC research, CIRM fostered sustenance and development of expertise in working with pluripotent stem cells and retained an enormous workforce of researchers "ready to go" when hiPSC became widely available.

It was clear to the SAB that this field continues to gain momentum and that there will be clinical proof-of-concept data emerging in the relatively near future. California is likely to play a part in those successful projects and hence is likely also to play a part in the development of the regulatory guidelines and strategy that will allow these novel approaches to medicine to get to patients as quickly and as safely as possible.

It is worth considering where California's regenerative medicine might be without the CIRM and, although there is clearly successful regenerative medicine activity in other states and other major university centers, the California effort in this arena would be much impoverished without the CIRM program.

These contributions should be recognized by those who originally conceived the program but, in addition, by wider community of policy makers and citizens of California will immediately recognize the potential importance of this both to the economy of the State and to the welfare of patients as soon as positive proof-of-concept studies begin to emerge. For this reason, we believe that the CIRM should focus on trying to achieve that goal which is clearly obtainable over the next few years.

vi. Other recommendations

The SAB noted that the CIRM, despite its considerable achievements, had not received the attention and attribution that many equivalent funding bodies would have had for their contribution to successful science. Although it is understandable that individual research institutions rightly seek recognition for their achievements, most funding agencies would be more forceful about

insisting that their brand at least shared some of the recognition for the successes that have been achieved. The SAB would strongly suggest that the CIRM ramps up outreach activities, both to improve the California public's awareness of CIRM's uniqueness in the world, its successes so far, and the potential of stem cell research to advance treatment of diseases and injuries. CIRM has been catalytic in generating many of the scientific advances in this field, but its brand recognition internationally and even nationally is limited and this should be corrected.

Appendix 1
Members of SAB

Sir John Bell, Oxford University, UK (Chair for August 2013 Meeting)
Dr. Corey Goodman, VenBio Corp. USA
Dr. Maria Grazia Roncarolo Hospital San Raffaele, Italy (not attending)
Dr. Sean Morrison, Children's Research Institute at UTSW, USA
Dr. Christine Mummery, Leiden University Medical Center, The Netherlands
Dr. Stuart Orkin, Harvard Medical School, Dana Farber Cancer Institute, USA
Dr. Fiona Watt, *Centre for Stem Cells and Regenerative Medicine,* King's College, UK
Dr. John Wagner, University of Minnesota Stem Cell Institute, USA

Appendix 2
CIRM staff attending SAB review

Ms. Elona Baum, General Counsel & Vice President for Business Development
Dr. Natalie DeWitt, Special Projects Officer to President
Dr. Ellen Feigal, Senior Vice President of Research and Development
Dr. Patricia Olson, Executive Director of Scientific Activities
Dr. Bettina Steffen, Associate Director of Development Activities
Mr. Ian Sweedler, Senior Counsel for International Programs
Dr. Jonathan Thomas, Chair, ICOC
Dr. Alan Trounson, President
Dr Michael Yaffe, Associate Director, Research Activities

Appendix 3
Agenda

August 22, 2013	
6:00-9:00	Dinner and Discussion
August 23, 2013	
8:30-9:00	Breakfast: election of meeting Chair
9:00-Noon	CIRM staff presentations and discussion (15 min presentations)
Alan Trounson	CIRM
Pat Olson	Funding: awarded, approved and allocated
Michael Yaffe	Basic Science, shared facilities, and training programs
Ellen Feigal	Translation/Development and Clinical Programs
Elona Baum	Business development programs
Natalie DeWitt	Innovation programs
Jonathan Thomas	New financing opportunities
Noon-1:00	Lunch and Discussion with Californian Stem Cell Leaders (Irv Weissman, Owen Witte, Rusty Gage and Larry Goldstein)
1:00-5:00	SAB closed session
5:00-5:30	SAB and Alan Trounson

Scientific Advisory Board
Recommendations and Management Response

October 24, 2013

Purpose of SAB review

The SAB was established in response to 2012 recommendation of the IOM panel charged by CIRM with reviewing the Institute's operations.

The 13-member IOM panel, made up of experts in stem cell research, business and finance, law and bioethics, and research administration produced a set of recommendations aimed at ensuring that "all aspects of CIRM's operations are functioning at peak performance".

One recommendation was for CIRM to establish an external SAB, made up of experts in the "scientific, clinical ethical, industry, and regulatory aspects of stem cell biology" to be appointed by and report to the president. The IOM panel believed that a single SAB as opposed to multiple advisory boards would be best positioned to provide integrated advice to the president on strategic priorities for future RFAs, innovation projects, and the research portfolio.

SAB members – see appendix for details

- Sir John Bell, Oxford University, UK (Chair for August 2013 meeting)
- Dr. Corey Goodman, VenBio Corp. USA
- Dr. Maria Grazia Roncarolo Hospital San Raffaele, Italy (unable to attend August 2013 meeting)
- Dr. Sean Morrison, Children's Research Institute at UTSW, USA
- Dr. Christine Mummery, Leiden University Medical Center, The Netherlands
- Dr. Stuart Orkin, Harvard Medical School, Dana Farber Cancer Institute, USA
- Dr. Fiona Watt, Centre for Stem Cells and Regenerative Medicine, King's College, UK
- Dr. John Wagner, University of Minnesota Stem Cell Institute, USA

The plan is to conduct 3 to 4 SAB sessions per year, with at least one session in person

Meeting Agenda and Process

The CIRM president convened the SAB on August 23, 2013. Prior to the meeting, the SAB was provided with a document summarizing the following: 2012 Strategic Plan Update, Scientific Programs, Collaborative Funding Program, Industry Engagement, and other ancillary information. The SAB was asked to consider the following high-level questions relating to CIRM's strategy for the remainder of its current cycle of funding:

- CIRM is completing the allocation of funds provided by the California bond initiative and seeks advice on the best use of the remaining funds from this cycle of funding. How can we best maximize the impact of CIRM in regenerative medicine with the remaining funds, which at this time is approximately $600 million dollars, to be allocated in projects to be completed by approximately 2021?
- What unique priorities does the SAB recommend for CIRM for the next four years, consistent with the goals and objectives of the 2012 Strategic Plan?

The one-day meeting began with presentations by CIRM leadership. At the SAB's request, the members had a closed-session, one-hour teleconference with senior members of the Californian stem cell research community. The SAB discussed recommendations in an afternoon closed session, then held a wrap-up meeting with the CIRM president.

Recommendations - overview

The SAB advises CIRM to identify, through a prioritization process, the top 6 to 8 projects, with clear relevance to the remit of CIRM's stem cell mission, and to set aside the funding to ensure the projects can proceed to phase 1 and 2a clinical trials as rapidly as possible, without financial impediments.

Achieving clinical proof of concept is a key goal to achieve, to attract future potential investors and supporters of stem cell research, and has a strong chance of success, as long as CIRM advances the most promising clinical candidates "at speed"; this will require careful assessment/prioritization of the portfolio.

Management response: Management accepts this recommendation and will recommend a prioritization process for selection of these projects and the anticipated budget that would need to be set aside by the ICOC for these projects. The prioritization process will include representatives from GWG, CDAP, and other external expertise as needed. After identifying the prioritized projects, consideration will be given to providing additional expertise, and modifying approaches in order to maximize the potential and ensure maximum effective progress toward clinical proof of concept.

Recommendations – specific

1. CIRM Question: Training grants and shared laboratory funding build infrastructure and future capacity. Current training grants and shared laboratories will end in the next few years. However, there is strong support for these from California institutions and advice is sought on whether to continue or cease this program. Please advise whether there are particular opportunities or areas of unmet need in training that could be accomplished in the next 4 years

   The SAB recommends continued funding of training programs at all levels to develop a work force of trained individuals, which will be valuable as cell therapies burgeon; the SAB does not recommend continued funding of the 17 shared labs; these should operate on a revenue-neutral basis; although essential as a safe haven during NIH funding ban, the importance of these resources to CIRM's mission and achieving sustainability of earlier investments is not as compelling.

   Management response: Management supports the continued support of training programs; in addition, management supports the recommendation not to continue funding the shared labs, recognizing that the need for these facilities has declined with political changes and time, and that, where possible, these could be absorbed into ongoing general institutional facilities.

2. CIRM Question: The 2012 Strategic Plan Update emphasizes movement from the bench to bedside, which, in fact, is how CIRM's scientific programs have evolved, with increased emphasis on funding research in the clinic as opposed to basic and early translational research. Nonetheless, CIRM is still strongly supporting the engine of discovery, so please discuss whether there are particularly important areas of opportunity in the next four years for a) basic discovery and b) early translational research.

   Basic: The SAB recommends continued support for basic research, but felt restriction of CIRM funding in some RFAs to projects using only human cells was too prescriptive, and doesn't take into account the benefits that model organism research can offer.

   Translation: The SAB noted clinical projects should be carefully selected so they are strong in terms of their mechanistic basis, and have a strong chance of success. There was no consensus on particular areas of platform research focus - some felt a focus on ES cells, where California has already shown leadership and accumulated expertise, one suggested CIRM not focus on iPSCs given Japan's strong push in this area , whereas others thought a broader approach would be most effective in terms of maximizing successes and taking advantage of the broad range of projects and expertise in the state.

Grant reviewers: The SAB noted CIRM should continue to obtain the very best external reviewers, and could consider enhancing funding for its chairs, and schedule review meetings 1-2 years ahead, if there are difficulties in recruitment.

Management response:

Basic: Management supports continued funding of basic science. Human cells rather than cells of model systems have been a CIRM priority from the beginning, as these are systems anticipated to more closely mimic the human condition, by their nature are more complex to develop and traditionally have not been well supported by NIH. Innovative ideas that could be demonstrated with research on model systems have been included in Basic Science RFAs in recent years. Management believes we should continue to emphasize study of human cell systems, but potentially transformative studies using other organisms also will continue to be eligible for support.

Translational Research: Management agrees that translational studies selected to go into IND- enabling and clinical development studies should have a strong mechanistic basis. There was no SAB consensus on particular cell types to pursue, and management thinks it is in the best interest of CIRM to pursue a broad range of scientifically compelling stem cell platforms.

Grant Reviewers: Management agrees that the best available reviewers should continue to be chosen for assessing grants, and noted that CIRM's remuneration to reviewers already compares favorably to NIH and other foundations. It is available time, not dollars, that limits their participation. Senior management will strive to ensure the best reviewers are available using their personal and professional networks.

3. CIRM Question: What is your advice on how to better engage the private sector to partner with CIRM, to enable the translational and clinical development programs further opportunities to continue towards clinical proof of concept, and if successful, towards FDA approval and commercialization? Should CIRM funding support California cell manufacturing capacity for large-scale phase 3 studies to begin in 2-5 years? What types of costs and facilities would be necessary and is it reasonable to fund these without private-public partnerships?

   The SAB had a very positive view of interactions between CIRM and the commercial sector. They noted an advantage of leveraged funding from the commercial sector of externally validating the quality of science and the likelihood of success. They also recommended that for the prioritized set of projects, that it is important to ensure they can be funded without requiring matched leverage funding until after proof-of-concept (phase 2a) when successful programs should readily obtain external support.

Management response: Management agrees that, where appropriate, translational and development studies can be driven inside academia. Management believes that preclinical and early clinical trials need expertise that generally resides in industry and that consultants and partnerships with industry should be integrated into academic teams. Industry needs to be encouraged to participate in clinical trials with teams working across the portfolio and particularly for studies involving small molecules and biologics. However, it is important not to adversely penalize teams with prioritized projects where industry does not buy in.

4. CIRM Question: Should we engage our collaborating partners in a major project as a flagship to set the field in motion as we wind down?

   The SAB considered this option around a "straw man" in one therapeutic area, but felt the uncertainty of science in any one therapeutic area would make this a very high risk strategy and the SAB was against consolidating programs in this way. If an opportunity arose to participate in a major project in a single therapeutic area in a partnership that provided significant financial leverage to CIRM, it might be an effective use of resources provided it did not constrain progression of the prioritized projects.

   Management response: Management agrees that a major flagship project that would commit a large quantum of CIRM funds is not appropriate at this stage of CIRM's life. However, if significant national or international projects evolve in time, it may be appropriate for the ICOC to consider some involvement together with other relevant agencies.

5. CIRM Question: Looking to the future, how would you best make the case that CIRM was a great innovation in public funding of cutting edge science and whether it has delivered, and could continue to deliver in the future, value to the citizens of California and to the field of regenerative medicine?

   The SAB advised that advancing a project to successful achievement of clinical proof of concept will be important to making this case to the public. Careful selection of these projects, and effective support, will be key to showing that CIRM is delivering on its promise.

   The case that CIRM has been transformative in this exciting emerging field of biomedical science seems self-evident to the SAB. The level of activity in this field in California is extraordinarily high and there are many excellent programs being supported by the CIRM that would have failed to be supported given the limited amounts of funding available for this field when CIRM was established. The program has yielded a large number of extremely well trained students and investigators supported directly or indirectly by the CIRM, there is a critical mass in a number of the major academic centers around California that has allowed it to compete internationally in this field, and the commercial environment for regenerative medicine in California has thrived as a result of CIRM intervention.

Management response: Management agrees that clinical proof of concept will be an important driver in the public's assessment of CIRM's value and success. In addition, management agrees that the other activities CIRM has invested in have been key to achieving a critical mass of well trained students and investigators, enhancing the prospects for growing this rapidly evolving scientific field and increasing California's competitive advantage.

Recommendations – other

The SAB noted that CIRM, despite its considerable achievements, had not received the attention and attribution that many equivalent funding bodies would have had for their contribution to successful science. In particular, the SAB felt that CIRM should more forcefully require that its "brand" feature prominently when institutions publicize achievements accomplishments with CIRM's support.

The SAB also strongly suggests that CIRM ramp up its outreach activities, in order to improve the California public's awareness of CIRM's uniqueness in the world, its successes so far, and the potential of stem cell research to advance treatment of diseases and injuries. CIRM's brand recognition internationally and even nationally is limited and this should be corrected.

Management response: Management recognizes that CIRM should endeavor to require that press releases from institutions and companies on significant advances in the field include a CIRM contribution as recognition of CIRM's involvement and support. CIRM should also continue to elevate its own recognition in leading global developments in stem cell research and medical applications, and will work on ways to more effectively ensure that advances and developments arising from CIRM supported activities are effectively transmitted regularly to primary scientific journals and the research community, and to the public. Management will focus in particular on communications to the public.

CIRM staff attending SAB review

- Ms. Elona Baum, General Counsel & Vice President for Business Development
- Dr. Natalie DeWitt, Special Projects Officer to President
- Dr. Ellen Feigal, Senior Vice President of Research and Development
- Dr. Patricia Olson, Executive Director of Scientific Activities
- Dr. Bettina Steffen, Associate Director of Development Activities
- Mr. Ian Sweedler, Senior Counsel for International Programs
- Dr. Jonathan Thomas, Chair, ICOC
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