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Cell Biology and Biophysics Unit Review

The Cell Biology and Biophysics Unit at EMBL Heidelberg was reviewed on 9 to 11 May 2017 by a panel of 19 experts including seven members of SAC. The review was chaired by Susan Gasser, Friedrich Miescher Institute for Biomedical Research, Basel (CH). The Chair of SAC and the Norwegian delegate to EMBL Council attended the review as observers.

Evaluation Summary

Overall, the Cell Biology and Biophysics (CBB) Unit was rated as outstanding based on the quality of its research and services, the training and development of young scientists and its contribution to integrated activities in European life science research. The CBB Unit holds a unique position within EMBL, integrating and developing technologies for imaging and quantitative biology to address important biological questions. Accordingly, its faculty is composed of physicists, chemists and biophysicists in addition to biologists. The panel regarded this mixed constellation as unique and extremely powerful in enabling truly interdisciplinary research.

While considering the Unit's commitment to work at the interface of biology, physics and technology development laudable and very positive in itself, the panel noted that this commitment comes with some challenges. In particular, they stressed the importance that physicists, who apply and develop technologies to explore biological problems, focus on the truly important questions in their chosen area of biology, in order to ensure that their research is of the highest level. Since this research sometimes requires collaboration, the panel recommended broader mentoring of the technology-oriented group leaders to aid them in identifying biological collaborators who are truly at the forefront of their fields. The panel noted that this is not a problem for internal collaborations and thus recommended that the three upcoming recruitments be used to maintain a strong biological focus in the unit, since, by chance, several of the group leaders involved in turnover at this time are from the more "biological" side of the CBB Unit. While acknowledging ongoing efforts in this area and welcoming the recent recruitment of two female group leaders, the panel also stressed that continuing to improve gender balance should also be a strong focus of future hires, and suggested potential strategies to increase the number of female faculty in the Unit.

One concern raised by the panel was that contributions that reflect technology development – despite being crucial to individual projects and taking long years to develop – may not receive adequate recognition, especially through senior authorship on 'biological' publications. Recommendations in this respect included monitoring and reviewing authorship guidelines to address this particular issue, as well as specifically profiling physical and technological achievements through EMBL's communications channels.

The panel found the leadership and mentoring within the Unit by Jan Ellenberg to be outstanding. Rainer Pepperkok's role as Head of Core Facilities, an additional responsibility that he took on in 2014, was also highly appreciated. Great praise went to the Unit's efforts in making their newly developed technologies and innovations available to the broader European research community – both through commercialisation and by collaborating, sharing and providing training in these methodologies. In this context, the panel welcomed EMBL's proposal to seek funding for an Imaging Technology Centre, which would serve as a further platform for the dissemination of innovative imaging technologies, methods and approaches developed in both the Cell Biology and Biophysics and the Structural and Computational Biology units. This would enable EMBL to broaden its support to the community in the area of cross-scale integrated imaging, offering access to a unique facility.

As part of the review, the panel engaged in in-depth discussions with predoctoral and postdoctoral fellows on their experience, desires and perspectives. Overall, they found fellows in the CBB Unit to be strikingly content relative to many at peer institutions. Their conversation with the postdoctoral fellows highlighted the need for additional support in advanced computational image analysis, and resulted in a recommendation by the panel that EMBL strengthen and centralise efforts in this area.

A specific complaint raised by the postdoctoral fellows regarded the lack of regular faculty attendance at the Unit's internal seminars. In response to this, the panel recommended that participation of all Unit members – and particularly of group leaders – in all pan-unit activities and seminars be strongly encouraged.

Response to the Panel's Recommendations

I would like to begin by thanking the panel for their thorough review of the activities of the CBB Unit. They clearly grasped the specificities of the Unit, which are distinct from most other EMBL research units, and provided very detailed and constructive critique to the group leaders under review. I am very pleased with their very positive opinion of the Unit's performance, while also acknowledging their suggestions for further improvement.

With regard to the future composition of the Unit, and thus its strategy, the panel recommended that the current balance between more technology-oriented and more biology-oriented groups be maintained by recruiting strong biologists in the near future. The intention is indeed to recruit with this profile firmly in view. As noted by the review panel, there are challenges to maintain a unit with the diversity of CBB, which encompasses not only cell biology, biophysics, physics and technology development, but also chemistry, modelling and simulation, and service provision in light and electron microscopy. This not only requires a certain minimal size but also researchers who have the right interdisciplinary mindset. We will search for such individuals with the understanding that the intention is not to recruit "like-for-like", i.e. not necessarily to replace those leaving with others with the same expertise. There are however areas currently only represented in CBB that are important to maintain somewhere at EMBL, like experimental chemical biology, and general EMBL recruitment should attempt to maintain these areas. I agree with this recommendation.

The panel stressed that scientists in the Unit who engage in the development of technologies that are instrumental to biological discoveries should receive adequate recognition, particularly through senior authorship on publications. I acknowledge that this issue is important as it can impact on the career of both students and postdocs, who may not obtain a first-author publication within their fellowship, and of group leaders when they seek suitable positions on leaving EMBL. The difference in publication culture between different research domains needs to be borne in mind, but if the ambition of the CBB group leaders and fellows is to go on to work in a top life science environment, it is crucial that they publish visibly, i.e. as senior or first authors, according to the culture in this field.

Scientific exchange and cross-feeding are crucially important in fostering research that is truly interdisciplinary. This holds particularly true for the CBB Unit, where connections must be strengthened between scientists that have very diverse backgrounds and orientation. In view of this I share the panel's concern regarding the low attendance to pan-unit seminars and activities, and have discussed this issue with the Unit leadership. They are aware of this problem and have changed the structure and organisation of the Unit seminar series, aiming to ensure that future attendance improves.

Regarding the panel's recommendation to provide additional support in advanced image analysis, this is an issue that both myself and Jan Ellenberg are aware of and have been addressing. A computational scientist within CBB formerly provided support to Unit members in this area by, among many other things, collecting software developed in-house and ensuring its availability and robustness so that it became accessible to the entire internal community. Following his departure in 2016, we have unfortunately not found a suitable candidate to fill the position. We will persist in our

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attempts to recruit this specific expertise, which is of great value not only to the CBB Unit but to the whole of EMBL. This function may be better associated with the Advanced Light Microscopy Facility in order to embed it more firmly in the normal service turnover system.

I would like to join the panel in acknowledging the many external training and organisational activities undertaken by the faculty of the CBB Unit, including Jan Ellenberg's leadership of the European Strategy Forum on Research Infrastructures' (ESFRI) Euro-BioImaging project preparatory phases. These are greatly appreciated in the community and reflect EMBL's commitment to broadly serving biomedical researchers.

I conclude by congratulating Jan Ellenberg, the Senior Scientists and the entire Cell Biology and Biophysics Unit for a very strong performance and for their remarkable achievements over a very broad domain during the last four years.

Professor Iain W. Mattaj, FRS, FMedSci
Director General

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