

world wide Protein Data Bank Advisory Committee (wwPDBAC)
Report of September 29th 2008 Meeting
European Bioinformatics Institute, Hinxton, United Kingdom

Chair: Stephen K. Burley (RCSB)

PDB Site Representatives: Wayne A. Hendrickson (RCSB), Neil Isaacs (PDBe-EBI), Rob Kaptein (PDBe-EBI), Gerard J. Kleywegt (PDBe-EBI), Brian Matthews (RCSB, excused), Soichi Wakatsuki (PDBj), and Kei Yura (PDBj)

Ex Officio Community Stakeholder Representatives: Edward N. Baker (IUCr), R. Andrew Byrd (ICMRBS), and Marin van Heel (Macromolecular EM)

wwPDB Site Leaders: Helen M. Berman (RCSB), Kim Henrick (PDBe-EBI), John Markley (BMRB), and Haruki Nakamura (PDBj)

Funding Agency Representatives: Rebecca Aarons (Wellcome Trust), Janet Thornton (EMBL-EBI), John Norvell (NIGMS, absent), and Peter McCartney (NSF, absent)

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wwPDBAC Mission Statement

To help ensure that the Protein Data Bank is maintained for the public good as a secure, single, global archive for experimental structural biology data that is freely accessible in perpetuity.

Meeting Summary

The world wide Protein Data Bank Advisory Committee (wwPDBAC) to the leadership of the Research Collaboratory for Structural Bioinformatics (RCSB), the BioMagResBank (BMRB), the Protein Data Bank Europe (PDBe-EBI), and the Protein Data Bank Japan (PDBj) met at EBI in Hinxton, U.K. on September 29th 2008.

The agenda included

- (1) Responses to 2007 wwPDBAC Meeting Recommendations;
- (2) Overview of Recent Progress;
- (3) Improvements in Data Deposition/Processing;
- (4) Report from the Crystallographic Task Force;
- (5) Report from the NMR Task Force;
- (6) Remediation and Curation of Complex Chemistry in the PDB;
- (7) New Projects;

- (8) Long Term Funding/Stability; and
- (9) Other Matters.

The Committee considered various issues and provides the following unanimous commentary and recommendations:

Responses to 2007 wwPDBAC Meeting Recommendations

PRIMARY DATA DEPOSITION

Recommendations:

- The wwPDB shall require deposition of structure factor amplitudes/intensities (for crystal structure depositions) and/or NMR restraints (for NMR structure depositions) in addition to atomic coordinates as a prerequisite for receiving a PDB ID.

wwPDB Response: Depositor requirement as of February 1, 2008.

- The wwPDB leadership shall inform the relevant journals of this new policy, and will suggest that *Instructions to the Authors* read as follows:

“For papers describing structures of biological macromolecules, atomic coordinates and the associated experimental data (structure factor amplitudes/intensities and/or NMR restraints) must be deposited at a member site of the Worldwide Protein Data Bank (www.wwpdb.org): RCSB PDB (www.pdb.org), PDBe-EBI (www.ebi.ac.uk/msd), PDBj (www.pdbj.org), or BMRB (www.bmrwisc.edu). The PDB ID should be included in the manuscript. Authors must agree to release the atomic coordinates and the associated experimental data when the associated article is published. Questions relating to depositions should be sent to info@wwpdb.org.”

wwPDB Response: Policy published November 2007; Journals notified in December 2007.

- The RCSB, PDBe-EBI, BMRB, and PDBj, working with community experts, will establish additional validation procedures for structures determined by either X-ray crystallography or NMR spectroscopy. The results of these validation calculations will be made available to depositors immediately after submission. Upon depositor request, the RCSB, PDBe-EBI, BMRB, and PDBj shall make such structure validation reports available to designated scientific journal editors.

wwPDB Response: In Progress. Expected completion Q4 2009.

- The RCSB, PDBe-EBI, BMRB, and PDBj shall further work together with community stakeholders and thought leaders to establish recommendations for additional experimental data deposition and release requirements where appropriate.

wwPDB Response: In Progress. Expected completion 2009.

Pending Responses to Earlier wwPDBAC Meeting Recommendations

Inclusion of SAXS/SANS Data in the PDB

Recommendations:

- Work with the SAXS/SANS community to create appropriate representation of these data, and circulate progress reports to the Committee as appropriate.

wwPDB Response: In progress. wwPDBAC review deferred. Expected completion 2009.

Definition of the Purview of the PDB

Recommendations:

- The RCSB, the PDBe-EBI, the BMRB, and PDBj shall develop and present a formal recommendation to the wwPDBAC regarding the purview of the PDB at our September 2007 meeting in Princeton, N.J.

wwPDB Response: Complete. To be presented at the 2009 meeting.

Overview of Recent Progress

Commentary:

The four wwPDB member organizations are working well together. The Committee continues to be impressed by the high level of cohesion and the quality of wwPDB activities. Of particular significance was deposition of structure number 50,000 to the PDB archive and the record number of structure downloads in 2007, which now exceed 3 million annually. The wwPDB has achieved significant visibility of late with joint publications and presentations/exhibit booths at international conferences and professional society meetings. Finally, the committee was delighted to learn that one of its members, Kleywegt, has agreed to succeed Henrick as leader of the recently rebranded PDBe-EBI.

Improvements in Data Deposition/Processing

Commentary:

An update on wwPDB management of data deposition/processing was presented by Henrick. An effective joint effort among all wwPDB member organizations culminated in issuance of PDB Contents Guide 3.2 on September 15 2008. The goal of this exercise was to further clarify all data formats and data deposition procedures to create a more uniform archive. Implementation of this new standard occurred on November 15 2008 after a 60-day comment period, and all files in the archive are expected to conform to the new standard by the end of Q1 2009.

Report from the Crystallography Task Force

Commentary:

A summary of recent recommendations from the Crystallography Task Force was presented by Henrick. Considerable progress towards development of new crystallographic structure validation tools was accomplished at a recent wwPDB-sponsored Crystallography Task Force workshop hosted by the EBI in April 2008. This gathering produced a strong consensus regarding appropriate global and local structure validation measures. Software development efforts are now underway by a number of thought leaders, with the goal of producing a robust, stable, publicly-available validation package that will be used to evaluate future crystallographic structure depositions to the PDB. Implementation of this new validation strategy is expected by the end of 2009.

Report from the NMR Task Force

Commentary:

An update on wwPDB management of NMR data and structures was presented by Markley, together with a summary of recent recommendations from the NMR Task Force. A subset of these recommendations has been incorporated into the wwPDB policy regarding deposition of solid state and solution NMR data/structures. Two additional task force recommendations, including (1) that depositors be required to deposit chemical shift information, and (2) that depositors be “encouraged to avail themselves of third-party validation software prior to deposition of NMR structures”, have not been formally adopted by the wwPDB.

Recommendations:

- BMRB work with the NMR community to establish the feasibility/impact of requiring chemical shift depositions and provide a summary report to wwPDB leadership and the wwPDBAC.

Proposed Deadline: Q4 2009.

- BMRB work with the NMR community to establish a consensus regarding appropriate global and local structure validation measures with the eventual goal that thought

leaders will produce a robust, stable, publicly-available validation package that will be used to evaluate future NMR structure depositions to the PDB.
Proposed Deadline: Q4 2009.

Remediation and Curation of Complex Chemistry in the PDB

Commentary:

Henrick presented a detailed summary of recently completed efforts to ensure consistency within the archive for exotic oligopeptide structures (i.e., peptide antibiotics and other natural products) and small molecule inhibitors (both natural products and man-made compounds), many of which occur in complexes with their target proteins. The benefits of this exercise to PDB users are as follows: (i) to reflect correctly the genetic origins of the exotic oligopeptides and (ii) to facilitate comparisons among different ligand structures and across different target proteins. The committee commends the team for undertaking this challenging task, which reflects their enduring commitment to enhancing the integrity of the PDB archive.

New Projects

Commentary:

Berman described recent progress towards establishing templates necessary for inclusion of structures derived from small-angle scattering of X-rays and neutrons (SAXS/SANS) to the PDB. wwPDBAC briefing on the SAXS/SANS templates is expected at the 2009 meeting. Berman also described laudable progress towards production of a common structure deposition tool. Representatives of all four wwPDB member organizations are engaged in a multi-year project aimed at full standardization of PDB deposition. Conceptual design is slated for completion in 2008. Full implementation is anticipated in 2012, following a coordinated design/development phase running from 2009 to 2011. Reports on the design/development phase will be presented at subsequent wwPDBAC annual meetings. Timely completion of this exercise is deemed particularly important by the Committee, given the ever increasing rate of PDB depositions.

Long Term Funding/Stability

Commentary:

Berman reported on the issue of long term funding/stability of wwPDB sites. The RCSB-PDB competing renewal was successful, with current funding through 2013. PDBj funding will be subject to interim non-competitive review in late 2008, with current funding through 2011. BMRB funding is currently subject to competitive review, with expectations that successful renewal would result in a reduction in support. PDBe-EBI funding will shortly be subject to competitive review. Representatives from EMBL-EBI (Thornton) and the Wellcome Trust (Aarons) both reiterated their respective organization's commitment to PDBe.

Berman also discussed the need for separate funding for wwPDB activities to cover the costs of staff exchanges, joint outreach activities, and the annual meeting. The Committee strongly endorsed wwPDB proposals to seek funds from both national and international organizations, public and private.

Recommendation:

- Develop a plan for seeking independent funding of wwPDB activities and report to wwPDBAC.

Proposed Deadline: Q1 2009.

Other Matters

Advisory Committee Membership

Commentary:

Berman led a discussion regarding the desirability of periodic review/renewal of the wwPDBAC membership, with which the Committee concurred.

Recommendation:

- Develop a plan for periodic review/renewal of wwPDBAC membership and report to wwPDBAC.

Proposed Deadline: Q1 2009.

HPUB Limitations

Commentary:

Berman described recent challenges resulting from the current HPUB limit of 12 months, and proposed that the PDB have the flexibility to extend the HPUB limit to up to 15 months on a case by case basis without formally changing current HPUB guidelines. The Committee endorsed this proposal.

Industrial Macromolecular Crystallography Data Deposition Proposals

Commentary:

Berman led a discussion of various industrial proposals to deposit the following data into the PDB:

- (a) IFobsI data and partially refined structures;
- (b) IFobsI data for difficult cases that have eluded structure determination;
- (c) IFobsI data from heavy atom soak experiments;
- (d) IFobsI data and refined structures derived from contract research work to be kept confidential for a period of 5-10 years; and
- (e) biophysical data derived from studies of protein-ligand complexes.

A lively discussion ensued as Committee members identified potential pitfalls/concerns with each of the enumerated proposals enumerated. The Committee came to a consensus view that none of these data offerings were central to the overarching mission of the PDB, and recommended that the wwPDB members continue encouraging industrial macromolecular crystallography groups to deposit the data that the larger scientific community would most value (i.e., IFobsI data and fully refined structures of protein-ligand complexes).

Structure Validation Tools

Commentary:

Berman made the case that any X-ray or NMR structure validation tools critical to PDB structure deposition must be publicly available and stand-alone to avoid dependencies on third parties. The Committee concurred with this view.

Macromolecular EM

Commentary:

van Heel, representing the macromolecular EM community, articulated the need for an effort that paralleled recent activities of the Crystallographic and NMR Task Forces. The Committee concurred with this view.

Recommendation:

- Establish a Macromolecular EM Task Force that will provide input and support to the joint RCSB and PDBe-EBI, NIH funded effort to streamline deposition/validation of macromolecular EM structures/electron density envelopes.
Proposed Deadline: Q3 2009.

wwPDB-CCDC Interactions

Commentary:

A representative of the crystallographic community articulated the desirability of strengthening links between the wwPDB and the CCDC. The Committee concurred with this view.

Impact of Structural Biology Activities in China and India

Commentary:

In the face of increasing structure depositions from both China and India, the Committee concurred that the wwPDB should proactively develop thresholds/timelines for broadening representation from both of these countries, with the ultimate goal of broadening wwPDB membership as deposition levels dictate.

Recommendation:

- Broaden wwPDBAC representation to include China and India, and develop a plan for eventual wwPDB membership therefrom.
Proposed Deadline: Q3 2009.