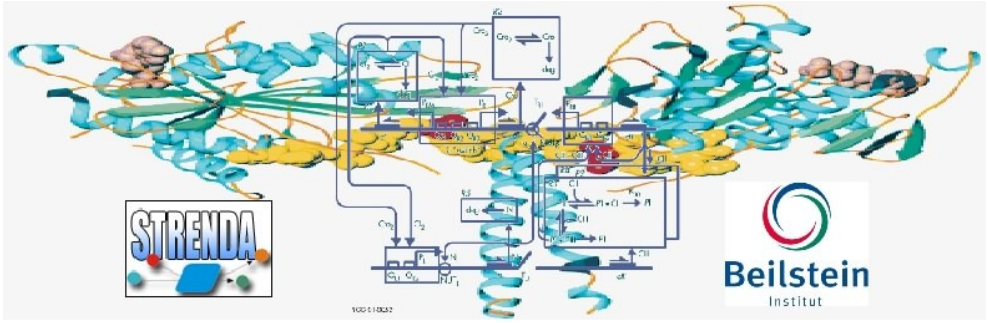

Minutes of the

6th STRENDA Meeting

23rd - 26th August, 2010
Assmannshausen/Rhein, Germany

by Carsten Kettner

Agenda

(as approved by the participants)

Opening, Expectations and Aims
STRENDA Overview
The STRENDA Network (and Website)
STRENDA Checklists Level 1 A and B
MIBBI
The electronic enzyme data submission system
5th ESCEC Symposium – modifications and improvements
Presentations

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Participants

(in alphabetical order)

- Richard N. Armstrong, Vanderbilt University, Dept. of Biochemistry, Nashville, TN, U.S.A., (RA);
- Amos Bairoch, Swiss Institute of Bioinformatics, Geneva, Switzerland, (AB);
- Aleksander Benjak, Heidelberg University Biochemistry Center, Heidelberg, Germany (ABen);
- Athel Cornish-Bowden, CNRS-BIP, Marseille, France, (ACB);
- Paul Fitzpatrick, The University of Texas Health Science Center, Dept. of Biochemistry, San Antonio, TX, U.S.A., (PF);
- Peter Halling, University of Strathclyde, Dept. of Pure and Applied Chemistry, Glasgow, United Kingdom, (PH);
- Carsten Kettner, Beilstein-Institut, Frankfurt/Main, Germany (co-ordination), (CK);
- Thomas S. Leyh, Yeshiva University, The Albert Einstein College of Medicine, Dept. of Biochemistry, Bronx, NY, U.S.A., (TL);
- Friedrich Lottspeich, Max Planck-Institute of Biochemistry, Martinsried, Germany, (FL);
- Camille Mary, Swiss Institute of Bioinformatics, Geneva, Switzerland, (CM);
- Frank Raushel, Texas A&M Univeristy, Dept. of Chemistry, College Station, TX, U.S.A. (FR)

Unfortunately, absent with valid excuse:

- Dietmar Schomburg, Technical University Braunschweig, Braunschweig, Germany, (DS),
- Rolf Apweiler, EMBL-EBI, Cambridge, UK,
- Johann Rohwer, Stellenbosch University, Stellenbosch, South Africa,
- Christoph Steinbeck, EMBL-EBI, Cambridge, UK,
- Keith Tipton, Trinity College, Dept. of Biochemistry, Dublin, Ireland,
- Richard Cammack, King's College London, London, UK.

Introduction

The STRENDA Commission, founded at the 1st ESCEC meeting in 2003 and constituted in 2004, aims at the improvement of the quality of reporting functional enzyme data. The objectives of the Commission are at least threefold: (i) the establishment of standards of reporting enzyme data to allow a full understanding of both the conditions under which the data were obtained and the analysis of the raw data as well as the presentation of processed data, (ii) the development and provision of an electronic submission tool that is intended to allow authors to deposit their data electronically prior to or after publication along with an interaction record accession number which can be quoted in publications, and (iii) the proposition of uniform assay standards to obtain experimental functional data from single enzymes or groups of enzymes under standardized conditions.

These efforts hopefully will lead to the formulation of commonly acceptable codes such as "Good Publication Practice" and "Good Laboratory Practice" in terms of comparability and reliability of the results of functional enzyme characterization. Fourteen journals have already adopted the STRENDA Guidelines for their "Instructions for Authors", amongst them are *Biochemistry*, *The Journal of Biological Chemistry*, *Archives in Biochemistry and Biophysics, Biochemical and Biophysical Research Communications, BBA* (all nine sections), *FEBS Journal*. The following publishers and journals recommend authors to refer to the MIBBI Portal for prescriptive checklists for reporting their research data. Publishers: BioMedCentral (e.g. *BMC Bioinformatics, BMC Biochemistry, BMC Biology, BMC Systems Biology*,...) and PLoS (e.g. *PLoS One, PLoS Biology, PLoS Medicine*,...). Journals: *OMICS.* It is hoped that further journals will follow.

The primary objective of this 6th STRENDA meeting is the common agreement on the status of the development of the electronic submission tool and its use by authors, journals and other users such as database providers. The second "big" issue is still the propagation and dissemination of the STRENDA Guidelines. The STRENDA Commission is aware that any recommendations or standardizations require broad discussions and co-operations within the scientific community, thus, further ways need to be identified to increase the visibility of the Commission's efforts which will hopefully lead to further opportunities to present and discuss the guidelines.

Opening, Expectations and Aims

The STRENDA Commission meeting took place at the Hotel Krone in Assmannshausen over two days and started on Tuesday, the 24th and ended in the late afternoon of Wednesday, 25th August 2010.

After a short self-introduction of the participants who included STRENDA Commitees and invited guests as integrated experts, CK gave a brief overview of the history and activities of the Beilstein-Institut.

The proposed preliminary agenda corresponded well with those topics which were of greatest importance to the participants. In particular, the following aspects were suggested by the

participants to be covered during the following days.

- Guidelines: Status and perspectives, requirements for adoption by journals,
- STRENDA: promotion of visibility, publications,
- Electronic Data Submission System (the STRENDA eform): common vision ("specification") and a agreed final implemented version, reasons for interest in enzyme data, size and amount of data sets, relationship between experimental enzymology and knowledge resources.

The first two aspects have been extensively covered in the discussions of the bullet points 2 to 5 of the agenda. The second day was completely reserved for the assessment of the draft tool already developed by the Braunschweig group (DS) and for the discussion about modifications and improvements of the tool.

The overall goal of the meeting was (a) a periodic revision of the STRENDA Guidelines and (b) the specification for the development of a pre-final version of the STRENDA tool as soon as possible.

STRENDA Overview

Along with ACB (book project) and TS (manuscript) CK gave a brief overview of the missions and activities of the Commission. The missions include on the one hand a long term vision, i.e. the establishement of experimental standard conditions to ensure the generation of reliable, validated and comparable enzyme data and two shorter term visions on the other hand, namely the definition of guidelines for good scientific publication and the generation of a comprehensive data acquisition system. It is obvious that STRENDA still requires the input and support from the community, journals, funding agencies and scientific societies.

Proceedings of the 4th ESCEC Symposium

The STRENDA Commission took part in the organization of the 4th ESCEC Symposium, held in Rüdesheim in September 2009. The proceedings which include 18 overview articles ranging from enzyme thermodynamics to insilico network modelling are available as a book and as online publications (http://www.beilstein-institut.de/en/symposia/overview/proceedings/2009-4th-escec-symposium/).

Conferences

In June 2010 CK attended the FEBS Meeting 2010 in Gothenburg, Sweden, and presented a poster along with a short oral poster presentation and a talk both on Reporting and Capturing Uniform Enzyme Function Data.

Adoption of STRENDA Guidelines

The STRENDA Guidelines were recently adopted by the *FEBS Journal* for the inclusion in the instructions for authors, the editorial decision of *FEBS Lett.* is still pending.

Omics announced in their editorial (Vol 13(6) 2009) that this journal recommends that all publications in 2010 follow relevant community-wide standards and, specifically, will be MIBBI-compliant.

STRENDA book project

ACB introduced in the STRENDA book project for which he took over the responsibility as editor together with CK. The book is planned to be published by the end of 2011 and will set out the issues and the recommendations for uniform reporting enzymology data. The following chapters are intended to be included in the book:

Chapter Title	Author(s)
Introductory remarks	Carsten Kettner (Beilstein), Athel Cornish-Bowden and the other members of the Beilstein STRENDA Commission
Standards of thermodynamics and kinetic data for enzyme catalysed reactions	Robert Goldberg (National Institute of Standards and Technology)
Nomenclature for enzymes and proteins	Keith Tipton (*Enzyme Nomenclature*, Trinity College Dublin)
BRENDA Database	Dietmar Schomburg (Technical University Braunschweig)
KEGG Database	Minoru Kanehisa (Kyoto University)
Enzyme assays	Keith Tipton
High-throughput assays	*to be decided*
Analysis and interpretation of enzyme kinetic data	Athel Cornish-Bowden and Keith Tipton
IUBMB recommendations (1983)	Athel Cornish-Bowden and Keith Tipton
Magnetic resonance	Octavio Monasterio (University of Chile)
Applications in systems biology	Pedro Mendes (University of Manchester and VirginiaTech)
Industrial applications	Peter Halling (University of Strathclyde)
Isotope effects	*to be decided*
Post-translational modifications	John Garavelli (European Bioinformatics Instititute; *to be confirmed)*
Electronic submission system	Tom Leyh (Albert Einstein College of Medicine)
STRENDA recommendations	Keith Tipton, Athel Cornish-Bowden and the other members of the Beilstein STRENDA Commission

The authors mentioned in the table confirmed their contribution. However, slight changes of chapter titles and/or chapter content are still possible.

Action: ACB will proceed to contact authors for those chapters of which the author status remained unclear. He also will discuss further questions with the authors concerning their chapters (details, content, modifications etc.)

STRENDA Manuscript

A long, apparently never ending story, is the STRENDA paper which has been commenced by DS almost four years ago but ended up in a tedious review process at *Nat. Biotechnology*. Despite of the fact that ACB along with KT and DS responded on the comments of the reviewers in deep detail the editors of *Nat. Biotech*. Did not make any decision. Consequently, the Commission agreed to rewrite the manuscript and submit it to another journal. TL came in contact with the editorial staff of *Nat. Chem. Biol.* who became very interested in the concerns of STRENDA and agreed to publish a manuscript provided is was appropriate according their ideas.

TL presented his new manuscript and apart of the suggestion for minor modifications there was general agreement to submit this manuscript to *Nat. Chem. Biol.*

Note: the manuscript has been published together with an introductory editorial on the issue of data standardization. R. Apweiler, R. Armstrong, A. Bairoch, A. Cornish-Bowden, P. J. Halling, J.-H. S. Hofmeyr, C. Kettner, T. S. Leyh, J. Rohwer, D. Schomburg, C. Steinbeck and K. Tipton (2010) A large-scale protein-function database. *Nature Chemical Biology* **6**: 785.

The STRENDA Network

CK presented the results of the efforts of the STRENDA Commission to get anchored withing the scientific community.

1. The Commission is in close contact to the IUBMB (International Union of Biochemistry and Molecular Biology), in particular, Angelo Azzi, the president of IUBMB is aware of STRENDA's concerns, and Willy Stalmans who is responsible for IUBMB's publications is lobbying for the adoption of the guidelines in IUBMB journals.
2. STRENDA takes part in the MIBBI project (see below).
3. The engagement in the MIBBI project resulted in the synergistic effect that BMC, PloS and Omics recommend their authors to refer to the guidelines lodged in the MIBBI portal. Here, authors will find the most appropriate guidelines for reporting data.
4. STRENDA is in contact with YSBN (Yeast Systems Biology Network), in particular with Edda Klipp and Hans Westerhoff. One result of this co-operation is a paper on standard conditions for the characterization of the yeast glycolysis enzymes (K. van Eunen, J. Bouwman, P. Daran-Lapujade, J. Postmus, A.B. Canelas, F.I. Mensonides, R. Orij, I Tuzun, J. van den Brink, G.J. Smits, W.M. van Gulik, S. Brul, J.J. Heijnen, M.J. Teixeira de Mattos, C. Kettner, J. Nielsen, H.V. Westerhoff and B.M. Bakker (2010) Measuring enzyme activities under standardized in *vivo*-like conditions for Systems Biology.

FEBS Journal **277**(3):749-760.*)*

5. Thanks to Dr. D. Auld who is the group leader of the Genomic Assay Technology group at NIH Chemical Genomics Center and TL (Dr. W. Jones who is responsible for Biotechnology and Enzyme Catalysis and regulation at the National Institute of General Medical Sciences) the NIH is aware of the efforts of STRENDA. In particular Dr. Jones appears to be very interested in the STRENDA submission tool.
6. More or less incidently the European Section of Applied Biocatalysis, a subsection of the European Federation of Biotechnolgy, became aware of the STRENDA guidelines, and the further development was consequent: Peter Halling was appointed to the STRENDA commission and the ESAB adopted and modified the STRENDA guidelines according their requirements.
7. Further contacts and co-operations are welcome.
8. The major database producers in the enzyme field are also closely connected with STRENDA, i.e. SABIO-RK whichimplements the recommendations of the *STRENDA* commission and BRENDA.
9. Actually, the first journal that adopted the STRENDA guidelines was Carbohydrate Research. But a recent assessment of the instructions showed that they were completely changed and the STRENDA guidelines were removed due to any reasons.
10. The next biochemical journals which decided to adopt the STRENDA guidelines for inclusion in the instructions for authors were Biochemistry and the Journal of Biological Chemistry.
11. In 2009 *Archives in Biochemistry and Biophysics*, *Biochemical and Biophysical Research Communications* and all nine sections of BBA decided to adopt the STRENDA guidelines.
12. Thanks to Athel's engagement in the Advisory Board of the *FEBS J.*, this is the latest journal which entered the STRENDA network.
13. Further journals are welcome.

The Foundation decided to incorporate the STRENDA project description in the "official" Beilstein-Institut website which means that the STRENDA issues will be removed from the former website at www.strenda.org. However, there is an automatic forwarding to the new sites implemented. This is the same for www.strenda.org/documents which points to the corresponding page on the Beilstein site. The maintainance of the strenda.org domain was necessary since there are many documents and publilcations in circulation which refer to the old STRENDA web site.
The new website of STRENDA is www.beilstein-institut.de/en/projects/strenda.

Action: all, have a critical look on this new site and pass CK ideas and suggestions for improvements or modifications required.

STRENDA Guidelines

ACB presented the STRENDA guidelines Level 1A and 1B. He commented and explained the individual aspects. The guidelines were then discussed in terms of consistency of form, content and relevance, as well as the order and plausibility of the list entries was considered. Some aspects were indicated as requiring minor changes. After introduction of the suggested changes both lists will be approved by the participants and the list will be then regarded as "finalized". The updated version of the lists will be published on the STRENDA web site.

> Action: CK and ACB will carry out the changes within the guidelines according to the agreements and their notes. CK will update the guidelines on the website.

MIBBI

MIBBI (www.mibbi.org) stands for "Minimum Information for Biological and Biomedical Investigations". This project was initiated by Chris Taylor, Dawn Field and Susanna Sanone (EBI, Cambridge, and Natural Environsment Research Concil, Oxford) in 2007 and is currently financially supported by UK BBSRC and NERC.

The goals of MIBBI are the improvement of communication, knowledge transfer and integration between checklist development. The project aims at to coordinate and describe standardization checklists in relative isolation, to create an integrated checklist resource for the community and to avoid the invention of standardization wheels several times.

MIBBI maintains a web-based, freely accessible resource for checklist projects with straightforward access to extant checklists. The common understanding of "standards" is regularization of data capture, representation, annotation or reporting data. Standards are not meant as best practices for experimental procedures. There are three kinds of reporting standards: Minimum information lists, syntax (formats), controlled vocabularies and ontologies (semantics). The co-operation and networking between the standardization groups will – hopefully – lead to an unification of standardization efforts since minimum information checklist projects could be connected along with their metadata sources. Additionally, the project is intended to maintain transparency of the checklist processes by providing access to any project-related information. Last but not least, MIBBI will ease to establish new checklist initiatives.

A second MIBBI workshop is planned which will take place at the Jagdschloss Niederwald in Rüdesheim, 2nd and 3rd of December 2010. This workshop will be funded and hosted by the Beilstein-Institut and organized in co-operation with the MIBBI project leaders at EBI and NERC.

Aims of the Workshop

1. extension of the MIBBI foundry modules by discussion boards and checklist analysis tools to identify the foci and overlaps between the checklists
2. Browseing, download and upload tools for adding and updating of further and existing checklists (MICheckout)

3. Discussion about data capturing tools according the participating checklists and integration of such tools in the MIBBI foundry
4. integration of the guidelines in OBO-Ontologies if possible and if necessary
5. strategies for advertising the guidelines and further MIBBI services at journals and funding agencies
6. which guidelines are still missing?

The Electronic Submission Tool

The objective of the development of a comprehensive data acquisition system is the second shorter term mission of the STRENDA Commission. The idea is that authors enter both the materials and methods data and the resulting functional enzyme data prior or during the publication process in this software form. The data entered are checked on STRENDA guidelines compliance and temporarily stored on a non-public server. Many issues, including the appropriate workflow of data and processes, need to be discussed. But the first step was to develop the STRENDA eform which can be presented to invite the community to take part in the acceptance and improvement process.
A second version of this submission system has been developed by the group of DS at the Technical University of Braunschweig, formerly at the University of Cologne. This version is still accessible for review at https://strenda.bioinfo.nat.tu-bs.de/strenda2/index.php?option=com_wrapper&Itemid=8.

This tool was assessed, again, and additionally a user-test was carried out by PF. TL pinned down some impressions and comments:
The four representatives from editorial boards at the meeting were quite interested in promoting acceptance of a suitable form either immediately, or in the future. None felt the form was ready for use at the journals. Correspondence with *Nature Chemical Biology* indicated that they, too, were considering adopting our E-form.

The current form is not yet ready for publication in *Nature Chemical Biology*, or for the Editorial Board Letter. Suggested solutions ranged from:

1. having the Beilstein support the development of an "in-house" form with its own resources;
2. approaching SABIO RK regarding adopting its recently published E-form;
3. continuing to work with Brenda on revisions;
4. use what we have "in-hand" as an alpha-version, and "go with that."

Specific Comments

- Web access should be seamless (currently, clicking on a link pops up a warning that the viewer is required to bypass in being redirected to a new site).
- The form should be housed at the STRENDA site – viewers should need to redirect from

STRENDA to BRENDA to view it.

- The Warnings that appeared at the top of all form pages during our evaluation need to be removed.
- The Login/ID should be removed– viewers simply need to be able to evaluate the form.
- The Reference TAB (retrospective page) of the form should be removed – it complicates the form.
- The User Tab should be removed – it too complicates the form, and this information should already be available at the journal that has accepted the paper.
- There was considerable discussion regarding entry into the Enzyme/Source page. For cases in which the publication deals with a known protein, any number of unique identifiers (Uniprot ID, DNA sequence, protein sequence…) would suffice as input for Java script that could "pull down" and fill in other required information in the form. The Description section should be more specific in following the guidelines.
- The Assay Page: katal units were considered sufficiently obsolete that they should be removed from the form.
- Kinetic Value Page. While there was considerable discussion regarding this page – many of the concerns centered on layout. For example, viewing the constants that had been entered, and multiple data entry were not intuitive.

Action: TL, CK, ACB, ABen, PH and others will discuss intensively (skype meetings) a modified third version which matches the results and agreements of the meeting. TL will organize the development of the form at Albert-Einstein College.

5th ESCEC Symposium

Jagdschloss Niedewald, Rüdesheim, Germany

12.09. - 16.09.2011

CK introduced in the potential topics of the forthcoming ESCEC Symposium and presented some ideas for modifications and/or improvement of the conference which were agreed by the participants.

- selection of speakers: every STRENDee contacts at least one appropriate speaker and invites him/her. CK will confirm this invitation upon acceptance by the speakers and send further information. The rule is: For invited guests/speakers Beilstein will cover reasonable travel expenses up to an anticipated limit of EUR 1000,-, boarding and lodging at the hotel and the conference fee. Extras, such as drinks, telephone etc. are excluded. Every speaker is expected to submit a proceedings article after the symposium.
  - ➔ This will ensure that the first 10 speakers will be on the list, the remaining ca. 10 persons will be invited by CK. Any suggestions and recommendations are welcome.
  - ➔ Poster session: Call for papers for 10 posters maximum. The posters will be displayed throughout the symposium in a separate room. Every poster presenter will have a 5 min slot to present the main aspects of his/her work

(3 slides plus introductory slide maximum).

➔ Papers submitted will be reviewed by the STRENDees.

➔ The best 10 papers will be selected for the presentation of both the poster and the short oral presentation.

➔ Poster presenters are waived the conference fee.

- Suggestion: papers are restricted to certain topics of enzymology.
- Focus of ESCEC: since the past ESCEC symposia dealt in a very general way with diverse aspects of enzymology, we should start to limit the meeting's topics to certain aspects which are reflected by a subtitle.
  Suggestions:
  From Sequence to Structure and Function;
  Enzymes in Collaboration;
  From Sequence to Activity;
  From Enzyme Kinetics to Physiological Meaning;
  Making Enzyme Experiments Useful for Physiology;
  Back to the Future: Enzymology in the Context of Systems Biology

Action: all, identification and invitation of appropriate speakers, announcement and promotion of the symposium, announcement of poster session.#

Presentations

The STRENDA Commission took the chance to get insight into new and/or running projects which are related with the concerns of STRENDA

- F. Raushel: The Enzyme Functional Initiative (EFI)
- A. Bairoch: neXtProt Knowledge
- C. Mary: Characterization of Human Proteins which are believed to be Enzymes

The 20+ mins presentations were followed by discussions.