IUPAB NEWS

REPORTS ON THE ACTIVITIES OF THE INTERNATIONAL UNION FOR PURE AND APPLIED BIOPHYSICS
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http://www.iupab.org

In Memoriam Notice Jorge Ponce Hornos

It is with great sadness that we learned in September of the untimely death of our dear friend and colleague **Jorge Ponce Hornos**, after a lengthy illness. Jorge was recently a member of our IUPAB Council and gave us much good advice. He was also a valuable member of the Argentine team which did such a wonderful job of organizing and facilitating our congress in Buenos Aires. This was performed with great success despite the difficult financial situation in Argentina.
Personally I shall also remember him as a fierce and excellent tennis partner.

Rest in peace dear friend and colleague.
You are fondly remembered.

Ian C. P. Smith

Some remarks of the Secretary General

First of all it is a pleasure for me to tell you that Professor F.J. Barrantes accepted to be co-opted into the IUPAB Council. We welcome him looking forward to a good cooperation.

I want to come back once more to the disaster with our homepage. As the final solution we had to go to another internet service provider. I can only hope that it works now better.

Fritz G. Parak

A short scientific contribution

Protein structure evolution, a challenge.

Jean Garnier
MIG/INRA and MSCL/CIT/NIH

Introduction
The modular structure of proteins into domains is well documented. The first proposals for such a structure for proteins came from the finding that along an amino acid sequence, one segment of that sequence (named domain) was homologous with segments contained in different proteins (Baron et al. 1991, Patthy 1991, Doolittle 1985, 1992). The term homologous is used to define an evolutionary relationship between the domains. The detection of domains is usually done by amino acid comparison and also by analyzing the 3 D structure of the protein. As structure is better conserved than the amino acid sequence during evolution, domain identification may differ if one uses amino acid sequences alone that are less sensitive to detect homology than 3 D structures. There are several databases of protein domains, according to the methods used for identifying them.

Protein domain databases.
Some of them are based on the homology detected by amino acid comparison, such as **ProDom** (Sonnhammer, ELL. and Kahn, D., 1994, http://prodom.prabi.fr/) and **Pfam** (Sonnhammer ELL. et al., 1997, http://www.sanger.ac.uk). They rely on the performance of the amino acid comparison methods such as for instance PSI-BLAST or HMMER, which requires at least 20-25 % of identical residues to detect a significant homology between amino

acid sequences. However there are many examples of low sequence identity between two proteins although they share the same 3 D structure and have the same function. For instance the alpha chain of human hemoglobin and lupin leghemoglobin are both oxygen carriers with the same heme as ligand and same structure but have between themselves a low (about 12 %) percentage of identical residues and are not detected as homologous.

Besides this limitation, the domain parsing is difficult to accomplish with accuracy. To define a domain, ProDom for instance, starts from the smallest sequence (greater than 50 residue long) in a non-redundant (NR) database of amino acid sequences. Through a PSI-BLAST search, if that smallest sequence matches significantly with some part of several sequences, it will define a domain in the limits of a given threshold on each side of about 20 residues after the multiple alignments of the matching domains. All the sequences of the NR database having this domain are excised of those sequence segments that are removed to make a new database. Another search cycle is started with the smallest sequence against all of the new NR sequences and so on. At present about one quarter of the known sequences can be decomposed into at least two domains. On average there are three domains per protein and the average domain length is about 130 residues long (Corpet F, et al., 2000). The advantage of this approach is that the domain is observed in isolation, that is, a priori, able to fold by itself to form a stable structure in charge of a specific function in the cell.

Structural domains in **CATH** (Orengo et al., 1997, http://www.cathdb.info/latest/index.html) and **SCOP** (Murzin et al., 1995, http://scop.mrc-lmb.cam.ac.uk/scop/) databases assume also that a domain is an entity able to fold by itself even if not observed in isolation. They are several algorithms to identify a structural domain all take into account that the atoms of a domain should be closer between themselves than with the other atoms of the rest of the protein (algorithm of compactness). In fine the limits of the domain are visually controlled. One would expect that structural domain would overlap the amino acid sequence domain definition but only partially because when the percent identity is too small, the sequence comparison will not detect any homology between domains. This probably occur in the example given in figure 1 for the electron transport protein, 1jju chain A, where SCOP detect

Figure 1: Example of a protein with several domains. The parsing of the domains differs depending on the methods used in the various databases, CATH, SCOP and ProDom. The numbering of the residues limiting the domains is taken from SCOP, they differ by 1-8 residues for an equivalent domain in CATH, or ProDom. Pfam B (not reported here) has the same domain definition than ProDom except an extra domain from res. 5 to 85 corresponding to the first domain of SCOP.

1jju: electron transport

Chain A (~500 res.) contains 5 domains:
From N to C terminal:
1- Cytochrome C fold[1] 1-85
2- Cytochrome C fold[1,3] 86-165
3- Beta barrel fold [1,2,3] 166-273
4- beta sandwich fold [1,2,] 274-351
5-beta sandwich fold [1,2] 352-489
[1]=SCOP, [2]=CATH, [3]=ProDom (4+5=1 dom.).

two structural Cytochrome C domains in the N terminal part when ProDom detects only one of the domains from residue 86 to 165. Similarly ProDom defines one domain from residues 274-489 when two structural domains are detected by CATH and SCOP.

Consequence for protein evolution of a multi-domain structure:

Each domain may have from origin an ancestral gene, a multi-domain protein would result of the fusion of several identical or different genes. This fusion could have occurred at different times and several times during evolution. Gene duplication allows a separate evolution of one of the duplicates when the other continues to perform an essential function for the organism. Reshuffling of exons within a domain or exchange of entire domains along the sequence can allow new overall 3-D structures with new properties of interactions or catalysis (Kinch and Grishin, 2002). The evolution of domains by point mutations, minute deletions or insertions,

although keeping the overall 3 D structure, can lead to different functions as for the domains having the same TIM barrel fold.

Classification of domains.

Classification requires putting together domains that are alike and separate them from those that are not alike. Recently, in collaboration with the groups of P. Munson (MSCL, NIH), BK Lee (NCI, NIH) and JF Gibrat (MIG, INRA) we analyzed the SCOP classification using VAST and SHEBA structural comparison methods (Sam et al., 2006). Our major findings are reported below.

SCOP is a hierarchical classification of structural domains of proteins, essentially manual and separated into class, fold, super family and family. The class level is related to the content in secondary structures, or size or cellular location. The fold level groups domains of "similar" structure of "same" secondary structures and connectivity. The family level in a fold groups structures with sequence identity greater than 20-35%. For structures of lower sequence identities that are not detected as homologous by amino acid comparison, but still belonging to the same fold with related function, they are put in a different super family of the same fold.

VAST or Vector Assignments Search Tool is a method to compare 3-D structure (Gibrat et al. 1996). Its algorithm considers helices and beta strands and their connectivity as a characteristic of a protein structure, like bones in vertebrates. They are replaced by vectors; two structures are similar if their set of vectors is aligned (within a threshold) in space with the same topology. The probability P of aligning by chance their vectors is computed and one compares the value of

Pcli = $-\log_{10}$ c.P, c is related to the number of superposed secondary structures. SHEBA (Jung and Lee, 2000) uses the amino acid sequence along with structural properties of each residue for a pair wise alignment. The program computes an *m* score defined as the number of matched residues versus the mean length of the two protein domains. By computing the *m* score for all the domain pairs of the database, a Z score value of *m* is calculated for that specific pair.

For the analysis of SCOP domain assignments, we performed a two by two comparison of 4 676 domains having less than 40% sequence identity (ASTRAL version 1.63, corresponding to 468 folds in classes A, B, C, D, E, F and G. A ROC curve of the results is presented in fig.2. The conclusion of this study is that SCOP classification has definite disparities in

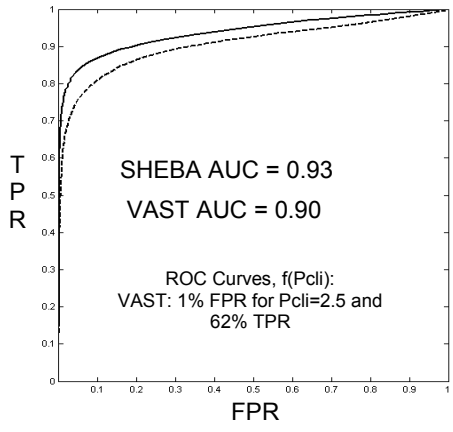
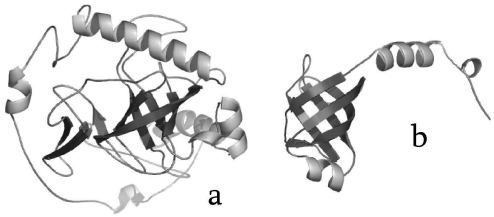


Figure 2: ROC curves of VAST (dotted line) and SHEBA (solid line) obtained by plotting the True Positive Rate (a weighted average rate that a domain is correctly detected to be similar to another domain in the same SCOP fold) against the False Positive Rate (a weighted average rate at which a domain is falsely detected to be similar to a domain in another SCOP fold). These curves detect the adequacy of the 3 D comparison methods of similarity with the SCOP similarity taken as a reference. For a reasonable difference of agreement with SCOP, for instance a 1 % of FPR, only 62 % of the $(4\ 676)^2$ domain pairs for VAST and 75% for SHEBA are similar in structure, then correctly classified in the same fold. The threshold of 1% FPR corresponds to a value of Pcli of 2,5 for VAST and a Z score of 2.7 for SHEBA.

domain similarity: for a 1% error rate, 1/3 to 1/4 of the domain pairs will not be put in the same fold in using these automatic methods. One of the reasons is that the SCOP

classification is not limited only to structural similarity criteria as exemplify in fig 3-6. This happens either because there is a conserved motif with many other secondary structures

Figure 3: Example of dissimilarity of structures (Pcli of 0) although classified in the same fold b.40 (a barrel). The conserved motif is in dark, the rest of the structure could be considered as decoration around a common motif.



Ex. of decoration, fold b.40,
Pcli = 0

(fig.3) or because the variations of the common motif are considered as not essential (fig 4) or on the contrary sufficient (fig. 5 and 6) to be differentiated. It comes more to a matter of opinion than to a quantitative basis. This quantitative basis is not straightforward if the fold space of protein is continuous rather than discrete. Some of these examples above may suggest that it is the case.

Figure 4: Example of variations in a same fold b.1. The variations of the common motif (immunoglobulin-like beta-sandwich) is important enough than VAST program considers structures a and c as dissimilar with a Pcli value of 0 although there is a path from a to c through b.

Pcli of

a/b:4.7	b/c:4.2	a/c:0
Scop	fold	b1

Figure 5: Example of structure variations not recognized by VAST (Pcli of 3.1) but sufficiently different to be classified by SCOP as beta sandwich of 6 strands in two sheets (fold b.4) and a beta barrel of 6 strands (fold b.107). Here the view distinguishes well a sandwich from a beta barrel, however the superposition of the strands are sufficiently conserved to be considered as similar, the difference being the extra twisting of the strands in b which makes the structure looking more alike a barrel than a sandwich.

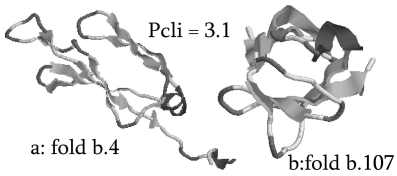


Figure 6: Example of similar structures (Pcli of 5.2) classified in a different SCOP fold. They are beta propeller domains with respectively 5 (a, fold b.67) and 7 (b, fold b.69) four-stranded blades.

a: fold b.67
Pcli = 5.2

b: fold b.69

Conclusion and challenges.

The first challenge is to establish a consensus automatic method to define domains and to classify the domain structure space. Due to the avalanche of new protein structures through the structural genomics projects, curated manual methods cannot match this trend. Methods like VAST, SHEBA are good candidate for that purpose.

The second challenge is precisely the sufficient coverage of existing protein structures. The prospective is optimistic if one considers the recent development of automatic processes for protein crystallization and the spread of Synchrotron beam facilities made available to crystallographers. There is still a bottleneck in recombinant protein expression for obtaining sufficient quantities for X Ray or NMR experiments.

The third challenge might be the difficulty to distinguish steps of variations within domain structures and to relate them with the time of evolution.

For the moment it is not possible to answer to the following questions: what is the phylogenic relationship between domain structures? Which domains are the most ancestral? Are the all-alpha proteins more primitive than the all-beta proteins? Are there significant intermediaries between an all-alpha protein and an all-beta protein? How long did a domain take to evolve into another domain?

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Minutes of the 52nd Council Meeting of IUPAB
Ottawa, September 9 – 13, 2006

Present: I.C.P. Smith, President, J. Garnier, Past President, K. Nagayama and W. Olson, Vice Presidents, F. G. Parak, Secretary General, R. Brasseur, F. Conti, Jun-Xian Shen, P.Laggner, M.Prieto, C. G. dos Remedios, G.C.K. Roberts, A.B. Rubin, T.P. Singh,

52.1 The tabled agenda was adopted

52.2 P. Brzezinski apologized for his absence due to a conflict in schedule. Jorge Ponce Hornos died some days before the Council meeting. G. Pifat-Mrzljak was not able to attend due to a visa problem. In agreement with the Executive Committee of IUPAB Zihe Rao was represented by Jun-Xian Shen.

52.3 The Minutes of the 50th and 51st Council Meetings in Montpellier, September 2005, were published in IUPAB NEWS 51. There was no request for changes.

52.4 The proposed revision of the IUPAB Statutes was modified. The accepted text is given as an appendix.

52.5 14 Adhering Bodies have unpaid dues, some of them since 2002. Some Council members are willing to contact personally representatives of these Adhering Bodies to discuss the problem.

52.6 The Secretary General reported that the Financial Statements for the years 2003 and 2004 have finally been controlled by an Audit. The Statement for 2005 is submitted to the Audit. The final balance of the Montpellier meeting is on hand. The total income was 529.983,87 €, the total expenses 522.438,04 €. The difference will be shared between IUPAB and EBSA.
The planned budget for 2006 is added as appendix. The Secretary General explained the problems, which arise by the fact that IUPAB has a USD and a Euro bank account. From the Audit the USD income and the USD expenditure are converted to Euro on the day when they are booked. A discrepancy occurs if between an income and expenditure the conversion rate changes. Since income and expenditure are booked on the same USD account, for our booking the rate change has no consequence while in the Financial Statement at the end of the year it is taken into account. To avoid this problem the Council decided that the USD account will be given up and the IUPAB will perform all financial actions in Euro. In 2007 the subscription will be asked in Euro converting the USD subscriptions into Euro at the beginning of the year. It is proposed that the General Assembly in 2008 raises the subscriptions moderately, asking for 6000, 3000, 960 or 100 Euro. Moreover, the assets at Merrill Lynch should be transferred to Crédit Lyonnais in order to avoid possible problems with taxes.

52.7 The Sociedad Mexicana de Bioquimica A.C. cancelled the subscription to IUPAB because of financial problems.

52.8 16th International Congress will be held in Long Beach, California, USA, February 2 – 6, 2008 in partnership with the Biophysical Society.

52.8.1 Jean Garnier reported on the present state of preparations.

52.8.2 The council decided that in the 2008 Congress there should be a Ramachandran Lecture and an Arne Engström Lecture. Jean Garnier is asked to organise the time of these lectures in agreement with the American hosts. The lectures will receive a limited financial support. Possible candidates were discussed. It was decided that written proposals with a justification of the candidates should be submitted to the Secretary General. The selection will be done by the Executive Committee of IUPAB.

52.8.3 The following topics were suggested for the Congress: **1) Protein Structure and Dynamics, 2) Biophysics of Disordered Proteins, 3) Protein Folding and Unfolding, 4) Simulations, 5) Protein-Protein Interactions (non-membrane), 6) Rotors and Motors, 7) Interaction of Membrane Proteins, 8) Membrane Transport/ Bioenergetics/ Light-Driven Pumps**, **9) Protein-Lipid Interaction / Lipid Biophysics, 10) Membrane Channels, 11) Actin and cytoskeleton, 12) RNA, 13) Macromolecular assemblies, 14) Single-molecule Biophysics, 15) Nano-scale Biophysics, 16) Nanoscale Mechanobiology, 17) Systems Biology, 18) Structural Bioenergetics, 19)**

Biophysics and Health, 20) Biophysics of Cell Imaging, 21) Cryobiophysics, 22) Organ Imagining, 23) Drug Development, 24) Bioinformatics, 25) Education and Capacity Building.

For all topics speaker have been proposed. No candidates from the USA were considered. The IUPAB representatives in the Program Committee, Jean Garnier, Israel Pecht and David Parry will try to bring into the final program as many of these suggestions as possible.

52.9 Reports of the Task forces were given in written form. They are printed in this IUPAB NEWS.

52.10 Some reports on sponsored meetings in 2006 were given in written form. They are also communicated in this issue of IUPAB NEWS.

52.11 The following workshops and conferences in 2007 will be supported:

1. Workshop on Biophysics of membrane –active peptides, April 1– 4, in Lisbon, Portugal, organised by Miguel Castanho: 3.000 USD
2. Modern spectroscopic methods in studying structure and function of biopolymers in biology and medicine, June 4–8, in Dubna, Russia organised by Andrei Rubin: 8.000 USD
3. Biophysics in Medicine: Principles, Applications, Perspectives, October 5- 9, Romania, organised by Eugenia Kovacs: 8.000 USD
4. International Conference of Biological Physics/Southern Cone Biophysics Congress, August 27-31, Montevideo, Uruguay, organised by Raul Grigera: 8.000 USD
5. Regional Biophysics Conference, August 21-25, Balatonfüred, Hungary, organised by Laszlo Zimanyi: 3.000 USD
6. Biophysical structural aspects of lipids and its biological implications related to macromolecular structures and cell resistance, November 7-18, Buenos Aires, Argentina, organised by Silvia del V. Alonso: 7.000 USD (some clarifications are necessary).

52.12 There was a discussion on the function of ICSU which was controversial in part. Although there is no doubt on the necessity of an institution like ICSU several members of the Council had the feeling that ICSU does not optimal promote the interests of the member Unions. In some part ICSU should be the lobby for science at the governments of the member countries. The engagement for less developed countries is valuable but should not be the only aim of this organisation. Ian Smith will prepare a letter to ICSU explaining our position.

52.13 The situation with the Quarterly Reviews of Biophysics is still unsatisfactory. Issues are late; there is no real cooperation with IUPAB. In the archive of IUPAB there are several letters relating to the establishment of the journal. However, there is no statement concerning the copyright. Ian Smith was asked to contact Springer again, asking if there is any possibility to find out who has the copyright.

52.14 In 2007 the Executive Committee will meet in Beijing to visit the congress site for 2011 and to formulate a contract with the Chinese Academy. The next Council Meeting will take place at the Congress in Long Beach in 2008.

52.15 The Council Members stood for a moment of silence to commemorate our late Council Member Jorge Ponce Hornos.

Ian Smith will be the representative of IUPAB in the Steering Committee for the initiative "Science for Health and Well Being" supported by ICSU.
The Secretary General reported on the problems with the IUPAB homepage. First the access was arbitrarily limited. Afterwards an old version was displayed. It seems to be necessary to change the provider.
By the death of Jorge Ponce Hornos a position in the Council became vacant. According to the statutes the Council can co-opt a person who assumes the role of the former member. Three possible successors were nominated. Ian Smith will ask the first of the nominated persons if he wishes to serve on the Council.

Budget 2006 (in USD)

Income and Expenditure Account

1. Income:

Subscription from adhering bodies	78.000
Grant from UNESCO	3.000
Bank Interests	5.000
Total income	**86.000**

2. Expenditures:

2.1 Scientific Activities	
Council Ottawa	25.000
Support of workshops	35.000
subtotal	**60.000**
2.2 Other Activities	
Dues to ICSU	3.600
subtotal	**3.600**
2.3 Administrative Expenses	
Secretary Services	1.500
Bank charges	2.500
Audit fees	2.300
IUPAB NEWS, Web.	1.200
subtotal	**7.500**
Total Expenditures	**71.100**
Income - Expenditure	**14.900**

ANNEX A: Revision of the IUPAB Statutes

(Proposed changes are italic)

IUPAB Statutes

to be revised in Long Beach 2008

(I) Legal seat and Administrative Centre

(1) The International Union for Pure and Applied Biophysics is registered as a non-for-profit organization under French Law. The legal seat of the Union shall be 51 Boulevard de Montmorency, 75016 Paris, France and the administrative centre of the Union shall be the Office of the current Secretary General or such other place(s) as the Council of the Union shall from time to time determine.

(II) Aims and function of the Union

(2) The objects of the International Union for Pure and Applied Biophysics are the advancement of education in the Science of Biophysics. In furtherance of this aim it may exercise the following powers:

(a) to organise international co-operation in Biophysics and to promote communication between the various branches of Biophysics and allied subjects;

(b) to encourage within each adhering body co-operation between the societies that represent the interests of Biophysics;

(c) to contribute to the advancement of Biophysics in all its aspects.

(3) For these purposes it shall have power:

(a) to set up task forces, commissions or other bodies for special purposes;

(b) to organise international meetings and conferences;

(c) to collaborate with other scientific organisations;

(d) to act in all ways as a constituent union of ICSU, the International Council for Science, in accordance with the statutes of that body;

(e) to develop any lawful activity deemed helpful to the forwarding of its declared objects.

(III) Membership

(4) The International Union shall consist of a group of adhering bodies representing Scientific Communities. In each Scientific Community the adhering body shall be a Research Council or similar institution, a scientific Society or a group of such Societies, or a body specially formed for the purpose of adhering to the Union. In each case a Committee with responsibility for international relations in Biophysics shall be formed, and adherence to the Union shall be ratified when the membership of this Committee has been reported to, and recognised by, the General Assembly of the Union. Scientific Communities that are not adhering bodies because of the lack of financial resources may be observing bodies of the Union, without voting rights. Applications for observer status will be acted on by the General Assembly.

(5) The term Scientific Community shall be applicable to the Biophysicists of a country or of an otherwise defined geographical area that has an independent budget for scientific purposes.

(6) The adhering and observing bodies shall be required to pay an annual subscription to the International Union (see Article V.11).

(7) Termination of membership for adhering bodies that (a) in a arrears with subscriptions or (b) have acted in a way that brings discredit on the Union shall be decided by the General Assembly by a two-third majority of those present.

(IV) Committees for Biophysics

(8) Within their own Scientific Communities the Committees for Biophysics will be expected to co-ordinate the interests of the various branches of Biophysics. In its relations with IUPAB each Committee for Biophysics shall appoint delegates to represent its Scientific Community at the General Assembly of the Union, and shall select a leader of its delegation. Each delegate shall vote on behalf of his or her Scientific Community at the General Assembly (see Article ~~IV.10~~ V 14).

(V) General Assembly

(9) The work of the Union shall be directed by the General Assembly of delegates, which shall normally meet once every three years. The membership of the General assembly of the Unions shall consist of the delegates appointed by the adhering bodies, the Officers and the ordinary members of the Council. In addition, each Task Force and Commission has the right to send one representative to the General Assembly. Only those members who have been appointed as delegates of the adhering bodies and are present in person may vote. Each voting member of the General Assembly may cast only a single vote.

(10) The General Assembly shall elect the Officers and Members of Council; nominations for candidates for election shall be submitted to the Secretary-General in writing at least four months before the meeting of the General Assembly.

(11) There shall be three categories of membership for adhering bodies, A, B and C according to the amount of the corresponding subscriptions to be fixed by the General Assembly, category A having the highest and C the lowest amount of subscription. Depending upon the category of membership chosen by the adhering body, it shall have the right to send three delegates for category A, two for category B and one for category C. to the General Assembly. The level of annual subscription for observing bodies shall be set by the General Assembly at a level below the lowest level for adhering bodies. Observing bodies may send one representative to the Assembly, who shall have the right to participate in the discussions but not to vote.

(12) The levels of annual subscription determined by the General Assembly shall be for the three-year period beginning 1st January following the General Assembly. The annual subscription must be paid in the calendar year to which it applies. Any Adhering body that is three or more years in arrears at the date of a General Assembly shall be deprived of the right to vote at the General Assembly.

(13) The quorum for a General Assembly shall be at least 50% of the Adhering Bodies that are represented in person by duly appointed delegates.

(14) At the General Assemblies, questions shall be decided by a simple majority of all delegates present except for the modification of Statutes (see Article XI, 31).

(VI) Extraordinary General Assembly

(15) An Extraordinary General Assembly shall be summoned by the Secretary General if unanimously requested by the Executive Committee or 2/3 of the Council or in response to a written request to the President from at least half of the Union's Adhering Bodies. The time, place and Agenda shall be notified in writing to all Adhering Bodies and Observer Members at least 3 months before the proposed date. No matter shall be discussed at an Extraordinary General Assembly that has not been included in the pre-circulated Agenda. The voting procedure should be as in a General Assembly (section V).

(VII) The Council

(16) The executive body of the General Assembly shall be a Council, which shall be guided in all its decisions by the tradition of free international scientific co-operation. Members of Council serve in their personal capacities and not as representatives of Adhering Bodies

(17) The Council shall consist of the five Officers of the Union, who shall also be the Officers of the Council, and not more than 12 ordinary Members. They shall be elected, with the exception of the *President and the Past President* ~~Honorary Vice-Presiden Past President and the former Vice-President~~ (Article VIII 22), by the General Assembly and normally from among its members.

(18) The ordinary Members of the Council shall serve for a term of three years and may not serve in that capacity for more than two consecutive terms. The Council may co-opt to any vacancies which occur (including the Officers) and any person so co-opted has the same tenure of office as the person replaced.

(19) In the exception of the purposes of the Union, no member of the Council shall be liable for any loss to the property of the Union or any of its Task Forces, Commissions or Committees arising (i) by reason of any improper investment mad in good faith (provide that he/she shall have sought professional advice before making such investment) or (ii) through the negligence or fraud of any agent employed in good faith by him/her or by any other member of the Council (provided reasonable supervision shall have been exercised) even if the employment of such agent was strictly not necessary or (iii) by reason of any mistake or omission made in good faith by any member of the Council or (iv) by any other reason except wilful and individual fraud, wrongdoing or wrongful omission on the part of the member of the Council who is sought to be made liable.

(20) No member of the Council shall acquire any interest in property belonging to the Union (otherwise than as a trustee for the Union) or receive remuneration or be interested (otherwise than as a member of the Council) in any contract entered into by the Council.

(21) The meetings of the Council shall be held:
(a) during the General Assembly;
(b) normally once between each General Assembly, but exceptionally at other times upon the decision of the Council.

Seven Members of the Council shall constitute a quorum at a Council meeting.

(VIII) Officers of the Union

~~(22) The Officers of the Union shall be a President, two Vice-Presidents, and a Secretary General, together with an Honorary vice-President.. The President shall hold office for a period of three years. Similarly, the Vice-Presidents may hold office for three years, one of~~

~~them normally then becoming President and the other former Vice-President continuing to serve on the Council for one further term only, as an ordinary member before retiring from the Council.~~

(22) The Officers of the Union shall be a President, a ~~Vice-Presidents~~ *President-elect, a* ~~Honorary vice-President~~, *Past-President, a Secretary General and a Treasurer. The President shall hold office for a period of three years. Similarly, the President-elect shall hold office for three years, and then become President.*

Special arrangement for 2008: The two Vice- Presidents elected in the General Assembly of 2005 shall be the candidates to become President. The candidate with fewer votes will stay for a further term as an ordinary council member. In 2008 only 11 ordinary council members have to be elected.

The position of ~~Honorary Vice-President~~ Past-President shall normally be held for three years ~~by the immediate past President~~. after his(her) term of three years as President.

The Secretary General shall hold office for six years, but may be re-elected for further periods of three years to a maximum of twelve years.

The Treasurer shall hold office for six years, but may be re-elected for further periods of three years to a maximum of twelve years.

(23) It shall be the duty of the Secretary General to maintain relationships with all bodies adhering to the international Union and all other relevant organisations within the field of Biophysics. ~~The Secretary General shall act as Treasurer of the Union and shall be responsible for the preparation of Financial Accounts and arranging for them to be professionally audited.~~ The Secretary General shall prepare the agenda, and circulate it at least four months before meetings of the Council and General Assembly.

The Treasurer of the Union shall be responsible for the preparation of budgets and Financial Accounts and arranging for the accounts to be professionally audited.

(IX) The Executive Committee

(24) The Officers of the Union, acting as the Union's Executive Committee, may conduct the business of the Council in the intervals between meetings of the Council. It is customary for the Executive Committee to meet mid-way between Council Meetings and to consult by mail or e-mail as necessary on day-to-day matters. All decisions and activities of the Executive Committee shall be reported to the Council.

(X) Task Forces and Commissions

(25) Task Forces and Commissions may be set up by the General Assembly or by the Council to take responsibility:

(a) for the various branches of Biophysics;

(b) for any other necessary purpose, including co-operation with other international organisations.

(26) The constitution of each Task Force must be approved by the Council. The convenor of each Task force shall be responsible for the presentation of a report on its work at each General assembly. Decisions of Task forces are made by a simple majority of the votes of their members.

(27) The Adhering Bodies shall be consulted regarding the membership of each Task Force. The Council shall appoint from among its members at least one representative on each Task Force, one of whom shall preferably act as convenor.

(28) Existing international bodies may be admitted as Affiliated Commissions to the Union by the General Assembly or by the Council (subject to confirmation by the next General Assembly). Affiliated Commissions shall pay an annual subscription, the amount to be designated by the General Assembly.

(29) The Council shall have the right to designate a representative to sit on the executive body of each Affiliated Commission. The Secretary General shall receive copies of all official communications pertaining to the activities of the Affiliated Commissions.

(30) In addition to grants made to them by the Council, Task Forces and Commissions may receive grants from other sources.

(XI) Modification of the Statutes

(31) The present statutes may be modified only by a two-thirds written vote of all adhering bodies present at a General Assembly to which prior notice of the change has been given on the agenda.

(32) These statutes shall be governed by, and interpreted in accordance with, French law. The working language of the Union is English.

(XII) Dissolution

(33) If the Council decides that it is necessary or advisable to dissolve the Union it shall call a General Assembly of all members of the Union, of which not less than three months notice (stating the terms of the resolution to be proposed) shall be given. If the proposal is confirmed by a two-thirds majority of those present and voting the Council shall have power to realise any assets held by or on behalf of the Union. Any assets remaining after the satisfaction of any proper debts and liabilities shall be given or transferred as determined by the Members of the Union to one or more institutions having objects similar to those of the Union or failing that shall be applied to some other appropriate purpose.

ADOPTED, STOCKHOLM, 2 August 1961.
MODIFIED, VIENNA, 7 September 1966.
MODIFIED, CAMBRIDGE MASS., 31 August 1969.
MODIFIED, COPENHAGEN, 6 August 1975.
MODIFIED, MEXICO CITY, 26 August 1981.
MODIFIED, BUDAPEST, 28 July 1993.
MODIFIED, AMSTERDAM, 14 August 1996.
MODIFIED, NEW DELHI, 22 September 1999.
MODIFIED, MONTPELLIER 28 August 2005.

TO BE MODIFIED, LONG BEACH 2008

Annex B: Proposal "Rules of Procedure"

(Proposed changes are italic)

(I) Adhering Bodies and Observer Members

Each Adhering Body or Observer Member of IUPAB shall appoint a representative who shall
(a) be responsible for communications with IUPAB and
(b) shall provide an effective channel of communication with the members of their Scientific Community of biophysicists. The Secretary General shall communicate the business of IUPAB to the representative.

The representative shall convey to the Secretary-General the name(s) of the Member's delegate(s) who have been appointed to attend General Assemblies of the Union.

The representative shall receive Agenda papers from the Secretary-General, shall submit items for inclusion on the Agenda of General Assemblies and shall prepare nominations for election to the posts of Officers and Members of Council. Nominations should be submitted by completion of nomination forms circulated in advance by the Secretary-General. Such nominations are not restricted to nationals of the nominating body and IUPAB members may support candidates put forward by other members. It should be noted that, although their candidature has to be put forward by IUPAB members, Officers and Members of Council serve in their personal capacities and not as representatives of the bodies that have proposed them.

(II) General Procedures at General Assemblies

Attendance at General Assemblies is open to all participants in the concurrent International Biophysics Congress, but only those appointed as delegates of Adhering or Observing Bodies are entitled to speak.

It is not a requirement that delegates to the General Assembly should be registered participants in the concurrent International Congress.

The President does not have a vote, but may exercise a casting vote if necessary to resolve a tied vote. The other Officers and ordinary Members of Council may vote only if they have been appointed as delegates of an Adhering Body.

(III) General Assemblies – Election Procedures
The Secretary-General shall be responsible for soliciting nominations from Adhering Bodies and Observer members of IUPAB, preparing them in a uniform style and circulating them to the designated representatives of the Union's members.

The following procedures apply to elections at General Assemblies:
(i). ~~Either or both of~~ *The serving* ~~Vice-Presidents~~ *President-elect automatically becomes* ***President.*** ~~and eligible for nomination for election as~~ **President,** ~~who will be elected by a majority of the valid votes cast. A valid vote is one which carries a~~ **X** ~~against the name of one and only one of the candidates. In case of a tie, the acting President will cast the deciding vote.~~

(ii) The election of the ~~two~~ ~~**Vice-President**~~ ***President-elect*** will proceed as follows:

(a) in the first ballot, delegates are instructed to place a **X** against one name only, papers with more than one **X** being treated as invalid. A candidate obtaining more than 50% of the total number of valid votes will be declared elected.
(b) If no candidate secures *more then* 50% support, the number of candidates will be reduced to 3 by eliminating those who obtained *fewest* votes, and the procedure will be repeated.
(c) If again no candidate receives 50% of the valid votes, the candidate with the lowest number of votes will be *eliminated,* and a third ballot taken with the remaining 2 candidates. In case of a tie, the acting President casts the deciding vote.

~~(b) When one Vice-President has been elected, the balloting procedure will be repeated, starting afresh with all the names unsuccessful in the first ballot, to elect the second Vice-President.~~

~~*(n.b. The two Vice-Presidents will have equal rights and equal standing, independent of the order in which they have been elected.)*~~

(iii) The election of the Council will proceed as follows:
(a) in the first ballot, delegates are instructed to place a **X** against ~~11~~ *12 (in the year 2008 11)* names, papers with a greater or smaller number of votes being treated as invalid. All those candidates up to ~~11~~ *12 (in the year 2008 11)* obtaining more than 50% of the number of votes cast will be declared elected.
(b) If fewer than ~~11~~ *12 (in the year 2008 11)* candidates secure 50% support, a second ballot will be taken to fill the remaining places, in which the 50% rule will not be applied. In the event of a tie for the last place, a further vote will be taken between the tied candidates.

Note: although Officers and Council Members serve in their personal capacities and not as representatives of their Adhering Bodies or Observer members, it is desirable for the Council to be as widely representative as possible; it would not normally be appropriate for the Council to include more than one member from the same Scientific Community and the President is empowered to invite a candidate to withdraw if this is a possible outcome of the elections.

(IV) The President

The President presides at General Assemblies, at meetings of the Council and the Executive Committee. If (s)he is unable to be present, the ~~Honorary Vice-President~~ *Past-President* ~~(normally the immediate Past President)~~ should preside.

The President shall instruct the Secretary-General to call meetings of the General Assembly, the Council and the Executive Committee and to set the Agenda thereof.

The President may consult (or request the Secretary-General to do so) the Members of Council, representatives of the Union's members, or other appropriate persons upon any matters within the competence of the Union. The President shall report to the Council and to General Assemblies on actions (s)he has undertaken on behalf of the Union.

(V) ~~Honorary Vice-President~~ *The Past-President*

In the event that ~~the immediate Past President~~ (s)he is not available to serve as ~~Honorary Vice-President,~~ *Past President* the Council may co-opt a suitable person, such as a previous President or other Officer.

(VI) ~~The Vice-President~~ *The President-elect*

The ~~Vice-Presidents~~ *President-elect* may be assigned specific areas of responsibility on behalf of the Union. *After his (her) term of three years (s)he becomes automatically President of the Union.*~~The two Vice-Presidents have equal rights and standing within the Union. At the end of their terms of office as Vice-President, one of them shall be elected as President and the other shall automatically remain on the Council as an Ordinary Member for one further term before retiring from the Council.~~

(VII) The Secretary-General

The Secretary-General shall:

• Act as secretary at all General Assemblies and meetings of the Council and Executive Committee and prepare Agenda, keep Minutes and other records of the Union's activities

• Normally be responsible for the maintenance of communications between the Union and its members, its Task Forces, other Unions and the International Council for Science

• Prepare Annual Reports on the activities of the Union and its bodies

• Maintain the Union's website

(VIII) The Treasurer

The Treasurer shall receive subscriptions from members, make grants as agreed by the Council, prepare accounts and budgets, and arrange for the accounts to be professionally audited.

~~*(VIII)*~~ ***(IX)*** **Periods of Membership of Council**

Ordinary Members of Council, having completed two 3-year terms, are not eligible for further consecutive terms in that role, but are eligible for immediate election to the posts of Secretary- General or ~~Vice-President~~. *President-elect or Treasurer.* The retiring President normally serves for a further 3-year term as ~~Honorary Vice-President,~~ *Past-President* following which (s)he retires from the Council. ~~Similarly, the Vice-President who is not elected to the Presidency automatically serves for one further 3-year period as an Ordinary Member before retiring from the Council.~~ In each case, former Officers and other Council Members are eligible for further periods of membership after the elapse of one or more 3-year periods.

(~~*I*~~X) Quorums for Council and Executive Committee

The Council

The quorum for a Council Meeting shall be 7 members including at least 3 Officers.

The Executive Committee

At least 4 of the 5 Officers should support any actions taken by the Executive Committee on behalf of the Council. If fewer Officers support proposed actions for which an urgent decision is required, the views of the full Council membership should be obtained in writing in which case at least 50% of the Council members should be in support of the proposed actions for the proposals to be put into effect.

(X*I*) Task Forces

Each Task Force must act in accordance with a Mission Statement approved by the Council. The Task Force should comprise about 6 members active in the relevant field; if possible, at least one should be a Member of the Union's Council, so as to facilitate communication. Task

Force members and Adhering Bodies should be invited to propose members for an Advisory Committee; such a Committee would provide a wider forum for exchange of knowledge, enhance its efficiency and provide a greater involvement of the Adhering Bodies in the Union's activities.

(XI*I*) Payment of Expenses

Officers and other Members of Council may be reimbursed travel and living expenses incurred in the course of the official business of the Union. The ~~Secretary General, as~~ *Treasurer* is responsible for authorising payments according to the circumstances of the duties. Whenever possible, members are encouraged to seek financial support from other bodies. Reimbursement of travel costs should be limited to Economy Class fares by the cheapest route and airline or railway that is reasonably practicable. The costs of meetings of Task Forces or other Committees of the Union should normally be met through specific requests to the Council for grants for the purpose.

Reports on activities from Task Forces

Task Force on Bioinformatics, 2006 report

Bioinformatics has become a discipline in itself and is well integrated into Biophysics. This is not because biologists need to digitalize their data and analyze them with computers but because this discipline needs to apply algorithms which come from concept or techniques developed in Physics or in Mathematics or to implement rigorous statistical tools for biological data analysis. These data can be obtained by molecular biological techniques, more exactly biochemical ones but also from physical analysis such as macromolecular structures. Bioinformatics is going also to be involved in the developing field of macromolecular interaction networks.

The Inter-Unions Bioinformatics Group is going to have its last follow-up meeting at the CODATA Conference in Beijing (China) on 23-25 October 2006. A round-table on Primary Biological databases will follow a session on this subject animated by H. Berman, Protein Data Bank, Rutgers University, USA, C. O'Donovan and G. Cochrane from the European Bioinformatics Institute, Hixton, UK, H. Sugawara from the DNA Data Bank, Japan and myself.

Jean Garnier, Convenor, Task Force on Bioinformatics

Task Force on NMR in biological systems

NMR in Less Developed Countries

I. Introduction

Countries in North America and Western Europe have a high level of expertise in Science and Technology (S&T). Several countries in Asia and South America have talented scientists and good research output. Most countries in Africa, less developed regions of Asia, Eastern Europe and Latin America fall in the category of Less Developed Countries (LDC), where scientific temper needs to be encouraged more vigorously. The level of education at higher levels in these countries is extremely poor. There are not enough teachers. The laboratories

and libraries are poorly equipped. Several of these countries have political instability and poor health facilities. Several of these problems can be linked to the poor level of education in masses. It is a moral responsibility of the knowledge-rich Countries to train teachers and researchers in LDCs. They can in their turn teach in their Universities the emerging areas in S&T. Even a few teachers and researchers thus trained, will provide good leadership in their country and lead to trained man-power.

In recent year, some of my colleagues have devoted efforts towards "Education and Capacity Building in Biophysics and NMR" in the LDCs. This is a team-work of a number of highly motivated and dedicated scientists from developed countries. The attempts made are devoted to biophysics using NMR as a basic tool. This is partly because of our own expertise and the support received from the International Union for Pure and Applied Biophysics (IUPAB). The approach followed has the following components:

1. Organisation of workshops and schools aimed towards LDCs.
2. Short term training programs for motivated scientists.
3. Ph.D. programs for talented students.
4. Development of text books, lecture notes and teaching material.
5. Teaching of postgraduate students.
6. Providing basic text-books to libraries in LDCs.
7. Encouraging visits through TWAS, ICSU, UNESCO and other organizations to LDCs by world renowned scientists and arranging their lectures.

II. An Approach Plan for Life Sciences and NMR

NMR is a unique technique in the sense that it encompasses the entire area of life sciences from molecules to animal behavior. It has resulted in four Nobel prizes in last 15 years. Applications of NMR to biology can be at different levels of complexity of biological structures. It may be mentioned that biophysics forms the base for modern biology. Subjects such as molecular biophysics, bio-informatics, proteomics, metabonomics, structural biology can be taught in an integrated fashion using NMR as a single technique for this purpose (Figure 1). A proposed syllabus for such an educational program has been prepared and is available on request.

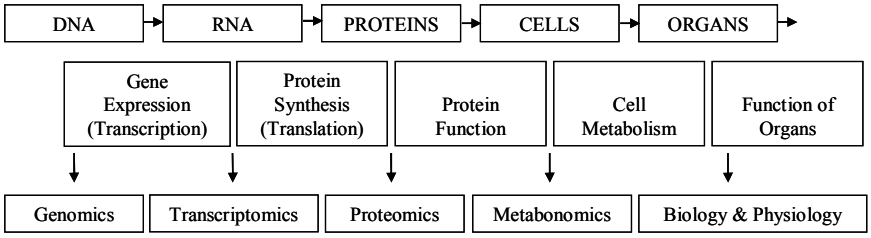

Figure 1. Flow of information in biological systems. Biological function is controlled at several levels. It is important to understand chemistry and biology of living systems at all levels shown in the above diagram.

Molecules in biological systems range from small molecules including water to complex and large macromolecules such as proteins and nucleic acids. Several of these molecules form multi-molecular assemblies, such as viruses, cell organelles etc. Cells are ultimately responsible for properties of organs in human and animal bodies. NMR has been applied to the whole range of biological complexity. The knowledge of the 3D structures of proteins, t-RNA, ribosome and their structure-function relationship is a major step in understanding biological processes. The structure of proteins and nucleic acids and their *in-vitro* function is thus form an important area of biophysical research. NMR and X-ray crystallography are two major techniques used to unravel 3D structure of biological molecules. The next level at

which NMR has helped us to understand living systems is macromolecular organization. An interesting application is study of biological membranes, which show liquid crystalline behaviour. Membrane bound proteins are often insoluble in water and are difficult to crystallize. Recent developments in high-resolution solid-state NMR techniques have made it possible to study such proteins. Cell function is a result of an intricate network of functioning proteins, small molecules and ions, which may activate or control enzyme functions. Even though attempts have been made to study enzyme function *in-vitro,* one can understand *in-vivo* biological functions by experimenting at cellular level. NMR has proved to be an valuable tool to understand cell metabolism and factors which control and modify such actions. Finally, while dealing with animals and human, different organs perform distinct functions. NMR is the technique of choice to understand such complex processes. Future strides in the methodologies of high-throughput NMR will further enhance our investigative capabilities to unravel complex biological structures and functions.

III. Discussion Meetings for Planning

We regularly try to evolve strategies and review our efforts by having open discussions. Because of financial reasons, such meetings have been organized during regular meetings. Some of the major recommendations that emerged, along with the follow-up actions are listed below:

1. Workshop on Education and Capacity Building: Asian-African Needs: Held at IIT Roorkee 24-25 Februaruy 2003, with the support of IUPAB, INSA and Indian Biophysical Society. The workshop was jointly organized with Prof. Grigera of Argentina (Chairperson of IUPAB Task Force on Education) and was attended by representatives of China, Japan, Taiwan, Argentina, Armenia, Sri Lanka, Sudan and Singapore. The major recommendations of the workshop are:

(a) Formation of a Network based on data for Latin America to include information for Asian and African Regions.

(b) Need of a program at Master and PhD level for the region to promote formation of high level biophysicists and facilitate Capacity Building for the future. A working group composed by Prof. Arapetyan, Prof. Jagannathan, Prof. Akasaka, and Prof. Grigera was set up. The mission of this working group was to prepare a draft of such a project and to make preliminary contacts. Since then, Prof. Akasaka has arranged possibilities of Ph.D. programs for scientists from LDCs on individual basis in Japan.

(c) A Post-Graduate Program has to meet International standards as well to optimize the resources of the region, Prof. Jagannathan was asked to develop curricula for Master and PhD programs. The syllabus recommended by him has been accepted by the IUPAB Task Force on Education.

(d) Need for appropriated textbooks was emphasized. Electronic form seems to be the most efficient way of dissemination.

(e) It was suggested that for Asia lead should be taken by India (because of the advantage of language) and by Argentina for Latin America. Japan agreed to provide help and work in close collaboration with Indian scientists.

2. First Meeting of the Task Force on NMR in Biological Systems: Held in Toronto August 18, 2002): Prof. Kainosho elaborated on a proposal that they have submitted to Japan Society for the Promotion of Science (JSPS). In light of this a proposal was submitted to organize a Workshop on "NMR in Biological Systems" at Osaka University. The workshop was later held in January 2004.

3. Second Meeting of the Task Force on NMR in Biological systems: The meeting was held in Hyderabad, India on January 20, 2005. Several scientists from India, England, USA, Japan, Australia, Canada Taiwan, and Germany were present. The meeting was held during the XXI International Conference on Magnetic Resonance in Biological Systems (XXI

ICMRBS). It was realized during the main conference that the use of NMR to unravel 3D structures of various biomolecules consists of a series of complex and difficult steps, each one of which requires specialized expertise and the availability of the appropriate infrastructure. The work is mostly carried out by a Ph.D. level scientist using sophisticated experimental methodologies and high-field NMR spectrometers, higher-end graphics workstations and highly specialized software. Besides, MRI and MRS instruments have become integral part of clinical centers, and there is an acute need for experts in the field of NMR. Thus, one of our major tasks in the coming years is in education and capacity building in the field of Biological NMR. The suggestions, which emerged, are summarized below:

(a) Need to initiate efforts for International Human Resource generation.
(b) Organization of short-term schools in countries with proper infrastructure for the benefit of young scientists from less developed countries.
(c) Dissemination of information by writing textbooks and creating an NMR Bulleting Board on world-wide-web.
(d) NMR workshops for scientists in the Asia, Latin America, East Europe and African region.
(e) Need for good teachers in NMR. It was felt that a parallel workshop for the benefit of pre-selected teachers should be organized wherever a international conference takes place. Such endeavor would help in utilizing the expertise of eminent scientists participating in the conference as a faculty in the workshop, without any extra expenditure for their travel. Under-graduate college teachers should be the target participants and beneficiaries. It was also felt that such workshops may be recorded on DVDs and then could be distributed freely to various science colleges and research institutions. Simultaneously, lectures can be put on a web site for free access to interested individual.
(f) Identify and encourage student scientists from LDCs to carryout their Ph.D. program in well-established research institutions. Special favors may need to be given to make it a successful venture. UNESCO or other funding agency might be approached for any financial assistance needed.
(g) Need for inter-NMR center interaction at international level for the successful implementation of above programs. It was mentioned following the success of Osaka workshop, JSPS would like to support a workshop in India for a duration of 2 weeks. Prof. Akutsu agreed to look into such a possibility.
(h) IUPAB may be approached on a regular basis to provide seed money and sponsorship to the programs of the Task Force.

4. Special Sessions on Education in Biophysics: as part of IUPAB Congresses (2002; 2005): In view of the objectives of UPAB to promote biophysics in the world, it organizes a special session with each Congress. It is heartening, that the attendance in these parallel sessions have continued to grow. The sessions have provided valuable information about the facilities and opportunities that exist in developed countries for training in the field of biophysics.

5. Symposium on Education and Collaboration in Biophysics in Asian Countries (2006):A symposium on the subject is planned during the forthcoming East Asian Biophysics Conference in Okinawa, Japan (November 2006). Speakers include scientists from Japan, China, India, Bangla Desh and Mongolia.

IV. Workshops and Schools:

A partial list of the workshops organised is given below.

(1) Winter School on NMR Spectroscopy at the Frontier of Progress in Life Sciences, Osaka, Japan, (Jan 2004); sponsored by IUPAB and JSPS. About 50 students were selected from several Asian countries, including Nepal, Pakistan, Malaysia, and Vietnam. The workshop was conducted in two parts. In the first, the core faculty introduced the participant to basic concepts in NMR spectroscopy and its applications to life sciences.

This was followed by a 3 day symposium on recent advances. Participants visited Spring-8 and the NMR Park in Yokohama. Students were provided with lecture notes. The workshop was highly successful and prompted JSPS to consider a second one in 2007, in India.

(2) Workshop on Spectroscopy in Biological and Medical Sciences, Rio de Janeiro, Brazil (May 2004); (IUPAB sponsored; organized by Ian Smith and Shirley Schreier). This likewise had two parts. An introductory workshop introduced the participants to basic concepts of spectroscopy. The second part dealt with state-of-art lectures on applications of spectroscopy in medical sciences. The participants were medical students and young researchers from whole of Latin America.

(3) Workshop on Biomedical NMR, (January 2005), New Delhi; (IUPAB/INSA sponsored; organized by Ian Smith, N. R. Jagannathan and Govil). The workshop provided the medical community glimpse of recent advances in MRI and f-MRI. The lecture notes were pre-edited and were printed in the form of an excellent book. The book was distributed to all participants. Speakers included Richard Ernst, Nobel Laureate.

(4) Proposed workshop for African Countries in Nigeria; 2007; To be supported by IUPAB and other organizations. Two Nobel Lauretes Richard Ernst and Kurt Wuthrich have agreed to be among the faculty members. Dates to be decided to suit their convenience (Organizers: Prof. Gabriel Ogumola, President of Nigerian Academy of Sciences, Ian Smith, and Govil).

(5) Proposed workshop in 2007 for Asian Countries: This has been discussed earlier. JSPS has offered support and has forwarded the proposal to Indian Government. The proposal is with the Secretary, DST for consideration.

V. Short and long term training:

This is a partial list arising from the Indian side. I am aware of the help that Japan has been providing to a number of scientists from Asia.

One faculty members, Mr. Budha Shah, who is a staff member of the Royal Nepal Academy of Sciences, is currently working at the High Field NMR National Facility and receiving training. He intends to join Prof. Akasaka in Japan for a Ph.D.

Another faculty member from Bangla Desh, Dr. (Mrs) Shamima Choudhury plans to visit the Facility to receive training in the field of NMR. She is a molecular biophysicists who has spent time in UK and Australia and is interested in setting up high field NMR facilities in her country.

The Molecular Biophysics Unit in Bangalore has also agreed to provide training in X-ray crystallography.

VI. Visits to LDC:

TWAS has recently introduced a scheme whereby scientist from developed countries can volunteer to teach in LDCs as TWAS Professors.

TWAS has appointed me as TWAS Professor to teach NMR in Kathmandu University. I propose to visit Kathmandu for four weeks each year to teach a course on NMR in biological systems. Prof. Richard Ernst, NL, has in recent years, has visited Nepal, Bangla Desh and Pakistan, as a part of visit to India for attending Congresses.

These visits indicate the availability of finances through sources other than IUPAB. I am sure there are others who are involved in such efforts.

VII. Books:

This is another major problem as even some of the standard text books are not available in LDCs. During the workshops discussed above, we have tried to address this problem by providing lecture notes. Fortunately, some individual donors have come forward to pay for

the essential text books for these countries. Another major problem is availability of good books.

VIII. Resources:

(a) Finances:

Initially the activity was supported by the International Union for Pure and Applied Biophysics (IUPAB). More recently, other organizations, such as TWAS, ICSU and Academies in developed countries have offered their help. Japan Society for promotion of Science has been providing generous funds for activities in Asia.

(b) Persons:

Even though this article has been written by me, there are a large number of scientists who have been involved in these efforts. In fact, I may not even be aware about some of their important contributions. I am sorry for any omissions and hope that more and more dedicated scientists will join this effort. A partial list of active workers is as follows:

Armenia: S. Arapetyan
Argentina: Raul Grigera
Australia: Francis Separovic
Brazil: Shirley Schreier
Canada: Ian Smith (he is also the current President of IUPAB)
China: Jun-Xian Shen
Germany: Heinz Rüterjans
India: Hosur, Chary, Govil, Jagannathan
Japan: Akasaka, Akutusu, Shiragawa, Shimada, Kainosho
Nigeria: Gabriel Ogunmula (President of Nigerian Academy of Sciences)
Taiwan: Tai-Huang Huang
UK: G.C.K. Roberts, Chris Dobson
USA: John Markeley, Jim Ferretti

Girjesh Govil, Raja Ramanna Fellow, Tata Institute of Fundamental Research, Mumbai 400005, India
Task Force on NMR in Biological Systems

The Task Force of Education and Capacity Building in Biophysics

Report of activities done between September 2005-August 2006

The activities during this period have been concentrated mainly on the project of Regional Post-graduate Programme. The general scope was informed in in last Report submitted to the Council (Report of activities 2002-2005), more detailed information is included at the end of this report.

As was informed several regions-sub regions are defined at least preliminarily. For instance Latin America can be easily defined as unique area, Africa, on the contrary, may be divided in Sub-Saharan, and North Africa but the latter can be associated to Middle East. In Asia we can consider at least two differentiated regions. The actual implementation of the programme requires a heavy activities and a few resources.

The most relevant contacts done to implement the Programme during this period have been:

- Robert Krieger Deputy Director ICSU, Regional Office for Africa, Cape Town.
- Dr Sergio Rezende, Ministry of Science and Technology of Brazil, Brasilia
- Director of evaluation of CAPES (Authority for High Studies of Brazil), Brasilia
- Rector of the ‘ Universidad de la Republica’ of Uruguay. Montevideo
- Director of PEDECIBA (Program of Basic Science). Montevideo.

- Ing. Tulio del Bono, Secretary of Science and Technology of Argentina
- Dr Eduardo Charreau, President of CONICET, Argentina

In the first of the mentioned meetings, Dr Krieger show interest on the Programme and suggest the possibility of support from ICSU in Africa. The starting discussion for this will be a Seminar attended by representative of different African Universities. ICSU may fund part of it. We still have to go on working on it.

The rest of the contact made where related with the implementation of the Programme in South America and where complemented with different meeting at Universities in Argentina and Brazil and a large number of colleagues of the region. The interest is wide and most people consider completely feasible.

An important output form the responsible of the areas of science and Technology and High Education was obtained. Uruguay, with the participation of the only public university and the its associated scientific agency for High Education (PEDECIBA) has officially approved the adhesion of the country on the Programme. As regard Argentina and Brazil, also the authorities of the area indicate a) the interest on the Programme b) to start the steps for officially approving c) assign economical support form Brazil to both Brazilian students and other Latin American students going to Brazil.

Due to the relative develop in the region of Brazil and Argentina, its participation on the programme is the key of success.

As regarding Latin America, the immediate next steps from our part will be:

a) The realization of the planned Workshop for the discussion of the syllabus and the administrative organization.
b) To keep contact with Brazilian and Argentinean authorities.
c) Establish agreements with other Latin American countries (which will be facilitates if the programme is accepted, even with a reduced number of countries).

The Workshop, that was approved by IUPAB Council last year, will be held in La Plata in the first week of November with the participation of a reduced number of people from Argentina, Brazil, Uruguay, Colombia, and other countries, all of them actives in Biophysics, with postgraduate teaching experience and with recognition form his/her University. In the case of Brazil, the names of participants have been previously discussed with CAPES.

One of the aspects that result of paramount importance is the International support given by IUPAB to the Programme.

I have to remark the economical support given by the Brazilian Society of Physics (SBF) that allows me to make a specific trip to Brasilia.

In the present situation it seems that the Programme may be granted in Latin America. To extend to other regions it is necessary to make personal contacts, as I did already in Latin America. Seminars and public presentation of the Programme may stimulate the support form the Institutions of the different regions.

J. Raúl Grigera, Convenor, Task Force on Capacity Building and Education in Biophysics

Regional Postgraduate Programme in Biophysics
Task Force for Education and Capacity Building-IUPAB

The scenario

Getting a post-graduate degree (Masters or PhD) is nowadays a must for future University researchers and teachers. The lack of specialised postgraduate programmes in the developing countries is one the elements that go against their quality of higher education and their

progress in the growth of human resources in science and technology, with the consequent deterioration in basic education.

For any student of science, the need of a post-graduate degree not available in their country of residence moves him\her to emigrate, in principle temporarily, to complete the studies in a developed country.

This often leads to the situation where many students, particularly the most brilliant ones, are tempted to remain in the country where they made their post- graduate studies, or eventually in another developed country. Those who return to their country of origin face the problem of carrying out their work in an environment with substantially fewer facilities than those where they had made their research training. It is not always possible for them to re-learn how to work with the precarious facilities available. The situation produces frustration, and most of the times these young scientists, with good perspectives and the potential to help their country have to either leave science or emigrate, this time definitively.

Any of these alternatives discussed conduces to one of the biggest problems in developing countries: brain drain. The cost of Higher Education, even at the level of undergraduate studies, is in relative terms extremely high in a developing country. Brain drain not only wastes the monetary investment of the home country, but also the personal effort of the family and the student him/herself, who will not be rewarded with the possibility to contribute to the development of his/her country. The actual cost cannot be evaluated, since it exceeds what can be quantified.

An alternative to deal with this problem consists in providing those students with the possibility to complete their post-graduate studies within their country of origin, or at least, within the region in which facilities and difficulties will be comparable to those in their country. This training, which should be of the highest academic level possible, will teach the future scientists how to do good science with the available facilities.

This begs the question: is it possible even to think about providing such a possibility in the present circumstances or is it just a utopia?

It is clear that if in a given region there is a complete absence of Higher Education, we will face a real impossibility, since it is almost impossible to generate any post-graduate activity if the local capacity is null. Fortunately, with an adequate selection of the regions, or sub-regions, it will be possible to propose a programme with good perspectives, *provided that there is a firm determination of a given number of institutions and persons to carry it out.*

The proposal

The regions

The selection of the different regions requires an analysis both of the state of science –in the level of teaching and research as well as on the subject related with the particular programme – and of the socio-political situation. It is obvious that we have to avoid a region in which there are countries with political or racial antagonism.

For example, we can consider Latin America as a region, while Africa should at least be divided into north and south, where the northern part may associate countries with predominant Muslim influence, which could even be integrated with some Middle Eastern countries. The criterion should be flexible enough to consider exceptions and alternatives that may avoid conflicts that can lead to a failure of the programme in the chosen region.

A region integrated with members of equivalent capacity, but in which each country does not cover the complete needs to fulfil the graduate formation on the proposed subject is, in principle, a valid option. However, the integration of less developed countries to a region of these characteristic would allow helping them and providing strong support for the increase of their capacity.

General aspects

The basic strategy of the programme –that has been the basic idea from the beginning of the Task Force– is first of all to use the closest available resources. This requires a careful survey of such resources in each of the participating countries, and even in each of the internal regions (states, provinces, departments). This task does not demand the participation of survey specialists. A request can be made to the local key-players in the speciality, which can surely provide the information on the human and material resources in their scientific community (that will certainly be small).

Biophysics[1] is a multidisciplinary activity that demands the simultaneous and deep contribution of Physics, Chemistry, and Biochemistry with the indispensable participation of Mathematics and Informatics. Therefore, the applicants of the post-grade in Biophysics should have a strong formation in the above mentioned disciplines.

The access to post-graduate studies should be possible for graduates of Physics, Chemistry, Biochemistry, and any other denomination, provided they have a good basic formation on at least one of the subjects mentioned previously. Since not all applicants will have the same formation, it will be necessary to establish courses that allow them to reach the same level, so that at the beginning of their post-graduate studies all will have an equivalent level of formation. It is highly probable that these courses (*levelling courses*) can be accomplished in the Universities of origin. The courses should be defined for each particular case by a Special Committee, which should analyse the previous formation of the applicant and propose the content of the necessary courses. All academic plans should take into account the human resources available in the Region, trying always to supply the needs with the institutions of excellence closest (geographically or economically) to the place of origin of the applicant.

Once the candidate has been accepted into the programme, he/she will be assigned a particular plan of courses, seminaries and experimental work by a Special Committee – which may or may not be the same that has fixed the levelling course. This will be done in accordance with the candidate's interests and the available facilities, but under the unyielding condition of keeping an academic level appropriate to the post-graduate studies pursued (Masters or PhD).

The Institutions

The programme requires the participation of several Institutions, among them, and playing an important role, are the Universities and Research Institutes that may or may not be part of the Universities.

Since the program is formulated in such a way that the activities can be done in different places, it is essential that the Institutions agree about the mutual recognition of the activities done in any of them, provided a given set of conditions that have to be agreed upon previously.

The diplomas

It is clear that at the end of the post-graduate studies (Masters or PhD) it is necessary to issue a degree. Due to the characteristics of the programme, one of the Universities involved should issue it, accepting all the activities done in any other institution of the programme. It would be preferable that the degree indicates membership to a Regional Program. Notwithstanding that, if local regulations do not allow expressing such a circumstance, there exists the commitment of the IUPAB, the promoter of this Programme, to extend a certificate where this circumstance would be explicitly stated. This aspect is important, since otherwise we would be losing the effect of the support of the academic standards.

[1] We will not make any difference between Biophysics and Biological Physics, since we consider them as two expressions of the same subject. In this text we will always use Biophysics .

The next steps

The immediate course of action consists in establishing the basic conditions both for the levelling regime and the characteristics of the courses, activities and Theses, including the profile of the Theses Supervisors for each level. It can be consider the inclusion of a Tutor to coordinate the general activities that may or may not be the Thesis supervisor at the last step. It is necessary also to establish the structure of the Special Committees and a Follow up Committee. It will also be necessary to designate a Programme Director.

At the same time it is necessary to start the discussion of inter-Institutional agreements.

To initiate these aspects we propose the organization of a Workshop with the purpose of discussing the regional conditions and start the actions described. It is important that part of the participants of the Workshop have a good knowledge of the regional situation, both scientifically and about the local regulations on Higher Education. The output of this workshop should set on firm bases the conditions to carry out the programme, suggest the conformation of the Committees, and draw a strategic plan for achieving the success of the project.

In the future, different kinds of workshops on particular subjects have to be organised to produce written material for the future courses of the programme.

Conclusions

This programme, in spite of its ambitious nature, is based on a low-cost structure that requires a wide horizontal co-operation and the active participation of the scientific and research community of the region. The economical support, always needed, would no to be difficult to obtain due to its extremely efficient cost-benefit relation.

J. Raul Grigera, Convenor, Task Force for Education and Capacity Building

IUPAB Task Force on Biomedical Spectroscopy, 2005-2006

Aims of the Task Force

- Knowledge translation from the disciplines of physics and engineering to those able to make use of it in biochemistry, biology and
- Linkage of scientists of different specialities, especially in areas of dilute population or limited opportunity
- Organization of workshops to accomplish the above goals
- Interaction between our Union and other international organizations, in order to accomplish the above goals
- Increase the awareness of the value of biophysics in the biological and medical sciences

Members

Ian C.P. Smith (Canada), Carolyn E. Mountford (Australia), Shirley Schreier (Brazil), Girjesh Govil (India), Gheorghe Mateescu (USA)

Activities

The Task Force concentrated on the transfer of knowledge in the form of workshops. In 2006 they helped organize a workshop on magnetic resonance in medicine, especially MRI in radiology, in collaboration with the International Society of Magnetic Resonance in Medicine, in Poiana Brasov, Romania. The workshop was attended by 200 persons from Romania and ten other countries. They also supported the International Summer School on Biophysics,

Rovinj, Croatia. IUPAB President Ian Smith will attend present three lectures. A book on the scientific content of the summer school will be published by Kluwer in 2007.

Much activity was spent on planning of workshops for 2007. The Task Force attempted to organize workshops in Africa, including Eritrea, South Africa, and Nigeria. Only from Nigeria was local support forthcoming, and planning is still underway. It is hoped to firm up plans for South Africa in the near future once helpful contacts can be established. There is no Biophysical Society in South Africa. A workshop in Dubna, near Moscow, Russia, has been proposed by A. Rubin, involving structural biophysics and medical applications.

Ian Smith, Convenor, Task Force on Biomedical Spectroscopy

Report on sponsored meetings

Workshop on Biocalorimetry and Biological Thermodynamics (WBBT), April 30 to May 04, 2006, Rio de Janeiro, RJ, Brazil

This report shows the scientific activities of the WBBT and also brings the description of the expenditures of the funds received from IUPAB. The meeting was a success, taking into account the attendance and the high quality of the talks. A total of 128 attendees (Professors, Researchers, Students, and Others) were present during the meeting. The IUPAB funding to the meeting was essential for all the accomplishments of the meeting.

1. Organizing Committee:

M. Lucia Bianconi, IBqM, Universidade Federal do Rio de Janeiro, Brazil, Chair; Márcio F. Colombo IBILCE, UNESP, S. José do Rio Preto, SP, Brazil, Co-Chair; Jonathan B. Chaires, University of Louisville, Louisville, KY, USA; John Ladbury, University College London, London, UK; Leila M. Beltramini, IFSC, São Carlos, SP, Brazil.

2. Speakers

A total of 22 speakers presented a talk in the WBBT, being four of them young scientists with an important contribution to Biocalorimetry. Only two of the invited speakers (Luiz Juliano, Unifesp/Escola Paulista de Medicina, Brazil, and Nand Kishore, Indian Institute of Technology Bombay, India) were not able to attend the meeting due to personal problems. Following is the list of the speakers, and attached to this report is the final program were the title of each talk and the schedule of the workshop is presented.

- Brian Baker, University of Notre Dame, Notre Dame, Indiana, USA
- M. Lucia Bianconi, UFRJ, Rio de Janeiro, Brazil
- Marcio F. Colombo, IBILCE, UNESP, S. José do Rio Preto, SP, Brazil
- Alan Cooper, University of Glasgow, Glasgow, UK
- Marcia O. Fenley, Institute of Molecular Biophysics, FSU, Tallahassee, FL
- Thomas Heimburg, University of Copenhagen, Copenhagen, Denmark
- John Ladbury, University College London, London, UK
- Bruno Maggio, Universidad de Córdoba, Córdoba, Argentina
- Luis A. Marky, University of Nebraska Medical Center, Omaha, NE, USA
- Leopoldo de Meis, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil
- M. Angélica Perillo, Universidad de Córdoba, Córdoba, Argentina
- Peter Privalov, Johns Hopkins University, Baltimore, MD, USA
- José M. Sánchez-Ruiz, University of Granada, Spain

- Marcelo M. Santoro, Universidade Federal de Minas Gerais, Brazil
- Shirley Schreier, Universidade de São Paulo, São Paulo, SP, Brazil.
- Joachim Seelig, University of Basel, Switzerland
- Jerson Lima da Silva, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil
- Frederick P. Schwarz, National Institute of Standards and Technology, Rockville, MD, USA

Young Scientists Symposium

- M. Soledad Celej, UNC, Córdoba, Argentina
- Yraima Cordeiro, UFRJ, Rio de Janeiro, RJ, Brazil
- Flávio Antonio Maximiano, USP, São Paulo, SP, Brazil
- Ronaldo Mohana, UFRJ, Rio de Janeiro, RJ, Brazil

3. Poster Presentation

A total of 57 posters were presented during the meeting by students (mostly graduate students, and a few undergraduate students).

4. Financial Support (in alphabetical order)

Funding Agencies

- Conselho Nacional de Desenvolvimento Científico e Tecnológico
- Coordenação de Aperfeiçoamento de Pessoal de Nível Superior
- Financiamento de Estudos e Projetos (FINEP)
- Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro
- Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP)
- International Union for Pure and Applied Biophysics
- International Union for Pure and Applied Chemistry
- International Union of Biochemistry and Molecular Biology

Other Sponsors

- Calorimetry Sciences Corporation
- DP-Union Instrumentação Analítica e Científica
- Microcal, Llc.
- Precitech

5. Endorsement

- The Protein Society
- Pan-American Association for Biochemistry and Molecular Biology
- Sociedade Brasileira de Bioquímica e Biologia Molecular
- Sociedade Brasileira de Biofísica

O N R G / E O A R D / I U P A B S e m i n a r ” Mechanisms of Mechanotransduction in Living Cells”, 1-4 August, 2006, Yerevan, Armenia

The living cells are under the continuous effects of internal and external micro-mechanical forces (such as gravity, tension, pressure and shear). However, the nature of the cell mechanosensors and the metabolic pathway, through which the mechanotransduction in living cells is realized, is not clear yet. The elucidation of these mechanisms could bring us to a closer understanding of the mechanisms of functioning of the biological amplifiers and their

ability to detect the extremely weak physical and chemical signals, for which the mechanical energy serves as a transient step for realizing their biological effects.

This problem is one of the global problems in modern Life Sciences and it was the subject for multisided discussion during the ONRG/EOARD/IUPAB Seminar "Mechanisms of mechanotransduction in living cells" (1-4 August, 2006 Yerevan, Armenia). The Seminar was organized by UNESCO Chair-Life Sciences International postgraduate Educational Center (Yerevan, Armenia) in collaboration with the Office of Naval Research Global (ONRG), European Office of Aerospace Research and Development (EOARD) and International Union for Pure and Applied Biophysics (IUPAB).

The Seminar consisted of the following 5 Sessions:

Session 1. Cell bathing aqua medium as an extra-sensitive mechanosensor
Session 2. The acoustic effect of electromagnetic fields
Session 3. Cell Membrane and Mechanotransduction
Session 4. Dynamic properties of intracellular structures
Session 5. Poster session

19 scientists from 13 countries had the plenary lectures during the Seminar. 27 MS and PhD students participated in the meeting from which 14 students had Poster presentations.

The extra- and intracellular aqua solution as a universal and extra-sensitive mechanosensor was suggested by the meeting co-organizers Profs. Sinerik Ayrapetyan from UNESCO Chair-LSIPEC (Armenia) and Igor Vodyanoy from ONR (USA) as the main subject for discussion during the meeting.

On the basis of multidisciplinary discussion of the data obtained by different laboratories on the messenger role of water molecules in mechanical signal transduction in cells, the cell hydration was suggested as a potential cellular marker for estimation of biological effect of mechanical vibrations and which could be used for standard harmonization of MV and EMF from the point environmental protection and public health.

The participants of the Seminar suggested to create a Joint International project on "The study of the role of cell hydration as a universal mechanosensor". The suggestion of Prof. Gerald Pollack (USA) on the importance of establishing a new international journal "Water in Living Cell" was unanimously accepted by the participants.

In framework of the meeting a Round table on "Organization of Research Capacity Building in Biophysics and Environmental Protection" was organized. It was emphasized that the initiative of IUPAB in organization of regional network of postgraduate education in Biophysics would greatly promote the development of modern Life Sciences, Biotechnology and Environmental protection.

However, the absence of unique model for postgraduate education (according diploma), which could be acceptable for different countries, is the main barrier for developing horizontal collaboration in postgraduate education between different countries. This barrier could be removed if IUPAB in collaboration with UNESCO creates a unique postgraduate educational programs leading to MS and PhD, the diploma of which will be acceptable for all participant countries.

As the Biophysics is rather weak in regional countries, the preparation of science leaders in this field according to modern demands on the basis of national potential of single country is impossible without international supports.

The next barrier for educational collaboration between regional countries is the hard economical situation and the existence of ethnic conflicts between them. This barrier could be removed by the establishment of Distance Educational Systems (DES), giving the students of different countries an opportunity to obtain MS and Ph.D. degrees without leaving their home countries. This system will give us an opportunity to involve hundreds of participants from

regional countries and will also help to solve another important problem - lack of modern scientific literature. The Center of Advanced Engineering and Technology Education of University of Colorado at Boulder (USA) expressed its readiness to provide the technical assistance in establishment of DES in Countries of South Caucasus and Asia Minor.

III International symposium on Myosin V – III International Training Course; Proteins as Cellular Nanomachines; Molecular Motors, Channels & Pumps, Rio de Janeiro - Armação dos Búzios, July 10th – 21st, 2006

The III International Symposium on Myosin V - International Training Course: Proteins as Cellular Nanomachines: Molecular Motors, Channels & Pumps took place from Jul 10th - 21st, 2006, at the Universidade Federal do Rio de Janeiro-UFRJ (Course) and Colonna Park Hotel in Armação dos Búzios (Symposium), Rio de Janeiro, Brazil.

A total of 87 attendees participated in the course, as follows: 20 as faculty (four from Europe, ten from America and six Brazilian); eight graduate and post-graduate students as TAs; 39 students (one from Europe; three from North America and 35 from South America) in the practical and another 20 students in the in the lectures held in the Central Library Auditorium of the Federal University of Rio de Janeiro (UFRJ). The practical experiments were carried out in a number of laboratories in UFRJ's Biological Sciences Center under the sponsoring of Professors Hector Barrabin; Ronaldo Mohana Borges; Débora Foguel; Jerson Lima e Silva; Vivaldo Moura Neto; Cristina Mello; Fernando Mello; Rosália Mendez Otero; Ricardo Reis; Marcelo Felippe Santiago; Martha Sorenson and Gilberto Weissmuller. The symposium has 112 attendees.

Twenty lectures classes and 13 hands-on classes were administered to separate groups of participants (the students were asked to choose eight lab classes according to their interest), and 17 symposium conferences and a round table. We had a two day section where several posters were presented and discussed.

We try to include all the students that we selected depending on funding availability. We were asked to support four students from Asia; three from North America; three from Africa and at least more five from South America that do not achieve the profile required for selection.

All participants received financial aid via the organizing committee of the course that International and Brazilian Agencies had made available. They received total or partial payment of travel tickets, lodgings and/or *per diem* expense accounts covering the cost of transportation and/or meals. One of ours goals was to offer the most of we can to the foreign students. All of them received a significant amount of money to theirs expenses (from 50-100%). The committee made arrangements in order to offer housing in students homes and paid for them all the living and transportation expenses in Búzios.

We receive international financial support from: European Molecular Biology Organization (EMBO); International Brain Research organization (IBRO); International Cell Research Organization (ICRO); International Union of Pure and Applied Biophysics (IUPAB); United Nations Educational, Scientific and Cultural Organization (UNESCO). In addition to the mentioned, thanks are also due to the various Brazilian governmental as well as private institutions for financial support to make this event possible: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq); Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES); Fundação Carlos Chagas Filho de Apoio à Pesquisa do Estado do Rio de Janeiro (FAPERJ); Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP). Three faculties (one from USA and two from Europe) pay their own air tickets in order to increase the available money for the students.

The students rated the symposium and course according to the following categories (we applied a non mandatory anonymous questionnaire of 20 questions, available upon request):

a) the quality of the scientific talks at the practical course

Excellent **26** Very Good **06** Good **02** Adequate **0** Poor **0** Unsatisfactory **0**

b) the organizational aspects of the practical course

Excellent **14** Very Good **08** Good **10** Adequate **02** Poor **0** Unsatisfactory **0**

c) the practical course programme

Excellent **16** Very Good **10** Good **04** Adequate **04** Poor **0** Unsatisfactory **0**

We are very grateful for the assistance we have received and look forward to the continuing support of IUPAB in future events.

L. C. CAMERON, Ph. D., Professor

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Report on the workshop "Supramolecular Structure and Function", Rovinj, Croatia, 16-28 September, 2006

I have just returned from a visit to the IUPAB-sponsored workshop "Supramolecular Structure and Function", in Rovinj, Croatia, organized by our Council member Greta Pifat. I attended the workshop in order to ascertain if it was as good as I had heard. It was!

This workshop has been criticized because it is held every three years, and because there are some return visits of lecturers. Nevertheless, our Council voted in Montpellier last year to support it. I am pleased that they did.

The workshop was attended by students from 32 countries, who were there for almost two weeks. The lecturers were first class, and the coverage was very broad. Most impressive to me, all the lecturers paid their own travel expenses. Grants from UNESCO and IUPAB were used for the support of student travel. These students were very serious – each of them had to raise over 1000 Euros to cover their costs of attending. Lectures were very well attended: the

students asked probing questions, and there were daily discussion groups held informally between student and lecturers.

During the workshop I spoke in depth with both students and lecturers. There was unanimous praise for the quality of the teaching and the value of the workshops. The lecturers were soundly in favour of regular recurrence of the workshop. They noted that there was no repeat attendance by students. There were some repeat visits by lecturers who said that the spirit enthused them, and that they also learned a lot from the other teachers and the probing discussions. They are very willing to write letters of support for the continual holding of this workshop.

The organizers publish a book from the workshop every three years. These books, which appear soon after the workshops, provide up-to-date and broad coverage of biophysics, something definitely lacking from other sources. IUPAB had at one time considered an E-based book, but the task was never taken up. The above mentioned books, endorsed by IUPAB, would partly fulfill our responsibility.

The logistical details of the workshop flowed extremely well. Any complication of schedule was quickly solved by the organizers.

In summary, I believe that this is the best workshop I have attended during my 35-year career, with the broadest geographical coverage. IUPAB could not support a more efficient agent of knowledge translation – one of our main goals. Not to support it in the future would be to deny our mandate.

Ian C. P. Smith, President