[Please paste here your Experiment Details form after its completion]

ESRF BLOCK ALLOCATION GROUP PROGRESS REPORT

BAG RESPONSIBLE: **Juan C. Fontecilla-Camps**
EXPERIMENT NO: **LS-2186**
LAST REVIEW DATE: **September 2002**

Shift usage since last Biennial Review:

Allocated		Used 16		Cancelled by Users	0	Cancelled by ESRF	0
Total Number of Visits		9	Total Number of Visitors	12			

BAG Principle Investigators (indicate by # those left since last review, * those new since last review.)

Principal Investigator	Institute
Juan C. Fontecilla-Camps	IBS/LCCP
Dominique Bourgeois	IBS/LCCP
Jean-Luc Ferrer	IBS/LCCP
Christine Gaboriaud	IBS/LCCP
Dominique Housset	IBS/LCCP
Anne Volbeda	IBS/LCCP
Chrsitine Cavazza	IBS/LCCP

Total Number of PDB submissions from data from ESRF beam lines since last report	4
Total Number of Publications resulting from data from ESRF beam lines since last report	7

1. J.B. Reiser *et al.* (2003) CDR3 loop flexibility contributes to the degeneracy of TCR recognition. *Nature Immunology*, **4**, 241-247[1].
2. D. Housset & B. Malissen (2003) What do TCR-pMHC crystal structures teach us about MHC restriction and alloreactivity? *Trends Immunol.*, **24**, 429-437[1].
3. C. Darnault *et al.,* (2003), Ni-Zn-[Fe_4-S_4] and Ni-Ni-[Fe_4-S_4] clusters in closed and open α subunits of acetyl-CoA synthase/carbon monoxide dehydrogenase. *Nature Structural Biology* **10**, 271-279[1].
4. L. A. Gregory, *et al.,* (2003), X-ray structure of the Ca^{2+}-binding interaction domain of C1s: insights into the assembly of the C1 complex of complement. *J. Biol. Chem*., **278**, 32157-32164. [1]
5. A. Volbeda & J.C. Fontecilla-Camps (2003) The active site and catalytic mechanism of NiFe hydrogenases *Dalton Trans*. (in press).
6. Y. Nicolet et al.(2003) Crystal structures of human butyrylcholinesterase and of its complexes with substrate and products. *J. Biol. Chem.* published on line July 17, M210241200

There are five lines of research in the laboratory: kinetic crystallography, enzymes of the phenylpropanoid pathway in plants, proteins involved in the innate immune response, recognition of self : T-cell receptor-peptide-MHC complexes and metalloenzymes and related proteins. In addition, we have determined the structure of butyrylcholinesterase both native and complexed with various substrates and products and worked on Archean proteins absent from bacteria but present in more evolved organisms. During the last 2 years we have published several structures in high impact journals. Both in *Nature Immunology* and in *Nature Structural Biology* our results have been discussed in the *News & Views* section. Our systematic approach concerning both the innate complement protein C1 and the TCR-pMHC complexes has been very fruitful. For the former, we have practically completely disected the multimodular C1 allowing us to propose a plausible, structure-based, mechanism for C1 activation by microorganisms, antibodies and other substrates for this protein. Our studies on several TCR-pMHC complexes have been summarized in a publication in the prestigious *Trends in Immunology*. We were lucky to obtain a crystal form of the key anaerobic bifunctional enzyme acetylCoAsynthase/CO dehydrogenase they sheds considerable light on the catalytic mechanism. Based on our results, we challenged the conclusions concerning this enzyme published in Nov. 2002 in *Science* by a US group. After a brief contreversy, they have conceeded that we were right. Both the plant enzyme and the kinetic crystallography approaches are making considerable progresss that hopefully will be reported next year.

Summary of project status during review period:

Protein Name[a]	Data set[$]	Beam-line	Date	d_{min} ( )	R_{sym} (%)	Structure Status[b]	Publication Status[c]	ID number of PDB submission	Comments
PACE	native	ID14-EH2	12-05-03	2.0	5.6	More Phasing Needed	Not Applicable		
PACE	SAD	ID14-EH4	31-07-03	1.9	5.6	Under Refinement	Not Applicable		
TC R/peptide/MHC	irrelevant	ID14-EH1				Completed	Published		pdb files 1NAM and 1NAN
	native	ID14-EH1				Poor Data	Published		
ficolin	native	ID14-EH2	04/04	2.9	10	Initial Measurements	Not Applicable		
ficolin	ligand	ID14-EH1	12/05	2.5	17	Initial Measurements	Not Applicable		
C1s, CUB-EGF calcium dependent interaction domain	native	ID14-EH2				Completed	Published		
C1q, globular recognition domain	native	BM30				Completed	In Press		
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	native	BM30	19-07-2002	2.2	4.2	Solved	Published		Fe edge PDB 1OAO
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	ligand	ID14-EH1	11-9-02	2.2		Solved	Not Applicable		Xe complex
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	ligand	ID14-EH1	11-9-02	1.9	5.3	Solved	Not Applicable		CO complex
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	ligand	ID14-EH1	11-9-02	2.2		Under Refinement	Not Applicable		CO complex
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	SAD	ID29	2-10-02	2.7	4.5	Solved	Published		Zn edge
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	SAD	ID29	2-10-02	2.7	5.0	Solved	Published		Cu edge
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	SAD	ID29	2-10-02	2.7	4.6	Solved	Published		Ni edge
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	SAD	ID29	2-10-02	2.7	5.9	Solved	Published		Co edge
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	ligand	ID29	11-12-02	3.0		Initial Measurements	Not Applicable		CoA soaked
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	ligand	ID29	11-12-02	3.5		Initial Measurements	Not Applicable		CoA soaked
CODH/ACS (CO dehydrogenase / acetyl-CoA synthase)	ligand	ID14-EH1	11-9-02	2.3	6.5	Under Refinement	Not Applicable		CO2 complex
iron regulatory protein 1 (IRP1)	unusable	ID29	11-12-02	2.7		Poor Data	Not Applicable		
IRP1	native	ID14-EH4	5-4-03	2.0	6.8	More Phasing Needed	Not Applicable		
IRP1	native	ID14-EH4	5-4-03	1.85	6.1	More Phasing Needed	Not Applicable		
Pyruvate ferredoxin oxidoreductactase (PFOR)	ligand	ID14-EH4	5-4-03	2.1	5.8	Solved	In Preparation		Several tome-resolved intermediate structures using pyruvate
phenylalanine ammonium lyase (pal)	native	ID14-EH4	5-4-03	2.55		Poor Data	Not Applicable		
CHS-like plant polyketide synthase	native	ID14-EH4	6-7-03	1.5		Solved	In Preparation		
iippi (synthase of non-	native	ID14-EH1	6-7-03	2.6		More Phasing Needed	Not Applicable		

mevalonate terpenoid pathway									
ychb (synthase of non-mevalonate terpenoid pathway	native	ID14-EH1	7-31-03	2.1		Solved	In Preparation		
	native	ID14-EH1				Poor Data	Not Applicable		
	native	ID14-EH1				Poor Data	Not Applicable		
	native	ID14-EH1				Poor Data	Not Applicable		
	native	ID14-EH1				Poor Data	Not Applicable		
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	native	ID14-EH1				Poor Data	Not Applicable		
	native	ID14-EH1				Poor Data	Not Applicable		

[a]Include name of substrate/inhibitor ligand if applicable. [b]either "poor data", "more phasing needed", initial measurements", solved , under refinement or completed . [c]Choose "not applicable", "in preparation", "submitted", in press or published as necessary. Also state if data set proved unusable or irrelevant and give reason under comments.
[$]Data set: describe as native, ligand, mutant, MAD, SAD, MIR.

Summary of project status during review period:

Protein Name[a]	Data set[$]		Data set[$]	Beam-line	Date	d_{min} ( )	R_{sym} (%) Structure Status[b] Publication Status[c] ID number ofPDB submission Comment s native ID14-EH1 Poor Data Not Applicable		
	native	ID14-EH1				Poor Data	Not Applicable		
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-. A. Volbeda *et al.,* (2002), High resolution crystallographic analysis of *Desulfovibrio fructosovorans* [NiFe]˚hydrogenase, *International Journal of Hydrogen Energy* **27**, 1449-1461[1].

-. J.B. Reiser *et al.* (2003) CDR3 loop flexibility contributes to the degeneracy of TCR recognition. *Nature Immunology*, **4**, 241-247[1].

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Beam line performance: No more than half an A4 page. Please comment on the beam line performance during your visits, together with any constructive suggestions about possible enhancements to the facilities.

Good performence in general. ID-14 -4 could be more user friendly. We had several problems for lack of proper documentation and rather primitive setup for crystal centering, etc.

BM30 appears as the most user friendly of all the bealm lines we have used at the ESRF.