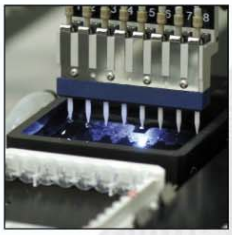
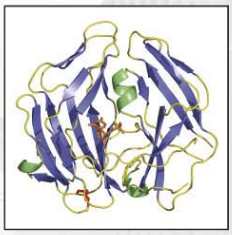
PSB IVMS

PRESS PACKAGE



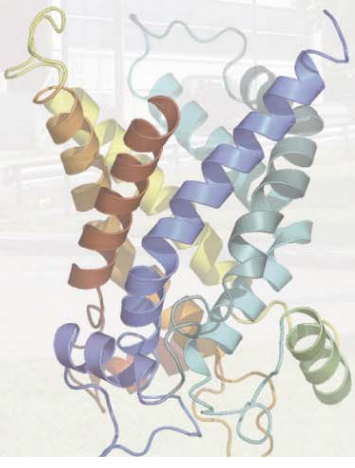
Inauguration of the Carl- Ivar Brändén Building

PSB - IVMS

On 13 January 2006

At 1.30 pm

European Synchrotron Radiation Facility Auditorium
6 rue Jules Horowitz – Grenoble – France



ESRF NEUTRONS FOR SCIENCE EMBL IBS UNIVERSITE JOSEPH FOURIER

Inauguration of the Carl-Ivar Brändén Building

13 January 2006

Photo : ESRF/ Wim Burmeister

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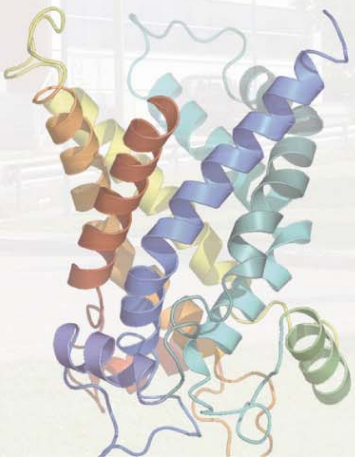
The University Joseph Fourier (UJF)
The ESRF
The ILL
The IBS
The EMBL



Inauguration of the Carl-Ivar Brändén Building

13th January 2006

In the European Synchrotron Radiation Facility Auditorium

Programme

1.30 pm	Opening Address and Welcome William G. Stirling, Director General of the ESRF Colin Carlile, Director of the ILL
1.40 pm	Sine Larsen, Chair of the PSB Steering Committee “Development of partnerships in structural biology in the spirit of Carl-Ivar Brändén”
1.55 pm	Yannick Vallée, President of UJF Michel Destot, Mayor of Grenoble and Deputy of Isère Bernard Soulage, Representing Région Rhône-Alpes
2.15 pm	Address Jean-Marc Monteil, Director of Higher Education at the French Ministry for Higher Education and Research.
2.30 pm	Address Iain Mattaj, Director General of the EMBL
3.00 pm	Official Opening Ceremony of the Carl-Ivar Brändén Building
3.15 pm	Visit to the Building followed by a reception at the ESRF/ILL Restaurant

Between 1992 and 1997, Carl-Ivar Brändén was Director of Research of the ESRF and during this time played a pivotal role in the development of structural biology in Grenoble.

Press release

A major European Centre for Structural Biology inaugurated in Grenoble

January 13, 2006. Today the new Carl-Ivar Brändén Building (CIBB) will be inaugurated on the Polygone Scientifique Campus in Grenoble, France. The CIBB will be operated as a collaboration between major international and national partners based in Grenoble and is a further step in the development of the region as a European Centre of Excellence for structural biology.

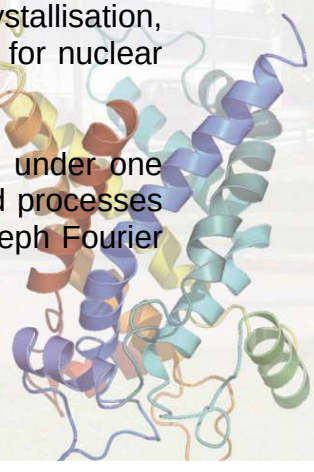
The CIBB comprises two complementary units: the Partnership for Structural Biology (PSB), whose members include the European Molecular Biology Laboratory (EMBL), the European Synchrotron Radiation Facility (ESRF), the Institut de Biologie Structurale (IBS) and the Institut Laue-Langevin (ILL), and the Institut de Virologie Moléculaire et Structurale (IVMS, associated with the Université Joseph Fourier and the CNRS).

“These partners offer an amazing range of expertise in the life sciences, and the Grenoble campus is an ideal place to cluster them together in an important new centre for structural biology”, says **Eva Pebay-Peyroula, Director of the IBS and current Chair of the PSB.** “It benefits from the presence of some of the world’s most important instruments for structural biology: the ESRF’s synchrotron X-ray source is one of the most powerful in the world, and the ILL is the world’s leading source of neutrons for research.”

For many years the ESRF, ILL and EMBL have collaborated in offering scientists services and training connected to these instruments, already making the site a pivotal contact point for large European research projects and interdisciplinary collaborations.

The CIBB will house research groups and a complete pipeline for carrying out high-throughput structural investigations of proteins and other molecules, with a particular focus on molecules related to human diseases. The CIBB laboratories contain robotics for high-throughput protein purification, expression and crystallisation, facilities for isotope labelling, especially deuteration, and instrumentation for nuclear magnetic resonance, mass-spectrometry and cryo-electron microscopy.

“By assembling all the components of this pipeline in a unique platform under one roof, we can greatly speed up the process of investigating molecules and processes relevant to diseases,” says Rob Ruigrok, Professor at the Université Joseph Fourier and Director of the IVMS.



Investigating the key steps in these processes should allow the identification of specific molecules and pathways that may be targets for antiviral drugs. Designing efficient inhibitors will require three-dimensional structures – atom-by-atom maps of proteins and other molecules such as RNA. The necessary level of resolution cannot be obtained with microscopes, so scientists turn to high-intensity X-ray beams, like those produced by the ESRF, and neutrons from the ILL. The many types of skills and expertise necessary for such analyses of molecular structures have now been brought together in the CIBB.

This strategy of combining complementary expertise has proved itself in past collaborative projects between the institutes. For example, since the PSB was founded in 2002, scientists have obtained crucial insights into fundamental biological processes that play a role in disease, and as part of the EU SPINE (Structural Proteomics in Europe) project, the PSB has produced potential drug targets in the battle against disease-causing bacteria and viruses.

“The CIBB is a concrete manifestation of the interdisciplinary and international scientific collaboration necessary to push forward fundamental disease research in this new era of high-throughput biology” says Stephen Cusack, Head of EMBL’s Outstation in Grenoble. “We are particularly pleased that it has received financial support and recognition through the European Union’s 6th Framework Programme”.

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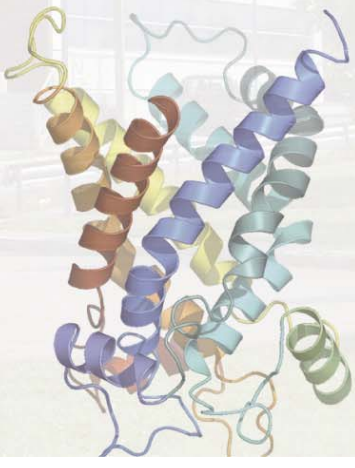
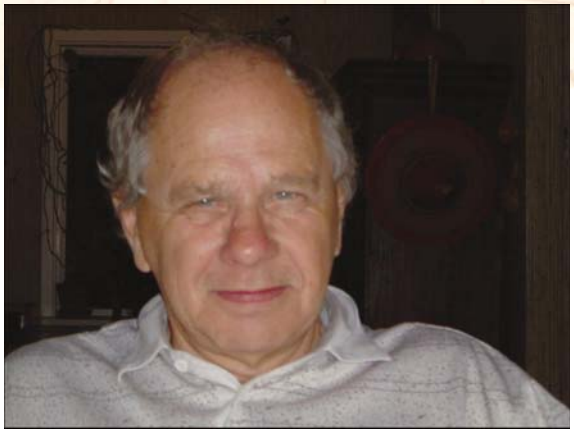
Plus d’informations : http://psb.esrf.fr/
http://www2.ujf-grenoble.fr/pharmacie/laboratoires/gdrviro/



Carl-Ivar Bränden
(1934-2004)



Science lost a valued citizen on 28 April 2004 when Carl-Ivar Brändén succumbed to lung cancer following an 18-month battle.

Carl had an ability to grasp opportunities and an intellect restless unless challenged. After studying mathematics and physics at Uppsala University he switched to chemistry. Professor Ingvar Lindqvist invited Carl into his laboratory for PhD studies in chemical crystallography and Carl was subsequently enticed to the new field of protein crystallography. In 1962 he joined the first generation of protein crystallographers and with many colleagues he experienced the heady early days of molecular and structural biology.

In 1963 Carl established a new research program in protein crystallography in his native Sweden. After a decade of hard work, despite the severe lack of budget, Carl's group had solved the structure of the enzyme alcohol dehydrogenase. Carl's interpretation of this new structure led to concepts of fundamental importance to biology.
At the same time Michael Rossmann and his group were working on the crystal structure of lactate dehydrogenase. Carl and Rossmann supposed, combining the results of their work, that the two enzymes, whilst displaying differences in their sequencing, nevertheless possessed similar architectures and similar functions. This hypothesis of the link between structure and function, was to be confirmed a few years later.

This discovery helped lead to the sequence-structure analysis so important to biology today.

Clear vision was also a hallmark of Carl's work in science administration. Never forgetting his own mentor Ingvar Lindqvist, he took great delight in helping younger scientists and he worked for several years as a member of the Nobel Committee for Chemistry. Quietly and persistently he would promote projects and people. His work at the ESRF is a good example.

Near the end of his career Carl spent five years in Grenoble giving structural biology a solid foundation at the new European synchrotron.

It is largely thanks to Carl that the facilities available in Grenoble for macromolecular crystallography research are now at the forefront of modern science.

Research at the IVMS

The Institute for Molecular and Structural Virology (IVMS) is a French laboratory supported by the Grenoble Joseph Fourier University (UJF) and the CNRS and hosted in the Carl-Ivar Brändén Building (CIBB) on the ILL/ESRF site. The main objective of the lab is the determination of structures of viruses, viral proteins and complexes between viral and cellular proteins by X-ray crystallography, electron microscopy (EM) or nuclear magnetic resonance (NMR). These structures can then be used for the design of small molecule inhibitors of viral infection that can be tested by enzymology and in cultures of virus infected cells. After the identification of potential drug candidates, pharmaceutical industries may be contacted for further development.

The people in the institute only work on human viruses. Some of these infect the majority of all people, like the Epstein-Barr virus, and cause benign diseases in most cases but may be associated with the development of cancers in other cases. One of the viruses that is most worked on is the influenza virus. With a potentially lethal influenza epidemic in the waiting, the work concentrates on the interaction of viral proteins with host-cell proteins and on the structure of the viral polymerase, a prime drug target. Here in particular are the newly developed proteomics and crystallisation platforms useful because the polymerase is very difficult to produce in recombinant form and cannot be isolated in its active form from virus particles or infected cells. Work is also going on about the characterisation of human adenovirus necessary for its development as gene or drug delivery device and a new project on the structural biology of the production of hepatitis C virus proteins has recently begun.

Other viruses like rabies and measles virus do not kill people in the rich parts of the world because good vaccines exist but kill millions of children in poor countries in Africa and Asia. Because pharmaceutical companies may be less interested in developing drugs against these diseases for economical reasons, the publicly funded research in the IVMS could make important contributions to drug development.

Finally, a small group of the researchers associated with the IVMS are situated at the Grenoble University Hospital (CHU-Grenoble) and travel daily between the two sites. This group works on medical virology aspects and epidemiology of virus diseases. There is a very close collaboration between the two sites which has resulted in a large number of co-publications. The epidemiological and hospital work profit from the molecules that can be made in the CIBB and from the technological developments in high throughput methods. The people oriented to the molecular work profit from the presence of medical doctors that can put their work into a wider therapeutic perspective. The IVMS aims to study virology at all or most of its levels of organisation going from atoms to viral molecules and particles, enzymology, through virus infected cells to sick people and epidemiology.

Superbugs

The ESRF science in the PSB focuses in resistant bacteria

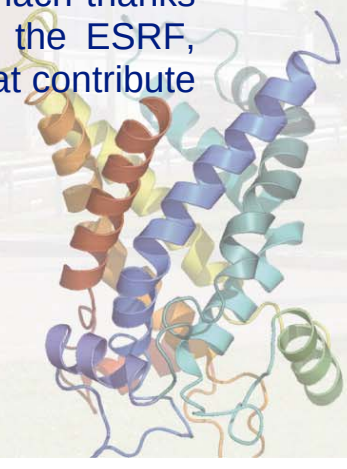
The ESRF Research Program is mainly focused on molecular mechanisms underlying bacterial adaptation to their environment. Two exceptionally successful bacteria are studied: Deinoccocus Radiodurans and Helicobacter Pylori. The genomes of these bacteria have been sequenced, showing some remarkable features. Our aim is to try to gain an insight into different pathways particular to those bacteria, which are dedicated to adaptation to their environment or modification of their metabolism, allowing survival under extreme conditions.

Deinoccocus Radiodurans

Deinoccocus Radiodurans (DR) is a bacteria highly resistant to ionising radiation. It is capable of withstanding acute irradiation doses of 10,000 Gy, a level hundreds of times higher than most other organisms. Exposure to such doses of radiation causes massive damage to genomic DNA, however DR is capable of surviving and repairing hundreds of double strand breaks without loss of vitality. It is hoped that a more complete understanding of the DNA repair mechanisms in DR will lead to the discovery of novel DNA repair systems, which may in turn be applicable to man.

Helicobacter Pylori

Helicobacter Pylori is the bacterium that causes more than 90% of duodenal (intestinal) ulcers and up to 80% of gastric (stomach) ulcers. The stomach presents a very acid environment, unsuitable for bacteria. However, Helicobacter Pylori manages to survive in the stomach thanks to the enzymes that increase the ph in the bacterium. At the ESRF, researchers are trying to find the structure of the elements that contribute to the survival of this bacterium.



IBS RESEARCH WITHIN THE PSB FRAMEWORK

Proteins play a role in all biological processes and the elucidation of the structure of a protein can take us a long way towards understanding its role in living organisms (its biological function).
The Institut de Biologie Structurale (the IBS) was founded in 1992 and has focussed from its early days on the structural and functional organisation of proteins. Its programmes include a number of projects in the field of medical and environmental research looking at phenomena such as cell division, immunity and host-pathogen interactions, membrane proteins or adaptation to extreme environments.

How a better understanding of cell division can boost cancer research or combat antibiotic resistance

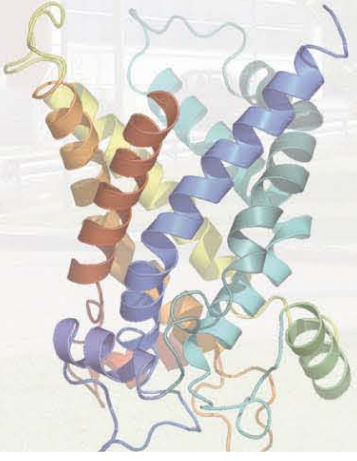
Better knowledge of cell division offers direct medical benefits: it can help, for example, in our search for targets for cancer therapeutics, or in the battle against antibiotic resistance which is becoming a major problem for public health.

Photo credit : CEA / P.Avavian

The IBS is involved in a five-year European research programme to provide detailed knowledge of the mechanisms involved in bacterial division. The aim is to discover new molecules capable of either blocking certain types of enzymatic activity or disturbing those interactions between proteins that are required by bacteria if they are to thrive.
This EU programme has a budget of 17½ million euro, 1.7 million of which has been awarded to teams from the IBS – and to the Laboratory for Nuclear Magnetic Resonance in particular, which is now setting up an isotopic labelling laboratory within the PSB. The new lab is soon to be installed in the CIB Building.

Immunity studies

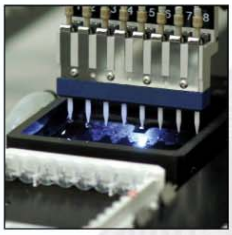
The human body lives under constant attack from infections induced by pathogenic micro-organisms (bacteria, viruses, parasites...). One part of its armoury is its system of natural immunity, which can identify aggression and generate mechanisms capable of providing instant protection whilst at the same time safeguarding its own tissues. This first line of defence mobilises a number of proteins that can recognise the molecular signatures on the microbes' cell surfaces.
Several of these molecules are being studied at the IBS. The aim is to improve our understanding of the mechanisms at play, with a view to developing strategies allowing us to fight infection more effectively. Part of this research will be conducted in a partnership with members of the PSB in one of the CIBB laboratories to be opened early in 2006.



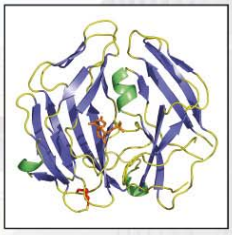
Neutrons and biology : the D-lab

The D-lab was created as a part of the PSB by the ILL and the EMBL for molecule preparation purposes: deuterium is used to "label" molecules, allowing the ILL's neutron beams to highlight the structures within them, thus enhancing our understanding of their biological functions.

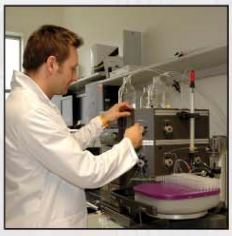
The great advantage of using neutrons in biology is that they can reveal the atoms in hydrogen and its isotope deuterium; these are very difficult to detect using X-rays for example. In molecular biology the relationship between structure and function is important at different scales, whether at the atomic scale or at the scale of the huge molecular machines of which living cells are made. By identifying the hydrogen atoms in a molecule we can obtain precious information about its structural organisation at different levels.



The deuteration process consists of replacing hydrogen atoms by their heavier isotope deuterium. It is the same principle as that underlying the microscopy colouration techniques used to distinguish the different components inside complex objects.



Hydrogen atoms play an essential role in the construction of biological macromolecules. In addition, they are involved in the phenomena of enzymatic catalysis which underlies the life process. Using deuterium labelling the hydrogen atoms can be visualised with neutron crystallography technology, thus shedding light on the mechanisms at play in the biological process. This can then lead to research to modify these mechanisms – the design of new drugs for example, or of enzymes with different functions.



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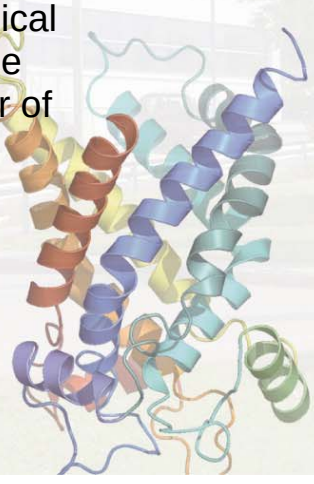
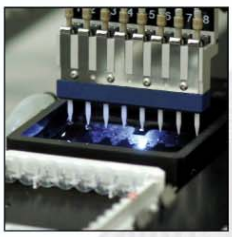
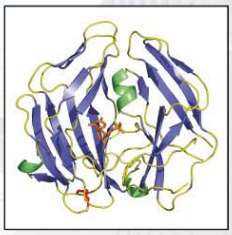


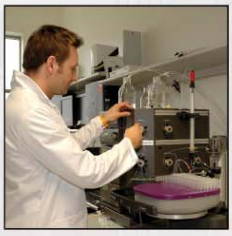
About a half of any biological macromolecule is made up of hydrogen atoms. By selectively replacing these with deuterium we can identify the different components present at a higher structural level inside the complex molecular assemblies responsible for the life process.

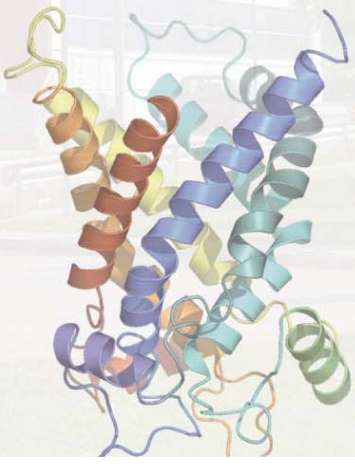
Biological molecules are very difficult to deuterate. This, however, is what the D-lab does, using state-of-the-art molecular biology techniques. One of the techniques being used, for example, is to introduce the DNA of the protein to be labelled into the gene pool of a bacteria. This bacteria is fed with deuterium and subsequently produces protein with the label desired.

The direct association of this laboratory with the world's most intense neutron source makes the Grenoble site a unique venue for studying biology with neutrons.









Searching the structure with light

ESRF develops state-of-the-art beamline

During the past years molecular biologists concentrated on identifying and sequencing genes. Now interest is turning towards determining the structure and function of proteins, which are made from genes. Proteins - the macromolecules essential for life - have well -defined functions linked to their structures, the 3D arrangement of the atoms they contain. X-ray crystallography is a first-class tool to determine the structure of a protein at the atomic level.

The unique qualities of synchrotron radiation have permitted the development of highly specialised techniques and X-ray crystallography has become an essential tool for biologists. The ESRF has built ID23, a new beamline with two experimental stations associated with the scientific programme of the Partnership for Structural Biology (PSB). This beamline allows scientists to carry out X-ray crystallography experiments, even with very small samples. The beamline's second station provides a focused beam down to 5 µm in diameter to allow protein microcrystals to be probed.

The ID23 team have focused on automating as many of the instruments' features as possible to make experiments easier. "We have conceived an automated beamline from the start," said Didier Nurizzo, scientist of the first station. The teamwork of the ESRF and the European Molecular Biology Laboratory (EMBL) has made it possible to build a beamline where the optical elements are all independent and can be aligned and prealigned automatically and a sample changer has recently been installed. The beamline has a minidiffractometer, which has a very high precision of rotation allowing minute samples to be used. It also has a new very-large-area CCD-based detector, which is essential for optimising data collection from certain valuable samples.

For more information :
http://www.esrf.fr/UsersAndScience/Experiments/MX/ID23-1/
http://www.esrf.fr/UsersAndScience/Experiments/MX/ID23-2/

TECHNICAL PLATFORMS OF THE IBS

Within the PSB, the IBS contributes quality control expertise and, in collaboration with the other partners, participates in the development of facilities for cloning, producing proteins and protein crystallization.

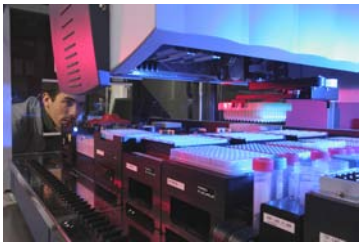


Photo credit : CEA / P.Avavian

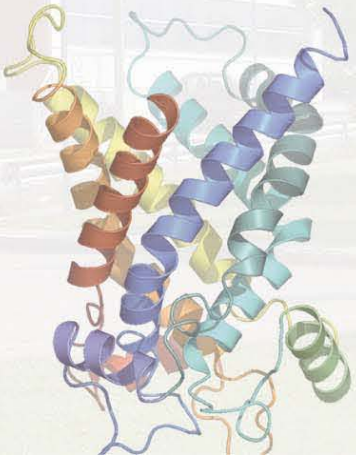
The institute is involved in the production of samples with RoBioMol (the Molecular Biology and Protein Expression Automated Platform) and the NMR group are setting up an isotopic labelling facility.

The institute provides many services related to quality control : Mass spectrometry, protein sequencer, Amino acids analysis, 1D NMR.

In addition to these platforms, some IBS scientists will move into the CIBB laboratories. Apart from the isotopic labelling facility, the IBS area in the CIBB will be dedicated to the incubation of new projects : a team working on the subject of " innate immunity" is currently moving into the building and will be in place at the beginning of 2006.

Photo credit : CEA / P.Avavian

The IBS also provides complementary approaches for the study of molecular structure and dynamics : Nuclear Magnetic Resonance (NMR) including a 800 MHz spectrometer, and molecular studies of interactions (Analytical Ultracentrifugation and Biacore's Surface Plasmon Resonance technologyBiacore's Surface Plasmon Resonance technology)



LIFE AND HEALTH SCIENCES at the UNIVERSITÉ JOSEPH FOURIER

Six major fields of research are developed together with two programmes at the interface between biology, medicine and chemistry.

Molecular ontogenesis and oncogenesis

From basic mechanisms controlling cell proliferation and differentiation to innovative applications in clinical oncology:

- Regulation of gene expression, structure of chromatin and nuclear organisation.
- Gene expression and function during lymphoma and lung tumour progression leading to in vivo targeting of therapeutic genes in tumours.
- Normal and pathological aspects of cell adhesion and migration.
- Normal and pathological aspects of angiogenesis.

Laboratories are located in the Institut Albert Bonniot on the health campus and on the scientific polygone.

Biological and Clinical Neurosciences

From basic to clinical neurosciences and conversely, with thematic oriented approaches involving multi-disciplinary expertise:

- Neuro imaging (NMR + X-Synchrotron): a direct view on the living brain.
- From pathological mechanisms of disabling neurological diseases towards new treatments.
- Molecular and cellular neurosciences: discovering the functions of brain cells.

Laboratories are housed in the Grenoble Neurosciences research institute located on the health campus.

Integrative approaches to microbiology and host response to stress.

- Genomic and cellular approaches, structure-function relationships, immunological aspects oriented towards prevention and new therapeutics.
- Cellular biology and stress adaptation
- Dedicated technological platforms and animal facilities (mouse and rat models to study human diseases: transgenic and immuno deficient models and A3 confinement)

Laboratories are located on the health campus and on the scientific polygone.

Engineering for life sciences

- Tele medicine, tele diagnosis and biosensors. Computer-assisted surgery and robotics.
- Bioinformatics and medical databases.

Laboratories are housed in the Institute of engineering for health sciences, on the health campus.

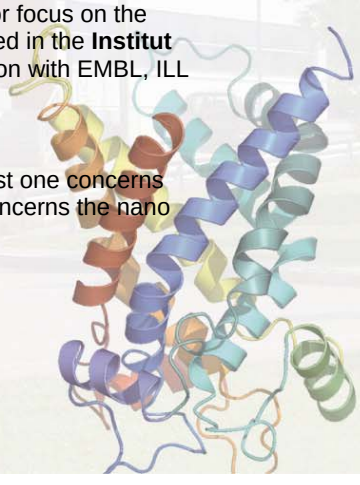
Plant biology and biodiversity

- Plastes and cell differentiation.
- Plant and animal biodiversity.
- Interaction plastes-cytoplasm and mitochondria.

Laboratories are located on the scientific polygone and on the Saint Martin d'Hères campus. They benefit from an outstation "Jardin Alpin du Lautaret", an Alpine garden which contains an important collection of mountains plants.

Structural biology

- This includes research developed at the **Institute for structural biology**, with a major focus on the membrane proteins and proteins involved in cell division as well as research developed in the **Institut for structural and molecular virology.** Research is being done in strong collaboration with EMBL, ILL and ESRF.



Two research programs are conducted at the interface between biology and chemistry. The first one concerns **metals in biology** with the Institute on metals in biology ; the second one, called **NanoBio**, concerns the nano biotechnologies.

For general information: MCFavrot@chu-grenoble.fr

Université Joseph Fourier,
research and training in a cutting edge environment

With 18 000 students (1 300 enrolled in a PhD programme), and 1 100 UJF research staff working in laboratories supported by the major French research agencies[1], Université Joseph Fourier – UJF is one of the leading universities worldwide. UJF covers the main scientific subjects and offers a wide variety of top level curricula including graduate, masters and engineering or technical curricula. UJF benefits from an outstanding scientific and technological environment comprising the major international research facilities located in the Grenoble area[2], as well as many leading-edge industries working in the fields of digital systems, microelectronics, biotechnologies, etc.

UJF: from fundamental research in the basic sciences to technology transfer and its benefits for society

UJF has a long standing tradition of excellence in fundamental research in several scientific fields– Chemical sciences, Information sciences and technologies, Earth and universe sciences, Life and health sciences, Mathematics, Physical and engineering sciences – which merge at highly active multidisciplinary interfaces leading to applications and technology transfer in domains as diverse as **information and communications technology** and **human health**.

Information and communications technology accounts for close to 30 000 jobs in Grenoble-Isère, (including 4 000 in public research). UJF and their research partners actively contribute to this field, focusing in particular on software quality, critical software, embedded systems on chips, robotics and man-machine interactions. UJF has set up a Software technology centre as well as partnerships with a wide range of companies. UJF is also actively involved in electronics, microelectronics and nanotechnologies, through several laboratories and collaborations with the major players in microelectronics in the Grenoble area.

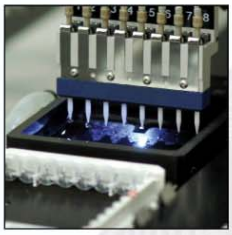
Life sciences account for more than 8 500 jobs in Grenoble-Isère (including 1 500 in research). The application of Chemistry, Electronics, Information sciences, Mathematics and Physics to biomedical research as well as partnerships with national research agencies[1], major international research facilities[2], CRSSA (military health research centre), and the Grenoble university hospital make it possible for UJF to cover the whole range **from fundamental research to clinical applications.** This research includes functional analysis of genes and proteins in normal and pathological tissues, drug and therapy design, medical instrumentation, medical and surgical robotics, and imaging for the health and life sciences, with strong links with *Cancéropôle Lyon-Rhône-Alpes*, *Génopôle Rhône-Alpes* and its research centre on proteomics. This research is developed in particular in two institutes devoted respectively to Neurosciences and to Molecular ontogenesis and oncogenesis. UJF participates in the international "Partnership in structural biology – PSB" (CEA, CNRS, EMBL, ESRF, ILL, UJF) and in the "Centre for Integrated Structural Biology – CISB", a European infrastructure which involves PSB and the UJF-CNRS Institute for Structural and Molecular Virology (whose main goals are the structural analysis of viruses and its application to the discovery of new therapeutic targets). UJF also develops NanoBio, a joint project with CEA, the purpose of which is to create an innovation centre relying on strong fundamental, technological and medical research in order to develop new tools for the health and life sciences using nano sciences and nano fabrication techniques. NanoBio involves UJF laboratories working on chemistry, at the interface of biology and physics, or working on human biology oriented towards diagnosis and therapeutic applications.
The Grenoble area is unique in Europe in bringing together a wide variety of research laboratories, international institutes, and research facilities. UJF is one of the major players in the science and technology field in the Grenoble area.

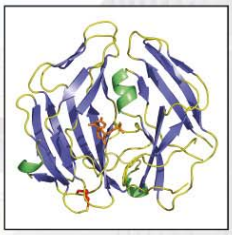
Contact : http://www.ujf-grenoble.fr Pierre.Berard@ujf-grenoble.fr Yannick.Vallee@ujf-grenoble.fr

[1] French research agencies: CEA –Atomic energy agency, CNRS –National scientific research agency, INRA – National agronomic research agency, INRIA – National research agency for computer science and control, INSERM National health and medical research agency).
[2] International organisations and facilities: EMBL – European molecular biology laboratory, ESRF – European synchrotron radiation facility, ILL – Laue-Langevin Institute, IRAM – Millimetric radio astronomy institute, LCMI – High magnetic fields laboratory.

CENTRE FOR INTEGRATED STRUCTURAL BIOLOGY

European Synchrotron Radiation Facility





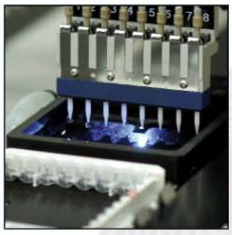
ESRF

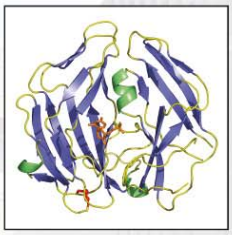
The European Synchrotron Radiation Facility (ESRF) is constituted as an international facility with 18 participating countries to operate, maintain and develop the most powerful third-generation synchrotron X-ray light source in Europe, and its associated experimental apparatus (beamlines). Each year several thousand researchers travel to the ESRF to conduct experiments on one of the 40 state-of-the-art beamlines made available to them. These studies cover a very wide range of scientific areas such as physics, chemistry and materials science, as well as biology, medicine, geophysics and archeology.

X-ray crystallography is one of the key methods that is used to build the database of three-dimensional information on protein structures. The ESRF decided to embark on a long-term programme in structural genomics as part of its overall peer-reviewed science programme. This included the commitment of resources both to build up the necessary infrastructure and to construct a beamline for protein crystallography, ID23. As a complement of techniques developed in partner institutes, this allows biologists to obtain more detailed information on the structure, function and interaction of the tens of thousands of proteins of interest, and to speed up the discovery of novel disease treatments.

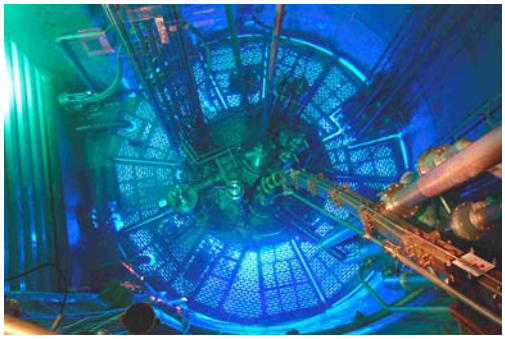
For more information: http://www.esrf.fr

The Institut Laue-Langevin

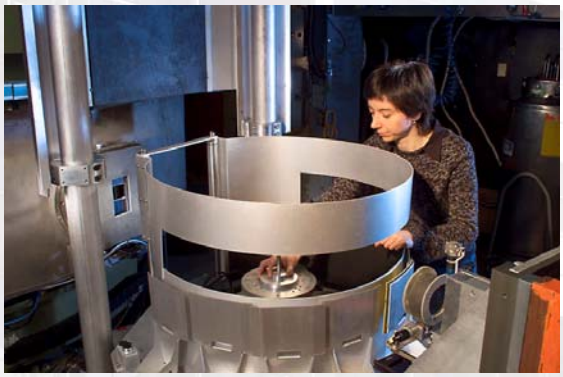




The Institut Laue-Langevin (ILL) is Europe's leading research facility for fundamental research using neutrons. The ILL operates the brightest neutron source in the world, reliably delivering intense neutron beams to 40 unique scientific instruments.



The Institute welcomes 1500 visiting scientists per year to carry out world class research in solid state physics, crystallography, soft matter, biology, chemistry and fundamental physics.



ILL is managed by France, Germany and the United Kingdom, in partnership with 9 other European countries.

http://www.ill.fr

INSTITUT DE BIOLOGIE STRUCTURALE Jean-Pierre Ebel

IBS

Photo credit : CEA / P.Avavian

The Jean-Pierre Ebel Structural Biology Institute (IBS) is a research facility, housing a total of approximately 200 people, and supported under a joint agreement between three major French scientific research organizations, the CEA , the CNRS and the UJF.
The Institute is close to the European large scale facilities, the ILL and the ESRF. It is a centre for research, for technical and scientific instrumentation and provides facilities for visiting scientists. It possesses cutting edge facilities for STRUCTURAL BIOLOGY, a field of molecular research that is essential for the understanding of fundamental biological processes.

IBS Objectives

- Research development in the field of structural biology, in particular the study of the structure and function of biological macromolecules, notably proteins.
- In-house research program
- Development of methods to obtain structural and dynamic information in complex biological systems.
- Hosting individual scientists or research groups and facilitating access to large scale scientific facilities in Grenoble, including the ILL (Institut Laue Langevin), the ESRF (European Synchrotron Radiation Facility), in particular via the resposability of equipment dedicated to the French research community.
- The IBS also develops an active training program for graduate students (Master and Thesis) and young researchers (post-doctoral fellows) to become expert in the diverse fields of structural biology represented at the Institute.

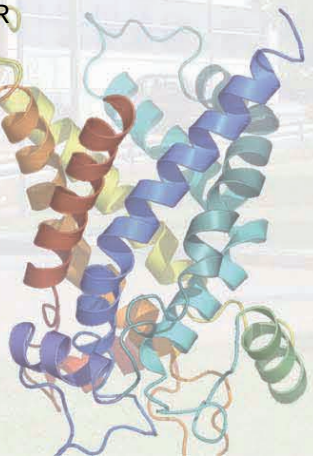
IBS in the European Research Area

- Participation in programs of development in biotechnology.
- Participation in research implicating human health.
- Participation in the Partnership for Structural Biology an initiative combining the complementary expertise and interests of the EMBL (European Molecular Biology Laboratory), the ESRF and the ILL, and whose primary aim is to enhance the study of medically important proteins.

IBS technical platform

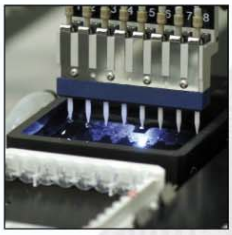
An ensemble of state-of-the-art technical instrumentation and expertise for structural biology is available at the IBS :

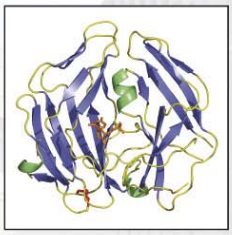
- Crystallography (associated with the large-scale facilities)
- Nuclear Magnetic Resonance (in the framework of the Rhone-Alpes National High Field NMR Centre located in Lyon)
- Structural Electron Microscopy
- Protein production (associated with the regional Genome project ‘Génopole Rhône-Alpes’)
- Quality control (mass spectrometry, sequencer, amino acids analysis, 1D NMR)



For more information : http//www.ibs.fr

The EMBL Grenoble Outstation

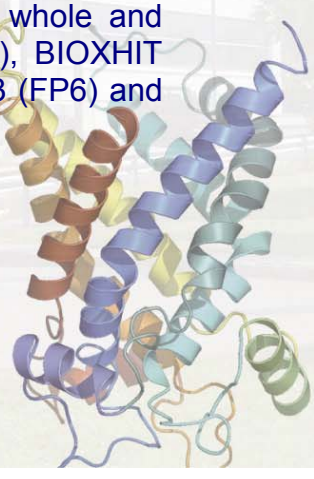




EMBL is financed by 18 European countries and is established on five sites, the central laboratory being in Heidelberg, Germany. The EMBL Outstation in Grenoble is a self-contained laboratory of about 80 people, located on the same site as the Institut Laue Langevin neutron facility and the European Synchrotron Radiation Facility (ESRF). The Outstation collaborates very closely with both of these world-leading large-scale facilities in building and operating beamlines for respectively neutron and X-ray macromolecular crystallography, in developing the associated instrumentation and techniques, and in providing biochemical laboratory facilities and expertise to help external visitors making measurements. Notable instrumentation developments have been the design and construction of an automated microdiffractometer and sample changer for use on ESRF beamlines and of the novel image plate detector on the LADI instrument at the ILL. EMBL also collaborates in the running of the highly successful UK bending magnet MAD beamline (BM14) at the ESRF and permits European users to obtain beamtime on it.

Within this context, the Outstation has a very active in-house research programme in the structural biology of cellular processes, making use of a wide range of techniques, including molecular biology, biochemistry, electron microscopy, light scattering, neutron scattering, X-ray crystallography and computing. Topics under study include eukaryotic transcription factors and polymerases, nucleocytoplasmic transport, signal recognition particle, proteins that manipulate membranes (e.g. viral fusion and budding proteins, proteins that cluster molecules at synaptic junctions), adenovirus capsid proteins, aminoacyl-tRNA synthetases and several proteins involved in RNA processing, maturation and decay. There is an increasing focus on large complexes studied by a combination of X-ray crystallography and cryo-electron microscopy and activity benefiting from the close collaboration with the IVMS and IBS. Recently a group of scientists and technicians has been established, within the context of the PSB and the EU SPINE programme, to establish robotics for high-throughput protein expression and nano-litre crystallisation.

The Outstation has extensive contacts with the wider European community especially through the activities of EMBL as a whole and through participation in EU networks such as SPINE (FP5), BIOXHIT (FP6), 3D Repertoire (FP6) Synchrotron and Free electron I3 (FP6) and DLAB (FP5 and FP6).



EMBL - RESEARCH HIGHLIGHTS

Protein-RNA interactions in RNA metabolism and translation, viral proteins (S. Cusack)
We are studying the structural biology of protein-RNA complexes involved in RNA maturation and translation.
In addition, we are interested in the structural basis of adenovirus host-cell entry.
Details: Zubieta et al. (2005). Mol. Cell 17, 121-35.

Applications of macromolecular crystallography using synchrotron radiation (R. Ravelli)
Our interests include the application of synchrotron radiation to challenging problems in macromolecular crystallography.
Details: Ravelli et al. (2004) Nature 428, 198-201

Instrumentation for protein crystallography using synchrotron radiation and neutrons (F. Cipriani)
Development of new instruments, automation of the ESRF beamlines and support of a neutron beamline at the Institut Laue Langevin (ILL) are important parts of our activity.
Details: www.embl-grenoble.fr/groups/instr/index.html

Structural biology of transcription and nucleocytoplasmic transport (C. W. Müller)
Using X-ray crystallography and electron microscopy our group studies macromolecular complexes involved in transcriptional regulation and nuclear transport.
Details: Petosa et al. (2004). Mol. Cell 16, 761-75

Proteins involved in viral and cellular membrane fusion processes (W. Weissenhorn)
Our group is interested in the structural requirements of membrane reorganisation processes during the viral life cycle as well as during intracellular transport processes.
Details: Sola et al. (2004). EMBO J. 23, 2510-9

High-throughput protein expression technologies (D. Hart)
Our group applies combinatorial approaches, screening and robotics to challenging problems in structural biology.
Details: www.embl-grenoble.fr/groups/htt/expression.html

High throughput crystallisation methods (J. Marquez)
Our high-throughput crystallisation platform is one of the core technical platforms of the Partnership for Structural Biology. We also try to bridge the gap between high throughput crystallisation and automated synchrotron data collection systems.
Details: www.embl-grenoble.fr/groups/htt/crystallisation.html