Argentina

Centro de Estudios Fotosintticos y Bioqumicos (CEFOBI)

Address: Suipacha 531, 2000 Rosario, Argentina. **Phone:** (+54 41) 371955; **Telex:** 41944 PBTH AR; **Fax:** (+54 41) 370044; **E-mail:** RNCEFOBI@alpha.arcride.edu.ar.
Director/Head: Rubén Héctor Vallejos.
Number of Research Scientists: 7; **Number of Staff:** 37.
Scientific Fields of Interest: Biochemistry/Biophysics.
Main Lines of Research and Training Activities: Transgenic wheat plants resistant to Fusarium; transgenic cotton plants resistant to cotton boll weevil *(Anthonomus grandis);* transgenic maize resistant to *Diatraea saccharalis;* study on evolution of photosynthesis in higher plants; structure of phosphoenolpyruvate carboxylase and NADP-malic enzyme in higher plants; structural and functional studies of ferredoxin-NADP oxidoreductase-binding protein complex; metabolism of triose phosphate in C4 and CAM plants.
Major Scientific Results or Products: Transgenic wheat and maize in field assays; scientific publications and patents; Master and PhD theses.
Main Research Facilities Available: About 540 square metres of laboratory space, containing cold rooms, ultracentrifuges, refrigerated centrifuges, spectrophotometers, HPLC equipment, freezers, phast system, scintillation counters, PCR β-Ram for measuring β-emitters in HPLC eluates, centrifugal concentrators, plant growth chambers, greenhouses, library.
Future Development Plans: New building under construction.
Cooperation Arrangements with Developing Countries: Agreements for applied research with public and private companies; TWAS collaborative project with Department of Biological Sciences, Yarmouk University, Jordan.
Other International Cooperation Arrangements: CSIC (Spain)/CONICET (Argentina): application of defence genes whose expression is induced by infection with fusarium; Fundación Antorchas (Argentina)/British Council (UK); improvement of nutritional and processing properties of wheat via genetic engineering; Department of Biochemistry, Nebraska University, Lincoln (USA)/Departamento e Química Biológica, Universidad Nacional de Rosario (Argentina); Department of Biophysics, Osnabrück University (Germany)/Departamento de Química Biológica, Universidad Nacional de Rosario (Argentina).

Centro de Investigaciones en Qumica Biolgica de Crdoba (CIQUIBIC-CONICET)

Address: Departamento de Química Biológica, Facultad de Ciencias Químicas, Universidad Nacional de Córdoba, Ciudad Universitaria, A.P. 4, CC 61, 5000, Córdoba, Argentina. **Phone:** (+54 51) 334168; 334171; **Fax:** (+54 51) 334074; **E-mail:** hbarra@dqbfcq.uncor.edu.
Director/Head: Héctor S. Barra.
Number of Research Scientists: 36; **Number of Staff:** 25.
Scientific Fields of Interest: Cellular/Molecular Biology; Biochemistry/Biophysics; Molecular Genetics.
Main Lines of Research and Training Activities: Study of biochemistry and molecular biology of tubulin and microtubule associated proteins in normal and pathological conditions; molecular properties of glycolipids, phospholipids and phospholipases in artificial lipid membranes; role of immediate early genes as regulators of metabolism of phospholipids; mechanisms of synthesis and intracellular transport of gangliosides and retention of Golgi-located glycosyltransferases; molecular genetics of glycolipid storage diseases; biochemistry and immunopathology of neurological autoimmune diseases; molecular genetics of DNA methylation and purine transport in lower eukaryotes; biochemistry of glycogen synthesis initiation; neuronal growth cone glycoprotein receptors during development; cytotoxic effect of lipoproteins Studies conducted by groups, comprised of doctorates and postdoctorates, under leadership of senior scientist. All groups participate in Centre teaching activities at undergraduate and/or graduate levels.
Major Scientific Results or Products: Hyperphosphorylated Tau in Alzheimer's disease interacts with normal Tau and HMWMAP's to disrupt microtubules; hydrophobic membrane tubulin arises from interaction of microtubule acetylated tubulin with membrane proteins; glycosphingolipids modulate

dynamic membrane topology, intermembranous interactions and phosphohydrolytic interfacial catalysis; protein products of immediate early genes can modulate metabolism of phospholipids in neural and non-neural cells; coupling of glycosylation steps for synthesis of gangliosides in trans-Golgi network occurs by non-vesicular mechanism; new mutation in HEXB gene affects structure and expression; antigen cross-reactivity is important in defining immunopathology; in lower eukaryotes glycogenin acts as auto and transglycosylating enzyme; novel receptor for IGF1 is highly enriched in nerve growth cones; high density lipoprotein (HDL) can modulate ganglioside synthesis in neurons.
Main Research Facilities Available: Building facilities: 700 square meters, which includes isotope areas, animal care and cell culture facilities; heavy equipment includes ultracentrifuges (3), refrigerated centrifuges (3), peptide and oligonucleotide synthesizer, UV/vis spectrophotometers and scanner, scintillation spectrometers (2), gamma counter, GLC, HPLC and FPLC, fluorescence microscope, inverted microscope, video image analyser, CO2 incubators, laminar flows (2), -70°C freezers, -20°C freezers, differential scanning calorimeter; small equipment includes PC computers, work station with 11 terminals, laser printer, scanner, balances, microinjector, micromanipulator, gel electrophoresis systems; library. *Current Contact* on diskette; biochemistry and biophysics *Citation Index*, compact disc ed., 1992, 1993, 1994, 1995, 1996. Access to data banks through Internet.
Future Development Plans: Continue main lines of research and pursue development of biotechnology unit.
International Cooperation Arrangements: Cooperation with New York State Institute for Basic Research in Developmental Disabilities (Staten Island, New York, USA) through Fogarty International Research Collaboration Award (FIRCA).

Institute of Biochemical Research of La Plata (INIBIOLP)

Address: Facultad de Ciencias Médicas, Calles 60 y 120, 1900 La Plata, Argentina. **Phone:** (+54 21) 834833; **Fax:** (+54 21) 258988.
Director/Head: Rodolfo R. Brenner.
Number of Research Scientists: 16; **Number of Staff:** 20.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics.
Main Lines of Research and Training Activities: Biosynthesis of fatty acids and lipids; essential fatty acids in nutrition; lipid protein interaction; lipid metabolism in modified cells; biochemistry of invertebrates and insects; lipids in atherosclerosis; fatty acids in pathological processes; biochemistry of aging.
Major Scientific Results or Products: Mechanisms of desaturation of unsaturated fatty acid; hormonal and other controls of unsaturated fatty acid desaturation; fatty acid metabolism in transformed cells; fatty acid metabolism in freshwater organisms; lipid metabolism and transport of lipids in insect *Triatoma infestans* in relation to Chagas disease; protein-lipid interaction in membranes; human lipoproteins in relation to atherosclerosis.
Main Research Facilities Available: Ultracentrifuges (2) ; spectrofluorometer; radioactivity scanner; computers; 2 HPLC; 2 GLC; cell culture facilities; liquid scintillation counter; densitometer; lyophilizer; microfuge; electrophoresis and TLC facilities; freezers and fridges; animal and insect rooms.
Future Development Plans: Continue research on protein-lipid interaction, membrane properties; biochemistry of lipid in cell nucleus; lipoproteins of *T. infestans* hemolymph and biosynthesis of lipids in cuticle and relation with pheromones; hormonal control of fatty acid desaturation in animals; transport of lipid in invertebrates; lipid metabolism in diabetics; gerontology.
Cooperation Arrangements with Developing Countries: INIBIOLP and Institute of Chemistry, Faculty of Basic Sciences and Mathematics, Catholic University of Valparaíso, Chile.
Other International Cooperation Arrangements: Institute and Hôpital Necker, Paris, in neuroimmune-endocrine interactions in three experimental models: diabetes, Chagas disease and experimental arthritis in mice.

Instituto de Biologa y Medicina Experimental (IBYME-CONICET)

Address: Vuelta de Obligado 2490, 1428 Buenos Aires, Argentina. **Phone:** (+54 1) 785 4880; 788 5928; **Fax:** (+54 1) 786 2564; **E-mail:** ibyme@proteus.dna.uba.ar.
Director/Head: Eduardo H. Charreau.
Number of Research Scientists: 80; **Number of Staff:** 58.

Scientific Fields of Interest: Biochemistry; Cellular Biology; Endocrinology.
Main Lines of Research and Training Activities: Biology of reproduction; neuroendocrine regulation; steroid hormones; biochemistry of fertilization process; cellular biology of fertilization; biochemistry of second messengers; immunology; ovarian physiology; immunoendocrinology; molecular oncology; neuroendocrinology; neurobiology; chemistry of proteoglycans and extracellular matrix; male infertility; molecular endocrinology; biology of behaviour; neuroendocrine biochemistry; renal endocrinology; postgraduate courses.
Major Scientific Results or Products: Mechanisms of hormone action and mammalian fertilization; studies of hormone receptor interaction in cancer; studies of animal behaviour and control; in vitro fertilization in bovines and embryo transfer.
Main Research Facilities Available: Ultracentrifuges; centrifuges; spectrophotometer; spectrofluorometer; radioactivity counters (beta and gamma); cell culture facilities; densitometer; lyophilizer; microfuges; electrophoresis and TLC facilities; freezers and fridges; animal rooms; library; computers with connection to Internet.
Future Development Plans: Continue with research and training programmes in main fields of biochemistry, biology, endocrinology and immunology.
Cooperation Arrangements with Developing Countries: Institute of Biomedical Sciences, Federal University of Rio Grande do Sul; Department of Biochemistry, School of Science, University of Oriental Republic of Uruguay; Center for Nuclear Investigation, School of Science, University of Oriental Republic of Uruguay.
Other International Cooperation Arrangements: International Centre for Genetic Engineering and Biotechnology, Trieste, Italy; Lawson Research Institute, University of Western Ontario, Canada; Focal Point: Fogarty International Fellowship Programme; Focal Point: Americas Reproductive Biology Network, Canada, USA, Mexico, Chile, Brazil, Argentina.

Instituto de Botnica Darwinion (IBODA)

Address: Labardén 200, 1642 San Isidro, 1642 Buenos Aires, Argentina. **Phone:** (+54 1) 7434800; 7428534; **Fax:** (+54 1) 7474748; **E-mail:** postmaster@darwin.edu.ar.
Director/Head: Juan Héctro Hunziker.
Number of Research Scientists: 19; **Number of Staff:** 14.
Scientific Fields of Interest: Biology; Botany; Genetics.
Main Lines of Research and Training Activities: Botanical investigations on plants of the Argentine and South American floras, including taxonomic, floristic, anatomical, genetic, cytogenetic, embryological, palynological, phytogeographical and evolutionary studies.
Major Scientific Results or Products: Taxonomic monographs of several families or genera of vascular plants, regional flora of Entre Rios, Jujuy and San Juan; isozymic, DNA content and chromosomal studies in zygophyllaccac, gramineae, ephedraceae and compositae,.
Main Research Facilities Available: Herbarium containing approximately 500,000 specimens and library facilities for botanical research; scanning electronic microscope (Zeiss DSM 940 A); optical microscopes; Nikon photomicroscope Microphot FXA; computers.
Future Development Plans: Collaboration with universities and training of researchers in Latin America; cooperative studies of plant biodiversity of South America with Missouri Botanical Garden, USA Conservatoire et Jardin Botanique, Geneva, Switzerland, and Programa Pro Flora from CONICET, Argentina.
Cooperation Arrangements with Developing Countries: Through the “Red Latinoamericana de Botánica,” training of young scientists from Paraguay and Colombia.
Other International Cooperation Arrangements: Missouri Botanical Garden (St. Louis, Missouri, USA) and Conservatoire et Jardin Botanique, Geneva, Switzerland: floristic studies of Paraguay.

Instituto de Histologa y Embriologa de Mendoza (IHEM)

Address: Casilla de Correo 56, 5500 Mendoza, Argentina. **Phone:** (+54 61) 205115 ext. 2670; **Fax:** (+54 61) 494117.
Director/Head: Mario H. Burgos.
Number of Research Scientists: 29; **Number of Staff:** 12.

Scientific Fields of Interest: Biology; Medical Sciences.
Main Lines of Research and Training Activities: Reproductive Biology: Male gamete maturation and capacitation; molecular mechanism of Acrosome reaction; ovocyte fertilization. Cell Biology: Mechanism of endosome fusion vesicular transport on microtubules; coat assembly on vesicles. Neuroendocrinology: Pineal gland, Photoperiod and Leydig; Sertoli cells. Chagas Disease: Macrophage; *Trypanosoma cruzi* interaction; temperature action and heat shock proteins.
Major Scientific Results or Products: About 25 papers published annually; publication of scientific journal BIOCELL (listed in Current Contents and other international systems) as continuation of Electron Microscopy and Cell Biology, published 1983 - 1993).
Main Research Facilities Available: Electron Microscopes TEM & SEM; fluorescence microscopes; video microscopy; ultracentrifuges; Beta and Gamma counters; Balzer's freeze fracture; Internet link; library; electrophoresis; cell culture; cryostat.
Future Development Plans: Courses on video microscopy and digital processing of images; electron microscopy and elements detection; scanning electron microscopy and X-rays microanalysis.
Cooperation Arrangements with Developing Countries: CABBIO (Brazilian-Argentinian Center for Biotechnology; Iberoamerican Society of Cell Biology, Uruguay.
Other International Cooperation Arrangements: Marine Biological Laboratory; National Science Foundation; Population Council, Harvard Medical School; Woods Hole, MA., USA; Howard Hughes.

Instituto de Investigaciones Bioqumicas de Baha Blanca (INIBIBB)

Address: C.C. 857, Camino de La Carrindanga km 7, 8000 Bahía Blanca, Argentina. **Phone:** (+54 91) 26114/861201; **Telex:** 81578 PPINQ AR, 81712 DUJOR AR; **Fax:** (+54 91) 861200; **E-mail:** rtfjb1@criba.edu.ar.
Director/Head: Francisco José Barrantes.
Number of Research Scientists: 20; **Number of Staff:** 50.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry.
Main Lines of Research and Training Activities: Effect of oviducal secretions and meiotic maturation on lipids of amphibian oocytes; polyunsaturated fatty acids of lipids and membrane proteins; structural functional correlates of nicotinic acetylcholine receptor and lipid microenvironment; molecular modelling and evolution of proteins; factors that intervene in survival and differentiation of retinal cultured neurons; ultrastructural studies of membrane proteins.
Major Scientific Results or Products: Since its founding in 1970, Institute has published more than 250 papers in international scientific journals and prepared 20 book chapters.
Main Research Facilities Available: Institute facilities include seven laboratories equipped with following instruments: state-of-art patch-clamp setups (Axopatch 200B, EPC-9, EPC-7); ONYX graphic workstation; Alfa AXP digital computer; oscilloscopes; freezers -20 and -80°C; refrigerated centrifuges; centrifuges; ultracentrifuges; spectrophotometer IR, spectrophotometer; electrophoresis chromatographers; laminar flow equipment; spectrofluorimeter; cell incubator; cell incubator; microbalances; fluorescence microscope; radiochromatographer, radiomatic; ultracentrifuge; library
Future Development Plans: Continue with main research and training activities listed above.
Cooperation Arrangements with Developing Countries: Cooperation with scientists at the TATA Institute for Fundamental Research, IISc Campus in Bangalore and Mumbai (formerly Bombay), India, through Associate Membership Scheme at Centres of Excellence in the South of Third World Academy of Sciences (TWAS); CABBIO (Argentinian-Brazilian Centre for Biotechnology) with University of São Paulo, Brazil.
Other International Cooperation Arrangements: European Union; University of Bath, UK; Volkswagen Foundation; Max-Planck-Institute for Biophysical Chemistry, Göttingen, Germany.

Instituto de Investigaciones Bioqumicas Fundacin Campomar

Address: Av. Patricias Argentinas 435, 1405 Buenos Aires, Argentina. **Phone:** (+54 1) 863-4011/19-19; **Fax:** (+54 1) 865-2246.
Director/Head: Israel D. Algranati.
Number of Research Scientists: 78; **Number of Staff:** 15.
Scientific Fields of Interest: Biochemistry; Molecular Biology; Cell Biology; Genetics.

Main Lines of Research and Training Activities: Tumoral biochemistry; developmental biochemistry and molecular biology; molecular signalling; cellular and molecular biology; biosynthesis and structure of starch and other storage polysaccharides; neurochemistry; molecular biology and biochemistry of parasites; regulation of protein; synthesis and proliferation in bacteria and parasites; polyamines in bacteria and yeast; biosynthesis of complex carbohydrates in bacteria; plant biology; microbe-plant interaction; glycobiology; glycoprotein from *Bacillus thuringiensis* and bacterial genetics.
Major Scientific Results or Products: Immuno and genetic therapies of cancer; molecular aspects of morphogenesis and differentiation in insects; regulation of cell cycle; initiation of starch and glycogen synthesis; modulation of intracellular calcium homeostasis; developmental regulation of Thy 1.2 synthesis in cerebellum; drug-resistance in Leishmania; role of polyamines in control of stringent response; biosynthesis of Xanthan and Acetan in microorganisms; molecular studies on chloroplast fructuose-1,6-biphosphatase; biochemistry and molecular biology of interaction between plant and microorganisms; regulation of plant genes by light; quality control of glycoprotein folding; glycoproteins from *Bacillus thuringiensis*; biochemical and genetic analysis of helicobacter pylore infection; biochemical and molecular studies of catabolism of glucose, proteins and aminoacids in *Trypanosoma cruzi.*
Main Research Facilities Available: Ultracentrifuges (3); spectrophotometers (2); spectrofluorometer; automatic DNA sequencer; computers (10); HPLC (2); FPLC (2); liquid scintillation counters (2); densitometer; electrophoresis and cell culture facilities; animal, insects and plant rooms.
Future Development Plans: Further studies on molecular biology of microorganisms, parasites, insects, plants and animals.
Cooperation Arrangements with Developing Countries: Network for Research and Training in Parasitic Diseases at Southern Cone of Latin America.
Other International Cooperation Arrangements: Weizmann Institute, Israel; International Centre for Genetic Engineering and Biotechnology, UN Industrial Development Organization (ICGEB-UNIDO), Italy; Swedish Agency for Research Cooperation with Developing Countries, (SAREC), Sweden. Individual groups have cooperation arrangements with other institutions: CNR, Italy, World Health Organization (WHO), Switzerland, Association for International Cancer Research, (AICR), UK, Merck Sharp and Dohme Medical Research Grant, USA, Becton and Dickinson, USA, The Rockefeller Foundation, USA, National Institutes of Health (NIH), USA.

Instituto de Investigaciones en Ingeniera Gentica y Biologa Molecular (INGEBI)

Address: Vuelta de Obligado 2490, 1428 Buenos Aires, Argentina. **Phone:** (+54 1) 7845516; **Fax:** (+54 1) 7868578; **E-mail:** torres@proteus.dna.uba.ar.
Director/Head: Héctor N. Torres.
Number of Research Scientists: 67; **Number of Staff:** 15.
Scientific Fields of Interest: Molecular Biology, Enzymology.
Main Lines of Research and Training Activities: *Research:* Metabolic regulation, second messengers action, plant molecular biology, immunology of Chagas disease, transgenic plants and transgenic animals; *Training:* Advanced courses in biochemistry (metabolic regulation) and molecular biology (genetic engineering) and doctoral theses in same fields.
Major Scientific Results or Products: Over 80 scientific papers published in international journals over the last five years. On average three PhD theses per annum.
Main Research Facilities Available: Well-equipped facilities for biochemical and molecular biology techniques including “Core Facilities” for DNA sequencing and transgenic animals and plants.
Future Development Plans: Organize electro-biophysics laboratory.
Cooperation Arrangements with Developing Countries: Bolivia, Brazil, Chile, Cuba, Venezuela.

Instituto de Qumica y Fisicoqumica Biolgicas (IQUIFIB)

Address: Departamento de Química Biológica, Facultad de Farmacía y Bioquímica, Junin 956, 1113 Buenos Aires, Argentina. **Phone:** (+54 1) 9625506; **Fax:** (+54 1) 9625457.
Director/Head: Alejandro C. Paladini.
Number of Research Scientists: 41; **Number of Staff:** 15; Predoctoral Fellows: 69.
Scientific Fields of Interest: Chemistry; Biochemistry/Biophysics; Neurochemistry; Immunochemistry.

Main Lines of Research and Training Activities: Chemistry of fatty acid binding proteins; structure of ionic channels; aspartil proteinases, structure and function of ovine placental lactogen; idem of placental lectins; enzymes involved in metabolism of amino acids in *Trypanosoma cruzi,* mechanism of folding of proteins; growth hormone binding protein; biological signals transduction; natural and synthetic ligands for benzodiazepine receptor; myelin biochemistry; chemistry of bioactive peptides; oxidative damages in biological systems; D4 dopaminergic receptor in CNS; immunochemistry of hormones, cytokines and receptors, cation transport ATPases: biology/biochemistry; hydrophobic photolabelling of proteins; free radicals and excited states.
Main Research Facilities Available: Facilities for investigations in main research areas described above. Access to facilities for microsequencing of proteins, peptide synthesis and study of fast reactions.
Future Development Plans: Current fields of investigations will continue to be developed.
Cooperation Arrangements with Developing Countries: Joint research programmes with Brazil on proteins and in immunology.
Other International Cooperation Arrangements: German government: crystallographic studies of proteins; NIH (USA): study of protein folding; Pasteur Institute: genetic studies in myelin formation; Cellular Pathology Institute of Catholic University of Louvain, Belgium: study effects of viral infection on antibodies specificity; Mayo Clinic, Rochester (USA) and NSF: study cation transport ATPases; European Economic Community and University of Ghent, Belgium: study photolabelling of proteins.

Instituto Superior de Investigaciones Biolgicas (INSIBIO)

Address: Chacabuco No. 461, San Miguel de Tucumán, 4000 Tucumán, Argentina. **Phone:** (+54 81) 248-921; **Fax:** (+54 81) 248-025; **E-mail:** Farias@insibio.unt.edu.ar.
Director/Head: Ricardo Norberto Farias.
Number of Research Scientists: 30; **Number of Staff:** 40.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Medical Sciences.
Main Lines of Research and Training Activities: Membrane biophysics; Thyroid hormones; Free radicals; Bioengineering; Plant biotechnology; Microbiological genetic-antibiotic: Microcine 25; Animal nutrition and reproduction; Physiology; Renine-angiotensine.
Major Scientific Results or Products: More than 100 papers published in international journals; supervised 20 PhD theses.
Main Research Facilities Available: 2500 square metres of laboratory space; library; instruments for general use in biochemistry, microbiology, molecular biology, physiology.
Cooperation Arrangements with Developing Countries: For academic research with institutions in UK, Spain, Italy, Germany, Mexico and Brazil.

Laboratories for the Control of Hormones on Cell Regulation and Differentiation (Laboratories HRDC)

Address: Depto. de Bioquímica, Facultad de Medicina (UBA), Paraguay 2155, 5° piso, 1121 Buenos Aires, Argentina. **Phone:** (+54 1) 9619908; **Fax:** (+54 1) 9635457.
Director/Head: Ernesto Jorge Podestá.
Number of Research Scientists: 12; **Number of Staff:** 6.
Scientific Fields of Interest: Biology.
Main Lines of Research and Training Activities: Characterization and function of hormone-dependent proteins intermediaries in activation of arachidonic acid release; hormonal control of spermatogenesis; cellular communication and compartmentalization; hormone-stimulus and secretion coupling.
Major Scientific Results or Products: Characterization of phosphoprotein intermediary in release of arachidonic acid and steroidogenesis; demonstration of compartmentalization of recepto-adenyl cyclase and c-AMP dependent protein kinase.
Main Research Facilities Available: Ultracentrifuge; refrigerated centrifuge; computer; culture room equipped with video microscope; molecular biology laboratory; Beta counter; Gamma counter; HPLC; Gel chromatography equipment; animal room.

Future Development Plans: Development of methodology to study meiosis in vitro, based on model available in laboratory with immortalized testis cells lines; cloning of cDNA of proteins characterized in laboratory.
Cooperation Arrangements with Developing Countries: Planned with Mexico.
Other International Cooperation Arrangements: La Jolla Cancer Research Foundation, California, USA; Worcester Foundation for Experimental Biology, Massachusetts, USA; Salk Institute, California, USA.

Bolivia

Biosphere Reserve Beni Biological Station (EBB)

Address: P.O. Box 5829, Av. 16 de Julio # 1732, La Paz, Bolivia. **Phone:** (+591 2) 350612; **Fax:** (+591 2) 350612; **E-mail:** cmiranda@ebb.rds.org.bo.
Director/Head: Carmen Miranda Larrea.
Number of Research Scientists: 6; **Number of Staff:** 39.
Scientific Fields of Interest: Agriculture; Biology; Energy; Environment; Anthropology.
Main Lines of Research and Training Activities: Tropical ecosystems; training for environmental education and rural development; support to local communities for protection and dissemination of traditional knowledge; natural resource management programme; environmental monitoring programme; cooperative programme for institutional exchanges of information.
Major Scientific Results or Products: Involved in more than 100 projects; published findings in scientific journals (26); reports (24); theses (10), and manuals for rural education and sustainable development (6); EBB birds and mammals guide; and First International Congress Proceedings.
Main Research Facilities Available: Central Office in La Paz: documentation centre; communication facilities, computers; Regional Office in San Borja: Housing for 2-4 visitors/researchers; documentation centre; computer; basic field work equipment; Operation Center in EBB area: housing for 60 visitors/researchers; library; basic field work equipment; experimental fields; permanent plots; botanical garden; weather station; laboratory.
Future Development Plans: Improve role as research and regional development centre. Strengthen applied agroecology and environmental management activities aimed at sustainable regional development; advance science in fields of expertise.
Cooperation Arrangements with Developing Countries: Promotes participation of Beni Department of Ecology and Environment in national and international forums; part of UNAMAZ (Association of Amazonian Universities); cooperation arrangements with national and foreign universities and institutions; member of Species Survival Commission; Iberoamerican Network of Biosphere Reserves, COMSATS.
Other International Cooperation Arrangements: Interamerican Foundation; UN Educational, Scientific and Cultural Organization (UNESCO); Smithsonian Institution; University of Nottingham, UK; University of Leicester; Conservation International; World Wildlife Fund; World Bank (Global Environmental Trust Funds; MABNet Americas; University of Pennsylvania, USAID.

Instituto Boliviano de Biologa de la Altura (IBBA)

Address: Casilla 717, La Paz, Bolivia.
Director/Head: Enrique Vargas Pacheco.
Number of Research Scientists: 17; **Number of Staff:** 50.
Scientific Fields of Interest: Biology; Chemistry; Environment; Medical Sciences.
Main Lines of Research and Training Activities: Pulmonary and cardiac function at high altitude; immunology; parasitology; nutrition; muscular exercise; haematological studies.
Major Scientific Results or Products: Human adaptation to high altitude.
Main Research Facilities Available: Computers; library.
International Cooperation Arrangements: University of Michigan (USA), French cooperation.

Brazil

Escola Paulista de Medicina Department of Biophysics

Address: Rua Botucatu, 862, 7°, 04023-062 São Paulo, SP, Brazil. **Phone:** (+55 11) 5724583; **Telex:** 55-1136977; **Fax:** (+55 11) 5715780; **E-mail:** BIOFIS CIS.EPM.BR.
Director/Head: Antonio C.M. Paiva.
Number of Research Scientists: 20; **Number of Staff:** 25.
Scientific Fields of Interest: Biochemistry/biophysics.
Main Lines of Research and Training Activities: Structure-activity relationships of peptide hormones; blood pressure regulation by vasoactive peptides; molecular biology of angiotensin and bradykinin receptors; proteases from tropical disease parasites; neuropeptide processing enzymes.
Major Scientific Results or Products: Publish about 15 papers in refereed journals each year; synthesize and distribute peptide hormones ("orphan drugs") to Brazilian public health service; synthesize and distribute novel substrates for proteolytic substrates.
Main Research Facilities Available: Automatic peptide synthesizers; amino acid analysers; oligonucleotide synthesizer; automatic DNA sequencer; spectrofluorimeters; spectrophotometers; HPLC; silicon graphics graphic station; 15 networked microcomputers.
Future Development Plans: Place more emphasis on molecular modelling and use of molecular biology for exploring structure-function relationships of peptide receptors.

Instituto de Biofsica Carlos Chagas Filho

Address: Ed. do Centro de Ciências da Saude, Bloco G/Sala G1-019, Cidade Universitaria, Ilha do Fundão, 21.944-970 Rio de Janeiro, Brazil. **Phone:** (+55 21) 5903787; **Fax:** (+55 21) 280 8193.
Director/Head: Fernando Garcia de Mello.
Number of Research Scientists: More than 80.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Environment; Medical Sciences.
Main Lines of Research and Training Activities: Institute carries out 7 programmes with laboratories involved in cellular biology and parasitology, immunobiology, biomembranes, molecular biology, environmental biophysics and radiobiology, physiology, neurobiology.
Major Scientific Results or Products: Published more than 200 scientific papers and presented more than 400 conference papers, 1991 - 1993.
Main Research Facilities Available: Molecular biology facilities, tissue culture, laboratories, electron and confocal microscopy, electrophysiology, anatomy and histology laboratories, patch clamp methodology, computerized molecular modelling, computer network facility, protein chemistry, FACS (Cell sorter), physiological research facilities.
Future Development Plans: Strengthen molecular biology, immunology and protein chemistry groups and facilities.
Cooperation Arrangements with Developing Countries: Laboratories in Latin American countries.
Other International Cooperation Arrangements: University of Maryland, School of Medicine (USA).

Universidade de So Paulo Chemistry Institute, Biochemistry Department (DBq-IQUSP)

Address: Caixa Postal 20780, 01498-970 São Paulo, SP, Brazil. **Phone:** (+55 11) 211-8281; **Telex:** 11-80902 USPO BR; **Fax:** (+55 11) 815-5579; **E-mail:** hchaimo@fox.cce.USP.br.
Director/Head: Hernan Chaimovich.
Number of Research Scientists: 42; **Number of Staff:** 51.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry; Medical Sciences.
Main Lines of Research and Training Activities: Chemistry, biochemistry and toxicology of free radicals and excited species; biochemistry, physiology and development of insects; membranes and interfacial modelling; peptide synthesis (research and services); molecular biology and biochemistry of carbohydrate; differentiation, molecular biology and signalling of lower eukaryotes, bacteria and

mammalian cells; cell and molecular biology of cell proliferation and control; biochemistry and molecular biology of *T. cruzi*; molecular biology of structure-function relationships of proteins and protein engineering; biochemical education.
Major Scientific Results or Products: Photobiochemical and photobiological processes; generation of carbon-centred radicals; protein engineering of actomyosin complex; molecular basis of porphyric diseases; antigenic description of *T. cruzi* surface; theory on evolution on insect digestive systems; quantitative description of micelle and vesicle modified reactions; cloning and expression of human growth hormone, proto-oncogenes and glucocorticoid-regulated genes; mechanisms of iron promoted oxidative damage of DNA; membrane characterization by EPR; extra- and intracellular signalling in lower eukaryotic differentiation; characterization of *M. domestica* proteins.
Main Research Facilities Available: EPR; CG-MS; 200 MHz NMR; FT-IR; CHN microanalyser; UV; visible and fluorescence spectrometers; spectropolarimeter; CG and HPLC; amino acid analyser; peptide and oligonucleotide synthesizers; protein and peptide sequencing; PCR machines; cell sorter; computer station; library: 68,000 volumes, 556 journal subscriptions, 80,000 bound issues.
Future Development Plans: Development of: theoretical chemistry of biomolecules; plant biochemistry; transgenic and knockout mouse technologies.
Cooperation Arrangements with Developing Countries: Research groups maintain collaborative research projects with laboratories in Argentina, Chile, Peru, Uruguay, Venezuela and Mexico.
Other International Cooperation Arrangements: Grants received from Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Germany, National Science Foundation (NSF) and National Institutes of Health (NIH), USA, Third World Academy of Sciences (TWAS), International Centre for Genetic Engineering and Biotechnology (ICGEB)-UN Industrial Development Organization (UNIDO), Tobbaco Foundation, Andes-Vitae-Antorchas Foundation.

Universidade de So Paulo Instituto de Biocincias (IB-USP)

Address: Rua do Matao, Travessa 14 No. 321, Caixa Postal 11.461, 05422-970 São Paulo, Brazil.
Phone: (+55 11) 211-4773; 818-7515; **Fax:** (+55 11) 818-7416; **E-mail:** ecdofilh@lion.cce.usp.br.
Director/Head: E. Cabral de Oliveira Filho.
Number of Research Scientists: 105; **Number of Staff:** 198.
Scientific Fields of Interest: Biology; Environment; Marine Sciences.
Main Lines of Research and Training Activities: Molecular and cell biology; Genetic and evolution of angiosperms, marine algae, fungi, bacteria, molluscs, insects, reptiles, birds and mammals, including man; Anatomy, development of plants; Physiology of the pigmentary cell; Taxonomy and phylogeny of various groups of animals and plants; Ethology of social insects; Phytochemistry; Oxygen metabolism; Osmoregulation; Chemical communication; Neurosciences; Ecological impacts, cultivation of seaweeds of economic importance; Management of fruit fly populations; Muscular dystrophies; Genetic diseases.
Major Scientific Results or Products: Published more than 1,000 scientific papers in past 3 years; genetic counselling; methods for controlling fruit flies; seaweed cultivation; ecological impacts.
Main Research Facilities Available: Electron microscopes (TEM & SEM); ultracentrifuges; molecular biology facilities; greenhouses; electrophysiology laboratory.
Future Development Plans: Holistic approaches to study of ecosystems and biodiversity; extend studies of molecular biology to other groups of organisms; improve classroom facilities.
Cooperation Arrangements with Developing Countries: With Latin American universities; hope to develop cooperation agreements with African and Asian universities.
Other International Cooperation Arrangements: Cooperation projects with North American and European universities.

Universidade Estadual de Campinas (UNICAMP) Instituto de Biologia

Address: Cidade Universitária “Zeferino Vaz, Caixa Postal 6109, 13083-970 Campinas, SP, Brazil;
Phone: (+55 192) 391112; **Fax:** (+55 192) 393124.
Director/Head: Aricio Linhares
Number of Research Scientists: 138; **Number of Staff:** 100.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Environment; Marine; Veterinary; Medical Sciences.

Main Lines of Research and Training Activities: Lines of research are concentrated in three main areas: ecology, molecular and biomedical sciences. These main areas are distributed among eleven Departments: anatomy, cellular biology, zoology, botany, parasitology, plant physiology, physiology and biophysics, genetics and evolution, histology, biochemistry, microbiology and immunology. The Museum of Natural History and Electron Microscopy Centre are also responsible for many types of research concerning the areas mentioned above.
Major Scientific Results or Products: In the last two decades, over 2,900 full papers were published in the main areas mentioned above, and more than 780 master's and doctor's degree theses were defended. Basic as well as applied research are carried out in the Institute.
Main Research Facilities Available: There is an operational computer network interconnecting our eleven Departments. Two workstations and computer facilities in almost each laboratory make access possible to data banks from abroad, such as the Gene Bank/EMBL Data Bank. Facilities to perform automated microsequencing of peptides and proteins, and to construct cDNA libraries are available.
Future Development Plans: To improve the capacity for training undergraduate and graduate students, as well as postdoctoral fellows, the Institute plans to build or expand building facilities for classroom teaching and others such as rearing house under genetically controlled conditions.
Cooperation Arrangements with Developing Countries: At present the Institute maintains some cooperation programmes with Latin American countries, as well as with some African ones.
Other International Cooperation Arrangements: Kansas University (USA); Imperial College (UK); Organization for Tropical Studies, Texas University; Cornell University; Louisiana State University; Smithsonian Institution.

Universidade Estadual Paulista (UNESP) Instituto de Biocincias

Address: Câmpus de Rio Claro, Av. 24 A, 1515, Caixa Postal 199, Rio Claro 13506-900 SP, Brazil.
Phone: (+55 19) 5340244; **Fax:** (+55 19) 5340009.
Director/Head: Osvaldo Aulino da Silva.
Number of Research Scientists: 120; **Number of Staff:** 197.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Environment.
Main Lines of Research and Training Activities: Biology (general); botany, biochemistry; microbiology, ecology, zoology, biomechanics; Physical Education; Education (general); Post-Graduation courses on: Plant Biology, Zoology, Cell and Molecular Biology, Microbiology, Motricity Sciences.
Major Scientific Results or Products: Published journal papers indexed scientific periodicals; presented papers at conferences, meetings, symposia, congresses; supervised theses and MSe dissertations; conducted training sessions.
Main Research Facilities Available: Library; research centres in environment and social insect studies; computing centre with e-mail and Internet connections; two field stations.
Future Development Plans: Establish new graduate courses; create external assistance programme aimed at increasing interaction between university and local/regional enterprises.
Cooperation Arrangements with Developing Countries: Scientific and technological agreements with Spanish universities; future links with other universities from MERCOSUL.

Universidade Federal de UberIndia Departamento de Biocincias (DEBIO)

Address: Caixa Postal 593, Uberlândia, MG 38 405-382, Brazil. **Phone:** (+55 34) 2122111 ext. 243; **Fax:** (+55 34) 2328620; **E-mail:** debio02 BRUFU.BITNET.
Director/Head: Oswaldo Marçal Junior.
Number of Research Scientists: 26; **Number of Staff:** 9.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Environment.
Main Lines of Research and Training Activities: Genetics: cytogenetics, genetics and biology of bees; Ecology: population and community ecology, ecology of natural vegetation, animal ecology, urban ecology, human ecology; Zoology: biological pest control, herpetology, ichthyology, mammalogy, insect behaviour; Botany: phytosociology, numeric taxonomy, plant anatomy and embryology, pollination and reproductive biology of plants, physiology of plant germination, pteridology; Science teaching: methodology for science teaching, environmental education.

Major Scientific Results or Products: Biology and genetics of Brazilian stingless bees *(Meliponinae)* is strongest line of research: studies on animal/plant interactions, including pollination and ant defence against herbivores, have resulted in international publications.
Main Research Facilities Available: Research and training laboratories (9) linked to different research lines: basic facilities for microscopy and laboratory work, herbarium, small zoological museum and animal breeding facilities; computer facilities and central library; electronic microscopy and remote sensing analysis equipment; experimental farms (3) and ecological reserve of natural vegetation.
Future Development Plans: Development of more clearly defined research lines and creation of integrated postgraduate programme on environmental sciences; join research programmes with other institutions in Brazil and internationally.
Cooperation Arrangements with Developing Countries: Facultad de Ciéncias Veterinárias (UNICEN) da Universidad Nacional del Centro de la Provincia de Buenos Aires.
Other International Cooperation Arrangements: Members of staff involved in EEC programme on reproductive biology and karyology of tropical plants. Potential for cooperation programmes with universities in Great Britain (St. Andrews) and Spain (Sevilla).

Universidade Federal do Rio de Janeiro (UFRJ) Departamento de Bioqumica (ICB/UFRJ)

Address: CEP 68041, 21941-700 Rio de Janeiro, Brazil. **Phone:** (+55 21) 2609895; **Fax:** (+55 21) 2708647.
Director/Head: Radovan Borojevic.
Number of Research Scientists: 30; **Number of Staff:** 10.
Scientific Fields of Interest: Biochemistry/Biophysics.
Main Lines of Research and Training Activities: Metabolism; cell biology; food chemistry; nutrition; protein chemistry; biotechnology; photosynthesis; molecular biology.
Main Research Facilities Available: 30 PCs (XT, 386, 486); scanning spectrofluorimeter and spectrophotometers; HPLC; FPLC; protein microsequencer; gas chromatograph; lyophilizer; scintillation counters; library.
Cooperation Arrangements with Developing Countries: National Autonomous University of Mexico.
Other International Cooperation Arrangements: Commission of European Community.

Chile

Pontifical Catholic University of Chile Department of Physiological Sciences

Address: Faculty of Biological Sciences, P.O. Box 114-D, Santiago 1, Chile. **Phone:** (+56 2) 2224516 ext. 2864; **Telex:** PUCVA-CL 240395; **Fax:** (+56 2) 2225515.
Director/Head: Juan Roblero.
Number of Research Scientists: 17; **Number of Staff:** 19.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics.
Main Lines of Research and Training Activities: Laboratory of Neurobiology: physiology of arterial chemoreceptors and its contribution to respiration regulation. Neurohumoral Regulation Unit: central regulation of cardiorespiratory functions; circulatory homoeostasis and functions of neuropeptides and endogenous opioids; hormonal, systemic and local regulation of microcirculation; characterization of receptors for neuropeptides; regulation and function of gap junctions in diverse tissues under physiological and pathological conditions; participation of peptides in renal and cardiovascular regulation and clinical problems related to arterial hypertension. Reproduction and Development Unit: neuroendocrine regulation of gonadotropin secretion; physiology of spermatic cells; physiology of fallopian tube; endocrinology of pregnancy and fetus; endocrinology of human nursing and its relationship with postpartum infertility.
Major Scientific Results or Products: Research-related publications in journals and preparation of book chapters.

Main Research Facilities Available: Set ups for electrophysiological recording of neural activities, including recording of ventilatory and cardiovascular variables; set ups for microcirculatory studies; continuous recording of catecholamines release from tissues; electrophoresis equipment for analysing amino acid, peptides, proteins and ribonucleic acids; tissue culture room; multichannel tape and video tape recorders for storage and display of electrophysiological data; computers/printers; scientific journals.
Future Development Plans: Collaborative programmes have been initiated with both national and North American universities.
Cooperation Arrangements with Developing Countries: Postdoctorate training in physiology for students from Latin American countries.
Other International Cooperation Arrangements: Collaborative research programmes with several international institutions.

Universidad de Chile Departamento de Bioqumica

Address: Facultad de Medicina, Casilla 70086, Santiago 7, Chile. **Phone:** (+65 2) 7370081 ext. 5272; **Fax:** (+65 2) 7355580.
Director/Head: Eugenia del Villar.
Number of Research Scientists: 30; **Number of Staff:** 20.
Scientific Fields of Interest: Biochemistry/Biophysics; Environment; Medical Sciences.
Main Lines of Research and Training Activities: Signal transduction in eukaryotes and prokaryotes; human genetics; stress responses in microorganisms; biochemistry/physiology of bioleaching microorganisms; biochemistry/molecular biology of parasites; bioavailability of drugs; biochemistry/toxicology of environmental pollutants; mechanisms of cell proliferation; drugs metabolism/biological oxidations.
Major Scientific Results or Products: Publish between 20 and 25 articles each year in international journals; monitor environmental city pollutants and assess health risk; develop methods for monitoring bioleaching bacteria in industrial operations; monitoring drug levels in patients.
Main Research Facilities Available: Ultracentrifuges; microcomputers; HPLC; autoclaves; laminar flow chambers; microscopes (light, EM) spectrophotometers; DNA sequencing facilities; deep freezers; library.
Future Development Plans: Obtain private financial support for research; expand the research lines and training activities towards problems of interest for the country.
International Cooperation Arrangements: Research projects financed by Swedish Agency for Research Cooperation with Developing Countries (SAREC), UN Industrial Development Organization (UNIDO), World Health Organization (WHO), ICI (Spain).

Universidad de Chile Departamento de Biologa Celular y Gentica

Address: Faculty of Medicine, Independencia 1027, Casilla 70061, Santiago 7, Chile. **Phone:** (+56 2) 776560; **Fax:** (+56 2) 7373158; **E-mail:** hpalomin@med.uchile.cl.
Director/Head: Hernan Palomino.
Number of Research Scientists: 39; **Number of Staff:** 25.
Scientific Fields of Interest: Biology; Medical Sciences.
Main Lines of Research and Training Activities: Genetics: biology, evolution, behaviour; immunogenetics: MHC; populations, epidemiology, congenital malformations. Cytogenetics: ultrastructure, evolution. Human reproduction: histophysiology, gametes, hormones. Photosynthesis: aquaculture. Biology: phytobiology, molecular, cellular.
Major Scientific Results or Products: Publication of scientific papers in international journals.
Main Research Facilities Available: Sixteen laboratories with optic, electron and scanning microscopes; laboratories with equipment for cellular, molecular, DNA technologies; computer facilities with statistical software.
Future Development Plans: Molecular, cellular and immunogenetic studies on Chagas' disease; linkage analyses on congenital malformations; biology of gametes and infertility; human and vertebrate population studies; human, ultrastructural and evolutive cytogenetics; salivary research cell biology.
International Cooperation Arrangements: Collaborative research with: University of Texas at Houston (USA); CSIC, Madrid (Spain); University of Essex (United Kingdom) and New York University (USA).

Other international cooperation arrangements with: European Community, World Health Organization (WHO), Third World Academy of Sciences (TWAS), PNUD/United Nations Educational, Scientific and Cultural Organization (UNESCO), Rockefeller, PLAMIRH, National Institutes of Health (NIH).

China

Chinese Academy of Sciences (CAS) Chengdu Institute of Biology

Address: No. 9, the 4th Section, Renminnan Road, Chengdu City 610041, Sichuan Province, China.
Phone: (+86 28) 5583920; **Fax:** (+86 28) 5582753; **E-mail:** biosb@ntr.cdb.ac.cn.
Director/Head: Li Bogang.
Number of Research Scientists: 296 (14 PhDs + 282 others); **Number of Staff:** 151.
Scientific Fields of Interest: Agriculture; Biology; Energy; Chemistry; Environment; Zoology.
Main Lines of Research and Training Activities: Applied research in the four fields: creating and breeding new plant varieties by using new and traditional technologies together; Studying and developing natural drugs and environmentally safe natural pesticides; Controlling environment and rehabilitating degraded ecosystems; Studying and developing microbial resources and microbiology technology. Basic research: Evolution, taxonomy and fauna of amphibians and reptiles; Evolution, taxonomy and flora of plants; Ecology and geobotany; Species biodiversity and conservation. Master degree courses available in the fields of botany, microbiology, zoology, phytochemistry, etc.
Major Scientific Results or Products: Institute has received 221 research achievements and won 73 prizes. Recognized for development of Chuanyu 8 (wheat variety), Ningnanmycin (antibiotic to control bacterial leaf blight of rice) and Diaoxinxuekang (drug for cardiovascular diseases).
Main Research Facilities Available: Institute's advanced instruments include superconductive nuclear magnetic resonance analyser and high pressure liquid chromatographs; field stations (4) that focus on research issues related to rehabilitation of degraded ecosystems; more than 200,000 herbaria and 170,000 specimens of amphibians and reptiles; 200,000 books and periodicals.
Future Development Plans: Long-term strategies call for exploring problems issues to natural resources and developing bio- and other high technologies for agricultural, environmental protection, medicine and industry.
International Cooperation Arrangements: Have participated in collaborative studies and international research efforts with scientists from USA, Japan, UK, Germany and other countries as well as regional and international organizations.

Chinese Academy of Sciences (CAS) Institute of Biophysics

Address: 15 Datun Road, Chaoyang District, Beijing 100 101, China. **Phone:** (+86 1) 2022021; **Telex:** 2028; **Fax:** (+86 1) 2027837.
Director/Head: Shu-rong Wang.
Number of Research Scientists: 700; **Number of Staff:** 330.
Scientific Fields of Interest: Molecular biology/Biophysics.
Main Lines of Research and Training Activities: Structure, conformation, dynamics of enzyme molecules; kinetics of enzyme action; enzymes involved in metabolic regulation; molecular biology; folding of nascent peptide chain; three-dimensional structure and function of insulin, dehydrogeneses, phospholipases and other enzymes; crystal structure analysis of light-harvesting proteins; structure and conformational dynamics of proteins and nucleic acids; lipid-protein interaction of mitochondria, sarcoplasmic reticulum, mycoplasma and other membranes; translocation of protein across membranes; membrane cytoskeleton; biomembranes and diseases; structure and functions of visual systems; cell biophysics; protein engineering.
Major Scientific Results or Products: 1989 Chen Jiagen Prize for Life Sciences; studies on quantitative relation between chemical modification of side chain functional groups and biological activities of proteins; National Natural Science Award, 2nd class; precise structure of insulin and despentapeptide insulin at high resolution; National Natural Science Award, 3rd class; Studies on effect

of Mg2+ on reconstitution of mitochondrial H+ -ATPase; formation and properties of fluorescent derivative of D-glyceraldehyde-3-phosphate dehydrogenase; Academia Sinica Natural Science Award, 1st class; flexibility of enzyme active sites; kinetics of irreversible inhibition of enzyme activity; studies on precise structure of insulin at 1.2A resolution; Ministry of Public Health Award: Comprehensive investigation of Keshan disease in Chuxing, Yunnan Province, China; visual neuronal circuity and information processing in midbrain; relationship between structure and function of corpus callosum; neurocomputing and computer simulations of motion perception; lambrokinase; KS phototherapeutic instrument for superficial cancers; DYS low level liquid scintillation counter; Meeg902 brain electrical activity detecting and analysis system; 404-ESR.
Main Research Facilities Available: Electron Microscope; VAX-117730 computer system; laser Raman spectrophotometer; X-200B X-ray area detector system; RU-300 rotating anode X-ray generator; SG-silicon-graphics system; 4-cycle-diffractometer (Cad4); Vax-R computer; FPLC and HPLC system (GP 250, LKB); Fourier transformed infrared (FITR)-laser Raman spectra system; J-500 A CD; Leitz MPV-TAS PLUS image analytic system; ESR and NMR; L8-80 and TL-100 ultracentrifuges (Bekman); spectrophotometers.
Future Development Plans: Additional studies in fields of molecular biology, neurobiology, cell biophysics and protein engineering; develop bioanalytical technology and design and manufacture biomedical instruments.
International Cooperation Arrangements: Scientific exchange of scientists, graduate students and joint publications with USA, Canada, Australia, Germany, France, Switzerland, UK, Italy and Japan.

Chinese Academy of Sciences (CAS) Institute of Developmental Biology (IDB)

Address: Beijing 100080, China. **Phone:** (+86 10) 62645835; **Fax:** (+86 10) 62645835; **E-mail:** sunfz@sun.ihep.ac.cn.
Director/Head: Fang-Zhen Sun.
Number of Research Scientists: 48; **Number of Staff:** 86.
Scientific Fields of Interest: Biology.
Main Lines of Research and Training Activities: Studies on molecular mechansim of fertilization in mammals and plants; Developmental potentials of animal embryonic and somatic cell nuclei; The roles of mRNA on animal early development; Cell differentiation and pattern formation; Transgenic research on animals and plants. IDB has scientific training programmes for Master and PhD degree students.
Major Scientific Results or Products: Research findings published in leading international and national bioscience journals.
Main Research Facilities Available: Electron microscope, ultracentrifuges, liquid scintillation counter, computerized dynamic imaging system, high pressure and low pressure liquid chromatography, micro-manipulating systems, confocal microscope, capillary electrophoresis system and electrophoresis apparatus; experimental animal housing facilities for mammals, Xenopus, fishes; greenhouse.
Future Development Plans: Establish Institute as international centre for developmental biology research in Asia.
Cooperation Arrangements with Developing Countries: If adequate funding is available, Institute will host visiting scientists and PhD students from developing countries for research and training.
Other International Cooperation Arrangements: Extensive academic connections with scientists worldwide. Laboratory for molecular developmental biology supported in part by grants from Rockefeller Foundation (USA). Institute hosts scientists from USA, UK, Japan, France, Australia, Canada.

Chinese Academy of Sciences (CAS) Institute of Genetics

Address: Beijing 100101, China. **Phone:** (+86 1) 4914896; **Fax:** (+86 1) 4914896.
Director/Head: Shouyi Chen.
Number of Research Scientists: 160; **Number of Staff:** 80.
Scientific Fields of Interest: Agriculture; Biology; Medical Sciences.
Main Lines of Research and Training Activities: Research on biological law of inheritance and variation, including plant molecular genetics, genetic engineering, plant molecular cytogenetics, genomics and plant, conventional breeding.

Major Scientific Results or Products: During past 30 years, published 52 books and more than 1800 papers; obained 360 scientific results.
Main Research Facilities Available: Conduct advanced research on cellular and molecular biology; state key laboratory; CAS key laboratory; two experimental field stations in Beijing; 23 field stations in other provinces; new computer station to be established; library.
Future Development Plans: Research to focus on plant cytology and molecular biology/microbiological, medical, human and animal genetics; biotechnological products.
Cooperation Arrangements with Developing Countries: International Rice Research Institute (IRRI) in Philippines: rice genome mapping.
Other International Cooperation Arrangements: USA, Japan, Australia and Russia: human genome variety; USA, Australia and Japan: plant cytology; USA: rice genome; UK: cytology in wheat; Japan: cell culture in barley; Germany: genetic engineering of monocots and artificial seeds.

Chinese Academy of Sciences (CAS) Institute of Microbiology

Address: 13 Beiyitiao, Zhongguancun, Beijing 100080, China. **Phone:** (+86 10) 6255-2178; **Fax:** (+86 10) 6256-0912; **E-mail:** menggz@sun.im.ac.cn.
Director/Head: Guang Zhen Meng.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Environment; Medical Sciences.
Main Lines of Research and Training Activities: Bioresource and biodiversity: culture collection, systematics, screening for search of lead compounds and new metabolic products, ecology, molecular virology; Molecular genetics and breeding: molecular genetics of prokaryotic cell, expression and regulation of gene, microbial breeding by recombinant DNA technique; Biotechnology (innovation and commercialization): plant genetic engineering, enzyme engineering, fermentation engineering, protein engineering, pharmaceutical biotechnology, glycotechnology.
Major Scientific Results or Products: As of 1995, received about 300 achievements, some of which were from CAS and central and local governments; hundreds of scientific papers published each year.
Main Research Facilities Available: Computers; amino acid analysers; HPLC system; capillary electrophoresis system; automated peptide synthesizer; ultracentrifuge; DNA sequencer; molecular imager; benchtop fermentor; complete glyko FACE workstation; fluorescent gel documentation system.
Future Development Plans: Research and development strategy for next five years calls for strengthening basic research and high-tech innovation; enhancing cooperation with enterprises at home and abroad; advancing technology transfer and commercialization of scientific achievements.
Other International Cooperation Arrangements: Joint research programmes with USA, Japan, Russia; joint laboratory with World Laboratory in Italy.

Chinese Academy of Sciences (CAS) Institute of Zoology

Address: 19 Zhongguanchun Lu, Haidian, Beijing 100080, China. **Phone:** (+86 1) 255-5809; **Fax:** (+86 1) 2565689.
Director/Head: Wang Zuwang.
Number of Research Scientists: 190; **Number of Staff:** 280.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Chemistry; Environment; Medical Sciences; Mathematics.
Main Lines of Research and Training Activities: 1) Taxonomy, Zoogeography, Faunistics, Ecology and Evolution of Vertebrates and Invertebrates. 2) Chemical Communication of Insects; Genetic, Biochemical and Physiological Mechanisms of Pesticides. 3) The Regulatory Mechanism and Function of Hormones and Growth Factors; The Molecular Mechanism of Energy Transduction and Information Transmission in Biomembranes.
Major Scientific Results or Products: Studies on ecology and outbreaks of oriental migratory locust in China; synopsis of Avifauna in China; sex pheromone identification and synthesis on pest insects; studies on population dynamics and IPM of cotton pests; synthesis and function in ovulation of ovarian uPA and tPA in mammals.

Main Research Facilities Available: Ecosystem research stations (3); experimental animal house; library; systematic collections of animal specimen; 60 research instruments, including scanning electron microscopy, transmission electron microscopy, ultracentrifuge and liquid scintillation counter.
Future Development Plans: Retain leading position in study of zoology in China; advance virtually all research to international level in 20 years.
Cooperation Arrangements with Developing Countries: Applied to CAS for cooperation with University of Malaysia under South-South Cooperation Scheme.
Other International Cooperation Arrangements: Scientific exchanges with Max-Planck Gesellschaft (Germany), Royal Society (UK), CSIRO (Australia) and institutions in the United States, Sweden, Japan.

Chinese Academy of Sciences (CAS) Shanghai Institute of Biochemistry

Address: 320 Yue-Yang Road, Shanghai 200 031, China. **Phone:** (+86 21) 4374430; **Fax:** (+86 21) 4338357.
Director/Head: Qi-shui Lin.
Number of Research Scientists: 200; **Number of Staff:** 200.
Scientific Fields of Interest: Biochemistry/Biophysics.
Main Lines of Research and Training Activities: Structure and function of biological macromolecules, peptides, proteins, enzymes, RNA, DNA; molecular genetics/genetic engineering, regulation of gene expression; biological membranes, mitochondria, insulin receptor, glycoprotein; metabolism, monoclonal antibody.
Major Scientific Results or Products: Synthesis of crystalline bovine insulin; synthesis of yeast alanine transfer RNA; Hepatitis B surface antigen recombinant vaccine; epidermal growth factor; r-interferon; Interleukin-2.
Main Research Facilities Available: HPLC; FPLC; ultracentrifuge; electron microscope; microsequencer; micro amino acid analyser; peptide synthesizer; capillary electrophoresis; DNA sequencer; DNA synthesizer; liquid scintillation; r-counter; stop-flow; spectrophotometer; fluorospectrophotometer.
Future Development Plans: Emphasize basic and applied research; encourage technology transfer from laboratory to factory.
Cooperation Arrangements with Developing Countries: Close ties with Shanghai Life Science Center of Chinese Academy of Sciences.
Other International Cooperation Arrangements: Cooperation arrangements with Max-Planck Gesellschaft, Germany and Rockefeller Foundation, USA.

Chinese Academy of Sciences (CAS) Shanghai Institute of Cell Biology (SICB)

Address: 320 Yo-Yang Road, Shanghai 200031, China. **Phone:** (+86 21) 64315030; **Fax:** (+86 21) 64331090.
Director/Head: Guo Li-he.
Number of Research Scientists: 120; **Number of Staff:** 142.
Scientific Fields of Interest: Biology.
Main Lines of Research and Training Activities: Research: genetic engineering/protein engineering; structure of eukaryotic genome and gene expression; chromosome biology; differentiation of normal and cancer cells; cell immunology; cell engineering; cell surface membrane and cytoskeleton; developmental biology and neurobiology; signal transduction. Training: Master and PhD students; advanced training courses; students working on BS thesis.
Major Scientific Results or Products: Construction of artificial chromosome; Individual gene expression system in higher mammals; genetic engineering of human growth hormone and insulin; structure and function of Trichosanthin; growth factor, oncogene and cellular neoplastic transformation; regulation of globulin gene expression; immunogencity and expression of human sperm and membrane proteins; epidermal conductivity of amphibian embryos; in vitro maturation and fertilization of oocytes in amphibians; monoclonal antibodies against human liver carcinoma and lung cancer; mass cell culture techniques and manufacturing of serum and protein free medium.
Main Research Facilities Available: About 2800 instruments, including transmission and scanning EM, FACS, HPLC, DNA synthesizer, liquid scintillation counter, refrigerated ultracentrifuges, biosensor,

cytosensor, hollow fiber system, macrocarrier bioreactor; computerized administration; joint library with more than 630,000 volumes books and 880 journals.
Future Development Plans: Study such life activities as cell growth, differentiation, neoplastic transformation, immune response and their regulation and control at molecular and cellular levels; solve practical problems in biotechnology; produce products for medicine and agriculture.
Cooperation Arrangements with Developing Countries: International Oocyte Training Course, including lectures and laboratory work, opened to developing countries in 1997, which is sponsored by ICRO-UNESCO, CAS and Max-Planck Society.
Other International Cooperation Arrangements: Max Planck Guest Laboratory supported by Academia Sinica and Max-Planck Society established in 1985. World Laboratory, supported by both ICSC-World Laboratory and Shanghai Institute of Cell Biology, established in 1988.

Chinese Academy of Sciences (CAS) Shanghai Institute of Materia Medica (SIMM)

Address: 294 Tai-yuean Road, Shanghai 200031, China. **Phone:** (+86 21) 643 11833; **Fax:** int.+86 21) 64370269; **E-mail:** kxchen@iris3.shmm.ac.cn.
Director/Head: Chen Kaixian.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry; Engineering/Technology; Medical Sciences.
Main Lines of Research and Training Activities: The Institute is a comprehensive research institute for new drugs in both basic and applied fields by multidisciplinary cooperation. Efforts are devoted to the study of structure-activity relationships of biologically active substances. The main fields of research are as follows: chemistry of natural products, neuroactive substances, antineoplastic drugs, fertility-regulatory compounds, immunomodulatory agents, cardiovascular remedies, medicinal chelating agents, antibiotics, genetic engineering and computer-acidided drug design. The latest methods and techniques for organic synthesis, isolation, purification and identification of natural products as well as sensitive bioassays are used to explore biologically active substances. Studies on pharmacology, toxicology and mechanism of action of new medicines are carried out.
Major Scientific Results or Products: Since 1955, have received about 160 basic and applied research achievements, including studies on sites and mechanisms of analgesia of morphine, 12 active compounds of Chinese medicinal plants, Huperzine A—new cholinestrase inhibitor, synthesis of maytansine.
Main Research Facilities Available: About 100 large and medium-sized instruments for biological and chemical research; State Key Laboratory of New Drug Research; library (90,000 books and 600 periodicals); experimental animal house; herbarium; computer-work station.
Future Development Plans: National Science and Technology Committee has designated Institute as site of “National Drug Screening Centre,” scheduled for completion in three years.
Cooperation Arrangements with Developing Countries: Brazil in field of natural products.
Other International Cooperation Arrangements: Foreign pharmaceutical companies in Japan, USA, France.

Chinese Academy of Sciences (CAS) Shanghai Institute of Physiology

Address: 320 Yue-Yang Road, Shanghai 200031, China. **Phone:** (+86 21) 64370080; **Fax:** (+86 21) 64332445.
Director/Head: Yang Xiong-Li.
Number of Research Scientists: 85; **Number of Staff:** 200.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Engineering/Technology; Medical Sciences.
Main Lines of Research and Training Activities: Cellular and molecular neurobiology; developmental neurobiology, biocybernetics and bio-medico engineering; sensory information processing, hypoxia physiology (cardiovascular and respiratory physiology).
Major Scientific Results or Products: Information processing in retina and visual centres of CNS; quantitative analysis of auditory discriminative function; tolerance and acclimatization of cardiac pump and respiration to hypoxia; neural mechanism of acupuncture analgesia. Products designed and

manufactured include EMG controlled artificial limb, electrophysiological amplifier and stimulator, microelectrode puller and new natural nutrients.
Main Research Facilities Available: Electron microscope opton 902, freeze-etching BAF-4000; microcomputers PDP, IBM, Apple, high performance liquid chromatography, fast protein liquid chromatography, various spectrophotometers (fluro, ultroviolet), ultracentrifuges, hypobaric chamber, cardiopulmonary diagnostic equipment, polygraph RM-6000, blood gas analyser, oxygen dissociation analyser, radioisotope laboratory, electrophysiological equipment.
Future Development Plans: Institute will continue to pursue its two main activities: basic research emphasizing cellular, molecular and developmental neurobiology, and design and manufacture of new products based on its research findings.
Cooperation Arrangements with Developing Countries: Institute is ready to exchange scientists and accept young scientists from developing countries.
Other International Cooperation Arrangements: Institute maintains cooperative ties with National Institute for Physiological Sciences of Japan, Cullen Eye Institute, Baylor College of Medicine, Pharmacological Institute, Albert-Ludwigs University.

Fudan University Institute of Genetics

Address: 220 Handan Road, Shanghai 200433, China. **Phone:** (+86 21) 5483924, 5492222 ext. 3793; **Telex:** 33317 HUAFU CN; **Fax:** (+86 21) 5491875.
Director/Head: Shou-yuan Zhao.
Number of Research Scientists: 66; **Number of Staff:** 32.
Scientific Fields of Interest: Biology.
Main Lines of Research and Training Activities: Human and Medical Genetics: long-range restriction mapping of human chromosome, YAC library construction and screening, gene therapy. Microbial Genetics: molecular mechanism of thermostability of thermophilic bacterium, selection and breeding for high yield strains. Plant Molecular and Cell Genetics: molecular mechanism of male sterility of rice, transgenic plant, rice genome analysis. Evolutionary and Behaviour Genetics: Analyses of isoenzymes and mitochondrial DNA in different Drosophila populations. Genetic Engineering: Gene synthesis and gene cloning, host-vector system in yeast, isolation and purification of medical active peptides produced by engineering strains.
Major Scientific Results or Products: Long-range mapping of DMD gene, construction of Chinese genomic YAC library, animal model for haemophilia B gene therapy; genes coding for IFNS, TNFa, TNFb, IL-2, thermostable DNA polymerase, a-amylase and ANF have expressed in E. coli and yeast; purificaiton of protein products; fine restriciton mapping of rice chloroplast DNA.
Main Research Facilities Available: Amino Acid Sequencer; DNA sequencer; ultracentrifuge; scintillation counter; computer Vax II; library; HPLC; FPLC; fermentator (5 l, 16 l); pulse field gel electrophoresis.
Future Development Plans: Emphasis on basic research of genetics including structure and function of genes, organization of human and rice genome, molecular mechanism of male sterility of rice and molecular evolution. Further development of practical application to medicine, agriculture and industry, particularly in genetic engineering.
Cooperation Arrangements with Developing Countries: Interferon Sciences Inc. (USA); Ghent University (Belgium, European Community). Received funds from Rockefeller Foundation (USA) and UN Industrial Development Organization (UNIDO).

National Laboratory of Biomacromolecules (NLB)

Address: Institute of Biophysics, Academia Sinica, Beijing 100101, China. **Phone:** (+86 10) 6202-2027; **Fax:** (+86 10) 6202-2026.
Director/Head: Xu Gen-jun.
Number of Research Scientists: 20; **Number of Staff:** 6.
Scientific Fields of Interest: Biochemistry/Biophysics.
Main Lines of Research and Training Activities: The major projects in the basic principled study and relative study of the structure and function of the biomacromolecules. Its research emphasis focus on: Enzyme catalytic and regulatory mechanisms; Kinetics of irreversible modification of enzyme activity;

Folding of the nascent peptide chain into a biological active protein; Studies on the three dimensional structure, conformation and function relationship of biomacromolecules; Structural-function relationship of biomembranes centred on the interaction of membrane lipids and membrane protein.
Major Scientific Results or Products: "Conformational flexibility of enzyme active sites," Science, 282, 380-381 (1993); "A Proposed Interaction Model of the Insulin Molecule with its Receptor," Biophys. Chem. 50, 63-71 (1994); "Effect of Transmembrane Ca2+ Gradient on Gs function," FEBS Letters, 357, 13-15 (1995).
Main Research Facilities Available: Major instruments include 400 and 600 MHz spectrometer; Siemens X-200B area detector system; Rota flex 18-Kw stabilized rotating; anode X-ray generator and attachment; 38LA-00 DNA synthesizer; bio-rad polypeptide synthesizer; dionex temperature jump and stopped flow fast kinetics; 299T nanosecond spectrofluorimeter; JASCo-720 and 500A spectropolarimeter; Bio-rad FT-65A FT-IR and FT-Raman spectrometer; Waters HPLC, pharmacia FPLC, etc.
Future Development Plans: Focus on structural biology.

China, Taiwan

Academia Sinica Institute of Molecular Biology

Address: Nangkan, Taipei 11529, Taiwan, China. **Phone:** (+886 2) 7821236, 7821436; **Fax:** (+886 2) 7826085.
Director/Head: C.C. Wang.
Number of Research Scientists: 25; **Number of Staff:** 88.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Medical Sciences.
Main Lines of Research and Training Activities: Cellular response to external stimuli; molecular interactions; genetic programming; structural biology; molecular virology and immunology; molecular parasitology.
Major Scientific Results or Products: Human adrenodoxin gene and steroid hormone synthesis; functional and regulational analyses of chicken glutathione S-transferases; immunological studies of pseudomona exotoxin A; gene analysis of Drosophila laminin B2; transcriptional investigations of bacteriophage Xp 10 in xanthomonas campestri pv. oryzae; RNA self-cleavage and self-ligation of HDV; restricted V-(D), J junctional regions in T cell response to l -repressor.
Main Research Facilities Available: Siemens X-1000 area detector, SDMS area detector, AFC5R diffractometer, MicroVAX III computer, silicon graphics computer, convex C120 computer; centrifuges and ultracentrifuges; microscopy equipments; IBM AT compatible computers and Macintosh computers, library.
Future Development Plans: Mmost powerful method of determining the 3-dimensional structures of biological macromolecules remain single crystal X-ray diffraction methodology. Institute intends to utilize available resources and intellectual talents to fully develop X-ray crystallographic studies in next few years. Molecular parasitology will be another focus of our research.

Colombia

Universidad de Los Andes Instituto de Gentica

Address: Carrera 1E No.18A-10, Sante Fe De Bogota, D.C. Bogotà D.E. Colombia. **Phone:** (+57 1) 2816440, 2849911 Ext.2752; **Telex:** 42343 UNAND CO; **Fax:** (+57 1) 2841890; **E-mail:** mlinares@uniandes.edu.co.
Director/Head: Mauricio Linares.

Number of Research Scientists: 10; **Number of Staff:** 6.
Scientific Fields of Interest: Biology: Genetics and Evolution.
Main Lines of Research and Training Activities: Origin of biodiversity and major adaptations of Drosophila flies and Heliconius butterflies; population genetics and evolution of intrinsic and extrinsic (geographic barriers and selection gradients) of reproductive isolation and mimetic coloration; systematic phylogenetic inference at intra and interspecific level with molecular and morphological techniques.
Major Scientific Results or Products: Scientific publications.
Main Research Facilities Available: Electrophoretic equipment for starch and acrylamide runs; isoelectrofocusing equipment with phase-system analysis computer; incubators; centrifuges; power sources; refrigeration for -30°C for restriction enzyme work; butterfly insectary cages; small vehicle (jeep).
Future Development Plans: Develop Institute into one of most important research centres in Latin America, concentrating on molecular and morphological traits; advance PhD programme as part of overall strategy.
Cooperation Arrangements with Developing Countries: University of Porto Alegre, Brazil; Universidad Católica de Quito, Ecuador.
Other International Cooperation Arrangements: University College London, England; Universidad Autónoma de Barcelona, Spain.

Ecuador

Pontificia Universidad Catlica del Ecuador Departamento de Ciencias Biolgicas

Address: Av. 12 de Octubre y Carrion, Apartado 17-01-2184, Quito, Ecuador. **Phone:** (+593 2) 509-573. **Fax:** (+593 2) 509-573.
Director/Head: Alberto Padilla.
Number of Research Scientists: 17; **Number of Staff:** 32.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Environment.
Main Lines of Research and Training Activities: Biochemistry/Molecular Biology; Genetics; Microbiology; Developmental Biology; Zoology; Entomology; Botany; Biotechnology.
Major Scientific Results or Products: Publications in different areas of biology.
Main Research Facilities Available: Microscopes; computers (Macintosh and IBM); superspeed centrifuge (refrigerated); electrophoresis apparatus and power supplies; autoclaves; herbarium; entomology museum; field station in the Amazon under construction.
Future Development Plans: Undertake research in molecular biology at higher level and create graduate programme in biology.
International Cooperation Arrangements: University of Aarhus, Denmark; proposed cooperation initiatives with University of Houston, Department of Biochemistry and Biophysics for studies in molecular biology and biochemistry.

Ethiopia

Armauer Hansen Research Institute (AHRI)

Address: P.O. Box 1005, Addis Ababa, Ethiopia. **Phone:** (+251-1) 710288, 711202; **Telex:** 21138 AHRI ET; **Fax:** (+251-1) 711390; **E-mail:** ahri@alinks.se.
Director/Head: Sven Britton.
Number of Research Scientists: 6; **Number of Staff:** 55.
Scientific Fields of Interest: Biology; Medical Sciences.

Main Lines of Research and Training Activities: Basic and applied research on mycobacterial and related tropical diseases of Ethiopia and of the region in general in order to develop understanding and improve methods of prevention and clinical management. Contributing to the development of health research manpower of Ethiopia through teaching supervision and research cooperation.
Major Scientific Results or Products: Publications in scientific reviews.
Main Research Facilities Available: Facilities required for studies in cellular immunology; equipment for research in molecular biology, including FACScan, densitometer; library with 70 journal subscriptions in field of immunology.
Future Development Plans: Additional research on roles of genetics in susceptibility/resistance to tuberculosis; pathogenesis of latent and reactivation of tuberculosis; mucosal immunity in theogensis of leprosy.
Cooperation Arrangements with Developing Countries: All-Africa Leprosy and Tuberculosis Rehabilitation and Training Centre (ALERT); Ethiopian Nutrition and Health Research Institute (ENHRI); Addis Ababa University, Addis Ababa, Ethiopia.
Other International Cooperation Arrangements: Swedish Agency for Research Cooperation with Developing Countries (SAREC); Norwegian Council of Universities Committee for Development Research Education (NUFU); European Economic Union (EEC) and World Health Organization (WHO).

India

Bose Institute

Address: 93/1, Acharya Prafulla Chandra Road, Calcutta-700 009, India. **Phone:** (+91 33) 350-7073; **Telex:** 021-2646; **Fax:** (+91 33) 343886; **E-mail:** pkray@boseinst.ernet.in.
Director/Head: P.K. Ray.
Number of Research Scientists: 65; **Number of Staff:** 450.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Chemistry; Engineering/Technology; Environment/Immunotechnology; Marine; Veterinary; Medical Sciences; Physics/Astronomy.
Main Lines of Research and Training Activities: Physical and biological basic and applied research; services and consultancy in biological sciences, instrumentation, informatics; sponsored industrial work; two-year training course in biotechnology; research fellowships for PhD students.
Major Scientific Results or Products: Produced transgenic plants and animals; developed endocrine-based techniques for improved breeding in fish; identified anti-cancer agent (Protein A); discovered anti-toxic and anti-carcinogenic agent of prime importance for 2nd generation chemotherapy and protection of workers exposed to toxic and carcinogenic agents; produced drugs from marine sources now being tested for use in heart diseases; developed immunodiagnostics for tuberculosis, lesihmaniasis and DNA based diagnostics for amoebiosis.
Main Research Facilities Available: In D.I.C.: Micro VAX II and micros, CD-ROM workstation, E-mail, Internet, Nicmail, Nicnet, FTP and remote login; library, facilities for physical and biological research. In Laboratories: GLC, HPLC, ultracentrifuge, fraction collector peptide synthesizer, protein sequencer, DNA sequencer, FACS scan and FACS vantage, capillary electrophoresis, nanosecond spectrophotometer, FT-NMR.
Future Development Plans: Decentralize major facilities to facilitate transcampus activities; develop laboratory animal facilities in India and abroad.
International Cooperation Arrangements: UN Development Programme (UNDP); plans for cooperation with British Council/British Aid Programme; Food and Agriculture Organization (FAO); US EPA, World Health Organization (WHO); Food and Agriculture Organization (FAO), IARC, International Atomic Energy Agency (IAEA), Third World Academy of Sciences (TWAS).

Council of Scientific and Industrial Research (CSIR) Centre for Cellular and Molecular Biology (CCMB)

Address: Uppal Road, Hyderabad 500 007, India. **Phone:** (+91 40) 672241-50; **Telex:** 91-425-7046 CCMB IN; **Fax:** (+91 40) 671195; **E-mail:** DBALA@CCMB.UUNET.IN.
Director/Head: D. Balasubramanian.
Number of Research Scientists: 171; **Number of Staff:** 289.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Biomedicine; Biotechnology.
Main Lines of Research and Training Activities: Research: Biomedicine and biotechnology; genetics and evolution; molecular biology; cell biology and development; biochemistry and biophysics. Training: Research fellowships for PhD degrees (awarded by Jawaharlal Nehru University, New Delhi); post-doctoral fellowships (awarded by Department of Biotechnology, Indian government); specialized training courses; short-term workshops in biology; training of personnel sponsored by research and other institutions.
Major Scientific Results or Products: Cataract, major blinding disease; hepatitis; DNA fingerprinting; molecular basis of sex determination; regulation of sex-determining chromosomes; DNA fingerprinting and phylogenetic analysis; designer peptides; seminalplasmin; acquaculture; fish feed; extremophilic microorganisms; oncogenes and tumour rejection; regulation of cell division; mechanism of transcription; genetics of osmoregulation.
Main Research Facilities Available: Facilities for protein analysis; peptide synthesis; DNA synthesis; NMR spectroscopy; cell culture and cell sorting; electron microscopy; flow cytometry animal laboratory; library and information services. CCMB is part of Biotechnology Information System (BTIS) that provides network in areas of oncogenes, reproductive/physiology cell transformation; nucleic acid and protein sequences.
Future Development Plans: Continue work in present areas, with possible shifts in emphasis from time to time based on results and progress of work. More focus likely to be placed in near future on areas of biotechnology and industrial applications, particularly in human health, acquaculture, agriculture and biotechnology.
Cooperation Arrangements with Developing Countries: Wu Han University, Wu Han, China.
Other International Cooperation Arrangements: National Institutes of Health, USA; Medical Research Council, UK; Royal Commonwealth Society for the Blind, UK; Indo-US Vaccine Action Programme, India and USA; Indo-French Centre for the Promotion of Advanced Research, India and France; Indo-Japan Science Council, India and Japan.

Council of Scientific and Industrial Research (CSIR) Indian Institute of Chemical Biology (IICB)

Address: 4 Raja Subodh Chandra Mullick Road, Jadavpur, Calcutta 700 032, India. **Phone:** (+91 33) 473-3491; **Telex:** 021-7108; **Fax:** (+91 33) 473-0284.
Director/Head: J. Das.
Number of Research Scientists: 125; **Number of Staff:** 248.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry; Medical Sciences.
Main Lines of Research and Training Activities: Biochemistry; Biology; Biophysics; Biotechnology; Chemistry; Endocrinology; Enzymology; Immunobiology; Neuropharmacology; Parasitology; Physiology; Virology.
Major Scientific Results or Products: Developed bacteriophage typing technique for identifying cholera infection; evolved methods of preparing high-valued lectins from cheap agricultural and marine resources; identified Kallstroemia pubescens as alternative source of diosgenin; developed potentially viable process for chemical conversion of quinine to quinidine, antiarrhythmic drug; designed simple enzyme immunoassay techniques for estimating testosterone, cortisol, thyroxine, and triiodothyronine; established Leishmania strain bank.
Main Research Facilities Available: Refrigerated centrifuges and ultracentrifuges; freeze driers; fraction collectors; spectrophotometers and spectrofluorimeters; liquid scintillation counters; research microscopes; video camera; electrophoresis and electrofocussing equipment; GC-Mass spectrometer; HPLC apparatus; NMR instrument; transmission electron microscope; microfermentor; electronic stimulator; computer; library; modern animal house; reverse osmosis water purification plant; tissue culture facility; DNA synthesizer; ORD-CD equipment.

Future Development Plans: Research on: bioactive substances; biocatalysis, biosystems modelling; cell biology; immunobiology; Leishmania donovani; neurobiology; polysaccharidases; protein engineering; radiopharmaceuticals; reproductive biology; vibrio cholerae.
International Cooperation Arrangements: UN Development Programme (UNDP)-assisted project on molecular biology and biotechnology applied to study of parasites.

Council of Scientific and Industrial Research (CSIR) Institute of Microbial Technology (IMTECH)

Address: Sector 39-A, Post Box No.1304, Chandigarh 160 014, India. **Phone:** 45108, 45004, 44285, 28463; **Telex:** 0369 IMT IN.
Number of Research Scientists: 34; **Number of Staff:** 62.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry; Biochemical Engineering.
Main Lines of Research and Training Activities: The Institute, the youngest one under the aegis of CSIR, has been functioning at Chandigarh since January 1984. Set-up to be a forerunner in carrying out application oriented R&D in the frontier area of Biotechnology, the Institute, ever since its inception has been formulating such research programmes which have a short-term objective of capability generation and a long-term perspective of generating newer leads in the critical areas of its working, viz., molecular biology, genetic engineering, fermentation technology, etc. Most of the research programmes deal with the application of newer tools of molecular biology and genetic engineering to develop new technologies or improve upon the existing ones vital to our national needs. The Institute is currently carrying out its R&D programmes under the ambit of the following areas: 1. Molecular biology and Microbial genetics; 2. Animal cell/Tissue culture; 3. Protein engineering; 4. Separation technology.
Major Scientific Results or Products: Institute has achieved excellence in several programmes, which has led to excellent publications and filing of patents. Noteworthy research achievements include development of osmotolerant and ethanol tolerant strain of yeast capable of producing 12-16% (v/v) ethanol from molasses containing up to 30% (w/v) initial sugar concentration; development of new method for enzymatic conversion of rifamycin B to rifamycin S to near 100% efficiency compared to markedly lower yields afforded by chemical methods; development of simplified process for purification of urokinase from urine based on antiurokinase monoclonal antibodies; development of new targetting rationale for selective delivery of drugs to macrophages utilizing exquisite specificity and high efficiency of process of endocytosis mediated by receptors present exclusively on cells of macrophage lineage; identification of two membrane proteins in lower alkane-utilizing bacteria induced when bacteria are grown on propane and/or butane.
Main Research Facilities Available: Scanning and transmission electrone microscopes, ultra and superspeed centrifuges GC, protein sequencer, protein synthesizer, 1500 litre fermentation pilot plant and associated down stream processing equipments, microvax II computer system, microform reader printer, reprographic machines, LN2 plant.
Future Development Plans: Would like to augment R7D programmes in molecular biology/microbial genetics; animal cell/tissue culture; protein engineering and separation technology.
Cooperation Arrangements with Developing Countries: Through International Scientific Collaboration Unit of CSIR, Institute receives scientists/technicians from other countries for training in biotechnology and related areas.
Other International Cooperation Arrangements: None at present.

Indian Institute of Science (IISc) Division of Biological Sciences

Address: Bangalore 560 012, India. **Phone:** (+91 80) 334-4411-25; **Telex:** (845) 8349 IISc IN; **Fax:** (+91 80) 334-1683; **E-mail:** iisc admn@vign.ernet.in.
Director/Head: G. Padmanaban.
Number of Research Scientists: 54 faculty; 50 postdoctoral fellows; 200 PhD students.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Biochemistry; Microbiology; Cell Biology; Molecular Biology; Structural Biology; Genetic Engineering; Reproductive Biology; Endocrinology; Developmental Biology; Genetics; Ecology.
Main Lines of Research and Training Activities: Enzymology, biochemistry of viruses, molecular biology of genetic recombination, chromosome synapsis and segregation, drug resistance in malarial

parasite, membrane biology, biochemistry of reproduction, plant molecular biology, gene transcription and expression of cytochrom P450, chromosome pairing and recombination, genetic consequences of inbreeding in human populations, plant cell and tissue culture, plant physiology, thermophilic fungi, general and applied immunology, mammalian sex determination, tissue specific and developmental stage specific expression of silk fibroin and related genes, molecular biology of cancer, RNA spliciag, microbial metabolism, anti-microbial drugs, microbial leaching, immunology of microbial infections, tumour immunology and immunotherapy, immunodiagnostic and hybridoma technology, molecular biology and genetic engineering of animal virus, antiviral agents, theoretical and computer modelling studies of different types of biopolymers, X-ray crystallographic investigations on amino acids, peptides and their interactions, proteins such as lectins and protease inhibitors, viruses and protein hydration, synthetic, physico-chemical and spectroscopic studies on membranes, ionophores, bioactive peptides, oligonucleotides and oligosaccharides, biochemical studies on lectines, sequence specific structure and function of DNA, protein engineering membranes, ionic channels and electrophysiology, biological diversity, social behaviour, human ecology and ecodevelopment, molecular biology, genetic engineering and immunology of mycobacterium tuberculosis, cytokines, gene structure and expression, bacterial virulence/pathogenesis and encephalitis virus, vitamin carrier proteins and their role in reproductive processes, mechanism of action of hormones involved in reproduction, reproductive biology of primates, the molecular biology of reproductive processes and in vitro fertilization, differential regulation of homologous chromosomes, molecular biology of a cyptic operon, transcription termination in yeast and cell type specific gene expression of Dictyostelium discoideum.
Major Scientific Results or Products: More than 100 publications per year in refereed international journals.
Main Research Facilities Available: Central animal facility, primate research laboratory containing standardized colony of 500 bonnet monkeys and modern surgical theatre, dedicated computational and graphics facilities and bioinformatics centre, bacterial culture facility, including fermentor, control temperature orbital shakers, ultrasonic disintegrators French pressure cell, electroporator, plant and animal tissue culture facilities, FACS Scan-Flow cytometer, hybridoma facility, electron microscope, microinjection facility, inverted and fluorescence microscopes, gene cloning and sequencing facility, PCR instruments, pulse field gel electrophoresis system, ultralow temperature freezers, oligonucleotide synthesizers, automated peptide and protein sequences, amino acid analyser, HPLC and FPLC systems, liquid scintillation countries, analytical and preparative ultracentrifuges, refrigerated centrifuges, gel documentation system, high field NMR spectrometers with broad band probes, spectrophotometers, IR spectrometer, sealed-tube X-ray generators, rotating anode X-ray generators, Weissenberg, precession and Arndft-Wonnacott cameras, Scandig computer controlled microdensitometer, area detector system, image plate analyser, differential scanning calorimeter and microcalorimeter, temperature jump stop flow spectrophotofluorimeter, BLM and patch clamp experimental set up, facilities for theoretical and experimental research, animal and human ecology and social behaviour of insects, including field research facilities at different centres, access to supercomputer, low temperature and other Institute central facilities.
Future Development Plans: In addition to maintaining and improving Institute's strength as centre for fundamental work in modern biology, efforts are currently underway to establish industrial liaisons and increase applied work.
International Cooperation Arrangements: With many countries and international agencies.

International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi

Address: ICGEB Campus, Aruna Asaf Ali Marg, New Delhi 110 067, India. **Phone:** (+91 11) 618 9360; 618 9361. **Telex:** 31-73286 ICGB IN; **Fax:** (+91 11) 618-2316.
Director/Head: K.K. Tewari.
Number of Research Scientists: 45; **Number of Staff:** 104.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Medical Sciences.
Main Lines of Research and Training Activities: Research: Plant molecular biology, including stress, insect and pesticide resistance; transformation, replication and transcription. Mammalian molecular biology, including virology; malaria; structural biology and mammalian gene products. Training: three molecular biology courses per year, each lasting 3 to 4 weeks, for groups of 20 students.
Major Scientific Results or Products: Developed AIDS diagnostic kits and gamma interferon transferred to private company for commercialization; developed synthetic peptides as candidate vaccine

for Hepatitis-B virus; filed patent applications in Europe; published more than 200 papers in leading scientific journals.
Main Research Facilities Available: 10,000 square metres laboratory space; greenhouses; animal house; library; laboratory equipment for biotechnology; tissue culture facility; special equipment for diagnostic purposes; incubators; autoclaves; microcentrifuges; ultracentrifuges with rotors; spectrophotometer; spectrofluorimeters; microscopes; separate laboratory for training activities.
Future Development Plans: Estimated number of PhD scientists will increase from present level of about 30 to 60 and total staff will rise from 100 to about 190. Scientific groups are expected to increase from six (two each in plant and mammalian studies, one in structural biology and one in gene products) to 10. At same time, will strengthen existing groups. New programmes in agriculture and health to be launched.
Cooperation Arrangements with Developing Countries: ICGEB New Delhi and ICGEB Trieste, established by UN Industrial Development Organization (UNIDO), cooperate with all developing countries. Enjoy strong links with 14 affiliated centres in various member countries. Service facilities (computer work, data bases, supply of nucleotides, assays and probes and others) are made available to scientists from member countries.
Other International Cooperation Arrangements: Grants from such agencies as Rockefeller Foundation, European Union for research and training in rice biotechnology malaria. Efforts are underway to persuade major developed countries to become members of ICGEB.

Tata Institute of Fundamental Research (TIFR) Molecular Biology Unit

Address: Homi Bhabha Road, Mumbai 400005, India. **Phone:** (+91 22) 215 2971; **Telex:** 011-83009 code TIFR IN; **Fax:** (+91 22) 2152110; **E-mail:** molbio@tifrvax.tifr.res.in.
Director/Head: Virendra Singh.
Number of Research Scientists: 35; **Number of Staff:** 18.
Scientific Fields of Interest: Engineering/Technology; Earth Sciences.
Main Lines of Research and Training Activities: *Research:* Neurobiology; developmental genetics of chemosensory system and cell biology of the synapse in Drosophila; Molecular genetics of yeast; Molecular mechanisms of homologous recombination; development and differentiation in plants; molecular biology of the malarial parasite; membrane biophysics, molecular biology of oncogenes. *Training:* Training for the PhD Degree (by Bombay University); Postdoctoral training of 2 to 3 years duration; short-term training, courses, workshops seminars etc. in the selected areas of modern biology. Scientific and Technical Short-term visitors from other institutions on request.
Major Scientific Results or Products: Neurobiology; molecular basis of olfaction and gustation; cell biology of synapse; molecular genetics of glucose utilisation in yeast; hormonal signal transduction and homologous recombination in plants; molecular basis of acquired immunity against malaria; water transport across membranes; structure and function of oncogenes.
Main Research Facilities Available: Electron microscope; electrophysiology equipment; ultracentrifuges and refrigerated high speed centrifuges; small equipment for molecular biology: lyophilizers, electrophorators, PCR blocks; gas chromatography and HPLC equipment; oligosynthesis facility; plant and animal tissue culture facilities; animal house; personal computers with networking, e-mail and internet; library; mechanical workshop and glass workshop; liquid nitrogen and liquid helium facilities; radioactivity labs; transport; housing and canteen facilities; medical facilities.
Future Development Plans: Continue growth in some current areas in Molecular Biology Unit: neurobiology and developmental biology of drosophila, yeast genetics, plant molecular biology, parasite biology and mechanisms of recombination. Develop programme in cell biological processes in simple systems.
Cooperation Arrangements with Developing Countries: Negotiating possible collaboration with International Center of Insect Physiology and Ecology, Nairobi, Kenya.
Other International Cooperation Arrangements: Wellcome Trust, London, UK (1963-1969); Jane Coffin Childs Memorial Fund, USA (1974-1978); Nuffield Foundation, London (1974-1978); Rockefeller Foundation, New York, USA (1993-1996); Human Frontiers Science Programme (1994-1997); World Health Organization (1995-1998).

Tata Institute of Fundamental Research (TIFR) National Centre for Biological Sciences (NCBS)

Address: TIFR Centre, P.O. Box No. 1234, Bangalore 560 012, India. **Phone:** (+91 80) 334062; 343138; **Telex:** 0845-8488 TIFR IN; **Fax:** (+91 80) 343851; **E-mail:** vijay@ncbs.tifrbng.research.in.
Director/Head: K. Vijayraghavan.
Number of Research Scientists: 74; **Number of Staff:** 14.
Scientific Fields of Interest: Molecular Genetics; Neurobiology.
Main Lines of Research and Training Activities: Structural and cell biology: Protein folding, ion transport through membranes, mechanisms of endocytosis in metazoan cells. Biology of Diseases: Pathogenesis of Papilloma Viruses. Neurogenetics: Genetic analysis of chemosensory perception; Nerve and Muscle development, Molecular analysis of olfaction in drosophila. Neurobiology: Gene regulation in nervous system, computation neuroscience.
Major Scientific Results or Products: Papers in scientific journals.
Main Research Facilities Available: Well-equipped laboratories for molecular genetics and neurobiology.
Future Development Plans: In addition to existing laboratories., new campus with area of 1,000 square feet under construction.
Cooperation Arrangements with Developing Countries: TWAS Associateship Scheme.
Other International Cooperation Arrangements: Molecular Biology Unit at TIFR, Mumbai; training courses and exchange visits sponsored by Internal Cell Biology Organisation (ICRO); visitors from several Asian, European and US laboratories; special exchange programme with Cambridge University.

University of Calcutta Centre of Advanced Study in Botany on Cell and Chromosome Research

Address: University College of Science and Technology, 35, Ballygunge Circular Road, Calcutta 700 019, India. **Phone:** (+91 33) 475 3681; **E-mail:** sjha@cubmb.ernet.in.
Director/Head: Sibdas Ghosh.
Number of Research Scientists: 33; **Number of Staff:** 10.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Environment.
Main Lines of Research and Training Activities: Cell biological and molecular approaches to study cell and chromosome components, cell cycle control including initiation of myelosis; regulating factors controlling chromosomal stability in culture, protocols for regeneration and transformation in vitro, commercial exploitation of secondary metabolites. Chromosomal and genetic basis of genotoxicity. Localization of gene sequences in chromosomes. Conservation of desired genotypes and biotypes, biosystematics and application of chromosomal parameters in the study of evolution and phylogeny. Micropropagation of endangered plants, fuel wood and other commercial species.
Major Scientific Results or Products: Pioneering work on plant nuclear DNA analysis, genotoxic effect of metallic salts, metal-metal interaction; extensive work on plant tissue culture, including production of transgenic plants for successful commercial exploitation of secondary metabolites; molecular mapping of mulberry varieties utilizing RFLP and RAPD assay; identification and characterization of cell cycle proteins in plants, dynamicity of nucleolar organization (about 300 publications in the last 5 years).
Main Research Facilities Available: Main facilities include research equipment, computers, field station, library.
Cooperation Arrangements with Developing Countries: Plan extensive scientific cooperation with neighbouring countries in future.

Indonesia

Inter-University Center (IUC) of Biotechnology Institut Teknologi Bandung

Address: IUC on Biotechnology, ITB, Jalan Ganesya 10, Bandung, Indonesia. **Phone:** (+62 22) 2504256; 2504987; **Fax:** (+62 22) 2503659.
Director/Head: Ban Liang Dei.
Number of Research Scientists: 40; **Number of Staff:** 25.
Scientific Fields of Interest: Biotechnology.
Main Lines of Research and Training Activities: Three main research areas are cell fermentation technology, enzyme technology and industrial wastewater treatment; support such disciplines as microbiology, biochemistry recombinant DNA and biochemical engineering.
Major Scientific Results or Products: Scientific articles published in scientific journals; papers presented in seminars in Indonesia and abroad.
Main Research Facilities Available: Separation and analytical equipment, including chromatographs, spectrometers, UV/Vis; microchemical facilities, including DNA synthesizer, DNA sequencer, peptide synthesizer, peptide sequencer; PRR Machine; library; computers.
Future Development Plans: Increase research staff to 10 scientists, who are currently studying in degree programmes overseas and will return to Center within a year.
Cooperation Arrangements with Developing Countries: ASEAN (six countries) Biotechnology Project.
Other International Cooperation Arrangements: IIB (International Institute of Biotechnology), UK; Cooperation with CSIRO, Australia.

Indonesian Institute of Sciences (LIPI) Research and Development Centre for Biology

Address: LIPI, Jalan Raya Juanda No. 18, P.O. Box 18, Bogor 16122, Indonesia. **Phone:** (+62 251) 321041; **Fax:** (+62 251) 325854.
Director/Head: Soetikno Wirjoatmodjo.
Number of Research Scientists: 173; **Number of Staff:**
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Environment; Veterinary Sciences; Ecology.
Main Lines of Research and Training Activities: Biosystematics; ecology; physiology; morphogenetic; basic and applied microbiology; parasitology; phytochemistry; ethnobiology.
Major Scientific Results or Products: Technical papers on zoology, botany, microbiology, ecology, parasitology, ethnobotany, phytochemistry.
Main Research Facilities Available: Biosystematic laboratories; libraries; computers; microscopes; photographic room; ecological, physiological, microbiological and biochemistry research equipment; overhead and slide projectors.
Future Development Plans: Modernize laboratory equipment; computerize data; computerize library; develop biodiversity information network; improve buildings and laboratories.

Indonesian Institute of Sciences (LIPI) Research and Development Centre for Biotechnology

Address: P.O. Box 422, Bogor 16122, Indonesia. **Phone:** (+62 21) 875-4627; **Fax:** (+62 21) 875-4588; 875-3651.
Director/Head: Made Sri Prana.
Number of Research Scientists: 49; **Number of Staff:** 101.
Scientific Fields of Interest: Biotechnology.

Main Lines of Research and Training Activities: Embryo manipulation of cattle; Rumen microbiology; Fermentation technology; Biofertilizer; Microalga culture; In vitro culture technique of horticulture crops and forest tree species; Genetic improvement of rice; Secondary metabolites.
Major Scientific Results or Products: Embryo transfer technique (in vitro and in vivo fertilizer); production system for *Spirulina sp.;* tissue culture techniques for various crops; production systems for AMG enzyme and superior rhizobium strain inoculant.
Main Research Facilities Available: Laboratory equipment for biotechnology research; computing facility; 40 hectare field station; library linked to Centre for Scientific Information and Documentation in Jakarta.
Future Development Plans: Establish links with industries; human resources development; enhance collaboration with other institutions both at home and abroad.
Cooperation Arrangements with Developing Countries: Through FARM programme, subprogramme on biotechnology and biodiversity involving 8 ASEAN countries; collaboration with ASEAN.

Iran, Islamic Rep.

Razi State Serum and Vaccine Institute

Address: P.O. Box 11365-1558, Tehran, Iran, Islamic Rep. **Phone:** (+98 261) 72005-9; (+98 21) 3119708; **Telex:** 214797; **Fax:** (+98 261) 74658.
Director/Head: Ali A. Mohammadi.
Number of Research Scientists: 95 scientists; **Number of Staff:** 440.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry; Veterinary Sciences; Medical Sciences.
Main Lines of Research and Training Activities: Basic and diagnostic research in veterinary science; Research in biotechnology and biological products; Production of veterinary and human vaccines, therapeutic sera and diagnostic antigens through application of modern biotechnology; Research and production of antiparasite drugs for veterinary use.
Major Scientific Results or Products: Veterinary and human vaccines and therapeutic sera.
Main Research Facilities Available: Electron microscope (transmission type); computers; 150 hectare field station; fermentors; library; laboratory facilities in virology, bacteriology, parasitology, biochemistry, cell culture, pathology and poultry disease.
Future Development Plans: Updating production and research facilities; upgrading quality controls; increasing production levels.
Cooperation Arrangements with Developing Countries: Helping such Third World countries as Afghanistan, Pakistan, Sudan, Tanzania and the Central Asian Republics eradicate infectious human and animal diseases; establish branches of Razi Institute in some above-mentioned countries.
Other International Cooperation Arrangements: Cooperation activities with WHO, OIE designed to eradicate infectious diseases in such Third World countries as Afghanistan and Pakistan; cooperation.

University of Tehran Institute of Biochemistry and Biophysics

Address: P.O. Box 13145-1384, Tehran, Iran, Islamic Rep. **Phone:** (+98 21) 640 9517; **Fax:** (+98 21) 640 4680.
Director/Head: S. Semnanian.
Number of Research Scientists: 19; **Number of Staff:** 55.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Chemistry.
Main Lines of Research and Training Activities: Different aspects of biochemistry and biophysics; Protein denaturation; Enzyme immobilization; Protein purification; Plant biochemistry; Genetic engineering; Biosensors; Cell cultures; Electrophysiology; Behavioural physiology; Industrial enzymology; Membrane biochemistry/biophysics; Nutritional sciences.

Major Scientific Results or Products: MSc and PhD programmes; publications; textbooks; research training.
Main Research Facilities Available: Tissue culture rooms; electron microscope; spectrophotometers; microcalorimetry; HPLC; GC; ultracentrifuges; set ups for electrophysiological recording of neural activities; scintillation counter; analytic and electrophoretic equipment; computer network; library.
Future Development Plans: Set up modern computer centre, plant biochemistry laboratory, participation in new international projects.
Cooperation Arrangements with Developing Countries: Pakistan, Nigeria, India, Taiwan.
Other International Cooperation Arrangements: England, USA, Italy, Switzerland, Canada.

Kenya

International Centre of Insect Physiology and Ecology (ICIPE)

Address: P.O. Box 30772, Nairobi, Kenya. **Phone:** (+254 2) 802501; **Telex:** 22053 ICIPE; 25066 DUDU; **Fax:** (+254 2) 803360; **E-mail:** CGNET:CG1063.
Director/Head: Hans R. Herren.
Number of Research Scientists: 100; **Number of Staff:** 520.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Veterinary; Medical Sciences.
Main Lines of Research and Training Activities: Increase food production and improve rural health by conducting research on major food pests and disease vectors of livestock and human beings in tropics. Research focuses on tsetse, livestock ticks, crop borers, locusts, sandflies, mosquitoes; sandflies; PhD training and postdoctoral training; short-term training for practitioners.
Major Scientific Results or Products: Development of effective control strategies for tsetse; integrated pest management for crop borers using of resistant crop varieties; inter-cropping and adjusted agricultural practices; efficient integrated tick management; semiochemicals for management of desert locusts; arthropod diversity, conservation and utilization; training more than 150 PhD and postdoctoral fellows in insect science.
Main Research Facilities Available: Laboratories with following equipment: electron microscopes, gas chromatographs, mass spectrometers, electroantennographs, UV spectrophotometers; fermentors for biotechnological work; more than 150 powerful IBM computers; GIS equipment; field facilities in various ecological zones in tropics.
Future Development Plans: In addition to continuing core research activities, future emphasis will be placed on biological control and biotechnology; semiochemicals; arthropod diversity, conservation and utilization; development of IPVM menus on libraries for all target pests; expansion of training for leadership positions in insect science and consolidation of R&D networking with national programmes.
Cooperation Arrangements with Developing Countries: African Regional Postgraduate Programme in Insect Science (ARPPIS), collaborative training programme between ICIPE and 29 African Universities; Pestnet, research and development network involving 18 countries.
Other International Cooperation Arrangements: Financed through donations from UN Agencies, World Bank, government aid agencies, private foundations; collaborate with advanced research laboratories in North and South.

International Livestock Research Institute (ILRI-Kenya)
formerly International Laboratory for Research on Animal Diseases (ILRAD)

Address: P.O. Box 30709, Nairobi, Kenya. **Phone:** (+254 2) 632-311; **Fax:** (+254 2) 631-499.
Director/Head: A.R. Gray.
Number of Research Scientists: 50; **Number of Staff:** 350.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Veterinary; Parasitology; Epidemiology; Immunology; Socioeconomics.

Main Lines of Research and Training Activities: Development of vaccines to protect livestock from trypanosomiasis and East Coast fever; biochemistry, cell biology, electron microscopy, epidemiology, immunology, molecular biology, pathology, parasitology and socioeconomics of animal disease control; training of staff from national organizations for research on theileriosis, trypanosomiasis and other veterinary problems.
Major Scientific Results or Products: Improved accuracy of diagnostic and epidemiological work; identification of parasites in tissues of infected livestock and salivary glands of infected ticks.
Main Research Facilities Available: Complex of research laboratories and support facilities on 70 hectare site at Kabete (Nairobi) and ranch about 50 kilometres from Nairobi with breeding herd of Boran cattle. In addition to 8 laboratories, facilities at Kabete include electron microscopy, radioisotope and irradiation units; breeding units for animals, tsetse flies and ticks; facilities for biostatistics, training, graphic arts, photography and publications; administrative offices, conference rooms, library, dining room and visitors' hostel; recreation facilities and staff houses.
Cooperation Arrangements with Developing Countries: Memorandum of agreement with Sokoine University, Tanzania. — ILRI-Kenya, formerly the International Laboratory for Research on Animal Diseases (ILRAD), merged with the former International Livestock Centre for Africa (ILCA) in Ethiopia to become ILRI; the Kenyan site is the headquarters.

University of Nairobi Reproductive Biology Unit (RBU)

Address: c/o Dept. of Animal Physiology, P.O. Box 30197, Nairobi, Kenya. **Phone:** (+254 2) 43091; **Fax:** (+254 2) 569340.
Director/Head: Emmanuel Omolo Wango.
Number of Research Scientists: 6; **Number of Staff:** 8.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Veterinary Sciences; Medical Sciences.
Main Lines of Research and Training Activities: Reproductive physiology, endocrinology and morphology, contraception, infertility, reproductive toxicology.
Major Scientific Results or Products: Trypanosomiasis interferes with testicular function; unlike ruminants, baboon placentae do not respond to prostaglandins with respect to steroid metabolism; cauda epididymis of dogs contains specific androgen binding antigen; mesoquinones have antifertility effects in males.
Main Research Facilities Available: Laboratories (3); library, computer, Beta counters (2); freezers; refrigerated centrifuges; microscopes, equipment for E.M. and histological preparations.
Future Development Plans: Become training and research institute for postgraduate students from African countries in reproductive biology; in collaboration with IAP&GR, Cambridge, develop molecular biology laboratory; pursue strategies for studying reproduction of endangered species.
Cooperation Arrangements with Developing Countries: Planned collaborative efforts with Sokoine University, Tanzania; University of Sheffield, England; Kenya Wildlife Services, Kenya.
Other International Cooperation Arrangements: WHO, IAEA (planned), DAAD.

Madagascar

Institut Malgache de Recherches Appliques (IMRA)

Address: Avabohitra, Boîte Postale 3833, Antananarivo, Madagascar. **Phone:** (+261 2) 26806; **Fax:** (+261 2) 35974.
Director/Head: Albert Rakoto-Ratsimamanga.
Number of Research Scientists: 9; **Number of Staff:** 6.
Scientific Fields of Interest: Biology; Chemistry; Medical Sciences.
Main Lines of Research and Training Activities: Research of bioactive compounds from Malagasy medicinal plants in following areas: antimalarial, anticancerous, antibacterial, antifungal, asthma,

hypertension, diabetes (ethnobotany, biological tests, structure elucidation, toxicity and clinical trials). Nutrition. Training IFS-NAPRECA: 6 graduate students. Training for in vitro tests.
Major Scientific Results or Products: Patent for triterpenes of *Centella asiatica* (wound healing drug); patent for antidiabetic drug originating from plant; development of new treatment of leprosy; antimalarial (27 papers); anticancer (19 papers); antibacterial/antifungal (12 papers); ethnobotany (15 monographs).
Main Research Facilities Available: Unit of extraction for medicinal and aromatic plants; laboratory of phytochemistry (bioguided purification of plants and extraction of bioactive molecules); cellular and parasitical pharmacology section (in vitro and in vivo tests); animal breeding house; field stations (4); vans (5) for plant collection; computers.
Future Development Plans: Factory for processing of plant extracts and aromatic oils.
Cooperation Arrangements with Developing Countries: NAPRECA; University of La Réunion.
Other International Cooperation Arrangements: IECD (France); EU; USAID; National Museum of Natural History, Paris; Institut of Health, Rome.

Institut Pasteur de Madagascar (IPM)

Address: P.O. Box 1 274, 101 Antananarivo, Madagascar. **Phone:** (+261 2) 264-92; 415-34; 401-64/65; **Fax:** (+261 2) 284-07; **E-mail:** roux@maki.pasteur.mg.
Director/Head: Jean Roux.
Number of Research Scientists: 35; **Number of Staff:** 125.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Environment; Medical Sciences.
Main Lines of Research and Training Activities: Research Unit: Arboviruses and viral diseases, malaria, medical entomology, tuberculosis, plague, schistosomiasis, cysticercosis. Moreover, an epidemiologist is working all along the year with those mentioned above. Diagnosis and analysis laboratories: clinical diagnosis, food microbiology and water survey. Training opportunities: training of technical and medical assistants.
Major Scientific Results or Products: Epidemiological data on malaria, tuberculosis, plague, cysticercosis, schistosomiasis and various virologic diseases; elaboration of tests for serological diagnosis in cysticercosis and plague; results of therapeutic assays on schistosomiasis.
Main Research Facilities Available: Laboratory equipment for biological studies; 60 computers; Internet connections; field stations (about 10); library (subscription to 60 periodicals; 3,500 books, CD-ROM Medline Life Sciences).
Future Development Plans: Improvement of plague, schistosomiasis and tuberculosis programmes in collaboration of Health Ministry; improvement of training and teaching in collaboration of the Education Ministry.
Cooperation Arrangements with Developing Countries: Training for research scientists negotiated with Pasteur Institutes International Network and public health services of Indian Ocean countries.
Other International Cooperation Arrangements: Planned with Institut Pasteur, French Cooperation Service, European Union, Republic of South Africa.

Mexico

Centro de Investigacin y de Estudios Avanzados (CINVESTAV) del IPN Departamento de Biologa Celular

Address: Av. I.P.N. No. 2508, Col. San Pedro Zacatenco, Mexico, D.F. 07360, Mexico. **Phone:** (+52 5) 747 7000; **Fax:** (+52 5) 747 7000; **E-mail:** mmeraz@cell.cinvestav.mx.
Director/Head: Jesus Calderon-Tinoco.
Number of Research Scientists: 15; **Number of Staff:** 44.
Scientific Fields of Interest: Biology.
Main Lines of Research and Training Activities: The department of Cell Biology has continued to pursue fundamental research activities in the most contemporary areas of biology, fostering the development of research programmes in cutting edge areas of cell biology, such as the following: 1.

Cellular and Molecular Mechanisms of Acquired Immunity against amoebiasis. 2. Epithelium cell differentiation and mesenchymal tissue development; characterization of molecular markers of epithelium cells; cicatrization and regulation of adipose tissue development. 3. Cytoskeleton proteins in prokaryote cells; role of iron in entamoeba histolytica metabolism; cloning and characterization of genes of actinobacillus pleuropneumonia. 4. Mucosal immunity; intestinal immune response to entamoeba histolytica; cancer immunity; induction of cytotoxic T cells on cervical cancer. 5. Cellular motility; intracellular translocation of cytoplasmic organelles; mechanisms of motility in infection of intracellular parasites. 6. Functioning of dystrophy on brain tissue and its relationship with the cytoskeleton; the role of defensins on local immunity; production of monoclonal antibodies against molecules of research interest in the department of cell biology. 7. Molecular studies and characterization of bacteriophages from *Escherichia coli*. 8. Development of animal models to study the skin cicatrization process; adipogenic factors and its role in the development of the adipose tissue; identification and characterization of epidermal stem cells; human epidermal cell culture and its application to human transplants. 9. Molecular mechanisms of Entamoeba histolytica pathogenically; cellular immunity against infection diseases, particularly enteropathogenic bacteria and intestinal amoebiasis; cholera toxin and its role as adjuvant; analysis of transgenic mice expressing the T antigen of SV40 and development of immortal cell lines derived from these transgenic animals. 10. Molecular biology of membrane receptors particularly interferon gamma receptor; regulation and gene expression of molecular markers on heterologous systems; development of a cellular and animal model to study demential diseases, particularly Alzheimer's and Parkinson's; gene therapy in demential diseases by using the methodology of gene delivery mediated by an endocytic receptor; development of a molecular vaccine against human papilloma virus. 11. Structure and characterization of actin genes in eukaryotic models and the mechanisms that regulate its transcription; molecular organization of microfilaments and its relationship with molecules and specialized structures of the cell membrane; signalling of cytoskeleton related proteins. 12. Cell biology of B lymphocytes; mechanisms of activation via surface molecules; mechanisms of signal transduction on B lymphocytes; identification and cloning of new differentiation molecular markers; antibody secreting cell differentiation; mucosal immunity and leprosy. 13. Carcinogens and its mechanisms of actions; Detection of early markers of cellular transformation on primary cultures of hepatocytes.
Major Scientific Results or Products: Publications.
Main Research Facilities Available: Seminar room for 40 people; academic meeting room; 11 laboratories for research; workshop station for maintenance of equipment and installations; air conditioned computing and centrifuge rooms; 4°C cold rooms (2); 37°C warm room; electron microscopy unit and epidermal culture unit; monoclonal antibody culture room; Department of Cell Biology receives more than 600 international magazines; library with access to Medline and Internet; equipment includes ultracentrifuges, incubators, analytical balances, pH meters, freezers, ice machine, refrigerated centrifuges, eagle eye, microscopes, fluorescence spectrophotometers, epifluorescence microscopes, HPLC equipment, computers, laser printers, controlled temperature orbital shakers, water baths, gamma counters, beta counters, video printer, video microscopy, ultrafreezers (-70°C), Sorvall centrifuges, refrigerators, laminar hood, FACS cell sorting unit programme to hire young investigators who want to do post-doctoral
Future Development Plans: Expand lines of research in cell biology by hiring new professors; develop training programme.
Cooperation Arrangements with Developing Countries: Support for researchers from Cuba for academic certification to help them continue their research.
Other International Cooperation Arrangements: Department professors participate in collaborative grants with US institutions tied to larger US/Mexico research efforts (Kellogg's, US NSF, and Mexico-US Foundation of Science).

Universidad Nacional Autnoma de Mxico (UNAM) Instituto de Biologa (IB)

Address: Circuito Exterior, Ciudad Universitaria, Apdo. Postal 70-233, 04510 Mexico D.F., Mexico.
Phone: (+52 5) 622-5690, 622-5689. **Fax:** (+52 5) 622-5710, 622-5687.
Director/Head: Antonio Lot Helgueras.
Number of Research Scientists: 70; **Number of Staff:** 197.
Scientific Fields of Interest: Biology.
Main Lines of Research and Training Activities: Taxonomy and systematics; Ecology and biogeography; Ethnobiology; Reproductive biology and ethology; Conservation of natural resources;

Germplasm bank programme of rare and endangered plants; *In situ* conservation programme; Aquaculture and marine primary productivity; Microbiology; Cytogenetics; Tissue culture and embryogenesis.
Major Scientific Results or Products: Faculty and staff members publish research results in well-known foreign and domestic scientific journals. The IB of UNAM publishes its own scientific journal, the *Anales*, in two series: botany and zoology; also three different book series. The IB of UNAM publications section supplies the library with a collection of books in different topics in biology for exchange.
Main Research Facilities Available: National collections of Mexican flora and fauna: National Herbarium (MEXU) and Zoological Collections (helminthology, malacology, acarology, oncology, entomology, ichthyology, herpetology, ornitology, mammals); Botanical Garden; Two field stations at Los Tuxtlas and Chamela; Laboratories of ethnobotany, molecular biology, tissue culture, microbiology, cytogenetics; Five specialized libraries.
Future Development Plans: Inventory of national biodiversity and consolidation of all IB programmes with well-trained personnel.
Cooperation Arrangements with Developing Countries: Most of IB's cooperation arrangements with developing countries have been made via UNAM's Exchange Programme Office and also by securing funds from the Red Latinoamericana de Botánica (Latin American Botanical Network).
Other International Cooperation Arrangements: Many scientific projects are supported by international agencies, such as AID, MacArthur Foundation, NSF, Macknight Foundation, World Bank. Donations given by MacArthur and other private companies. Projects are undertaken with institutions such as the Missouri Botanical Garden, Kew Botanic Gardens, University of California at Davis, and with governmental institutions in charge of the conservation of Mexican natural resources.

Universidad Nacional Autnoma de Mxico (UNAM) Instituto de Biotecnologa

Address: P.O. Box 510-3, Cuernavaca, Morelos 62271, Mexico. **Phone:** (+52 73) 114900; **Telex:** 173425 UFNME; **Fax:** (+52 73) 172388; **E-mail:** soberon@pbr322. ceingebi.unam.mx.
Director/Head: Francisco Bolivar Zapata.
Number of Research Scientists: 68; **Number of Staff:** 129.
Scientific Fields of Interest: Agriculture; Biochemistry/Biophysics; Engineering/Technology; Environment; Medical Sciences.
Main Lines of Research and Training Activities: Fifteen research lines: molecular biology and bacteria biochemistry; molecular biology and biochemistry of parasites; molecular biology and biochemistry of viruses; molecular biology and biotechnology of plants; genetics and molecular biology of the microorganism-plant interaction; molecular and cellular biology of animals; cellular biochemistry of peptidergic neurons; structure, function and manipulation of peptides and proteins; development and methodological consolidation in molecular biology; industrial microbiology; fermentation engineering and technology; product recovery and purification: design of process and control equipment; enzyme engineering and technology; biotechnological prospective; integration of processes and prototypes and technology development. Centre for academic programme of specialization MSc and PhD in biotechnology. Offer BSc, MSc and PhD in basic biomedical research.
Major Scientific Results or Products: Genetic organization of DNA and RNA regions in biological systems; generation of molecular tools and methodology for isolation and expression of genetic material; physiology, biochemistry and molecular biology of neuropeptides; determination of parameters for design of fermentors, biological electrodes and bioreactors; characterization of proteic toxins of poisonous animals. Since 1982, published 650 articles (300 in international journals), made 170 contributions to books, international symposia and congress proceedings, prepared more than 125 technical reports and signed more than 45 agreements with private firms and permanent agencies. Developed such technologies as construction of microorganisms that produce human proteins, enzymes of industrial interest and bioinsecticides; systems that detect congenital errors and infectious diseases using DNA and RNA probes; isolation and characterization of microorganisms of industrial interest. Awarded 10 patents (two in USA and filed 15 more; supervised 263 theses.
Main Research Facilities Available: About 8,500 square metres of research space comprising 21 research laboratories; 6 technical units (pilot plant, monoclonal antibody core facility, animal care facility, oligonucleotide synthesis core facility, greenhouse, microscopy and computer services); common areas (culture rooms, centrifugation, low and constant temperature rooms); equipment includes fermentors and air lift; basket centrifuges; homogenizer; vacuum evaporator; aspersion dryer; distillation column;

incubators; ultracentrifuges; HPLC; computer equipment includes microcomputers, Macintosh, PC 486, Microvax-II, Spring-KITK; satellite communication system (Telnet, BitNet).
Future Development Plans: Graduate 20 BSc, 20 MSc and 6 PhD students; publish 60 to 70 articles; participate in 150 congresses; develop 200 specific projects and conclude more than 45 collaborative agreements.
Cooperation Arrangements with Developing Countries: Training and exchange activities with Chile, Colombia and Honduras; collaboration with the Instituto Venezolano de Investigaciones Cientificas (IVIC).
Other International Cooperation Arrangements: European Community (7 at present; 12 planned); US-Mexico Foundation for Science (2 at present; 5 planned); International Centre for Genetic Engineering and Biotechnology, International Centre for Genetic Engineering and Biotechnology (ICGEB) (2 planned); International Development Agency (2 at present); Third World Academy of Sciences (1 planned); World Health Organization (1 at present). Grants from Howard Hughes International Research Scholars Programme (5 at present).

Universidad Nacional Autnoma de Mxico (UNAM) Instituto de Fisiologa Celular

Address: Apdo. Postal 70-600, Ciudad Universitaria, 04510 Mexico, D.F. Mexico. **Phone:** (+52 5) 622-5603/04; **Fax:** (+52 5) 616-2282; **E-mail:** gdreyfus@ifcsun1.ifisiol.unam.mx.
Director/Head: Georges Dreyfus.
Number of Research Scientists: 41; **Number of Staff:** 52.
Scientific Fields of Interest: Biochemistry/Biophysics.
Main Lines of Research and Training Activities: Molecular genetics, Cell biology; Neuroscience; Computing.
Major Scientific Results or Products: Published 73 scientific papers published in international journals in 1996; 15 book chapters and 4 books.
Main Research Facilities Available: Centrifuges, ultracentrifuges, HPLC and FPLC machines; circular dichroism; EM; infrared spectrometer; fluorimeters; confocal microscope; double beam spectrophotometers; calorimeter; French press; scintillation counters.
Future Development Plans: Development of a larger group of scientists involved in molecular biology and protein structure and function.
International Cooperation Arrangements: Howard Hughes Medical Institutes.

Pakistan

National Institute for Biotechnology and Genetic Engineering (NIBGE)

Address: P.O. Box 577, Jhang Road, Faisalabad, Pakistan. **Phone:** (+92 41) 651471; 651475-80; **Fax:** (+92 41) 651472; **E-mail:** ctc@cup.portal.com.
Director/Head: Kauser A. Malik.
Number of Research Scientists: 48; **Number of Staff:** 70.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Energy; Engineering/Technology; Environment; Veterinary Sciences; Medical Sciences.
Main Lines of Research and Training Activities: Research in plant biotechnology, development of virus resistant transgenic cotton and other plants; biofertilizers, use of rhizobium, PGPR, mycorrhiza, Frankia and Azolla; Biofuels, production of ethanol and methane from agricultural wastes; production of industrial enzymes and chemicals; basic biology, salt tolerance; medical biotechnology, diagnostics; biotechnology of minerals and fossil fuels; biohydrometallurgy of sulfadic and non-sulphidic ores, heap leaching technology, bioremediation of old mine sites, biosorption, biosensors, coal biotechnology, desulphurization, solubilization and bioliquefaction; environmental biotechnology, treatment of industrial effluents; application of molecular biology and recombinant DNA technology to solve problems related to agriculture, industry, energy and health care; postgraduate research programmes in collaboration with

universities; specialized courses and workshops on industrial biotechnology, plant biotechnology, biofertilizer production and various relevant topics are also held every year.
Major Scientific Results or Products: Established transformation technology for several models and local cultivars of rice, cotton, alfalfa and sugarcane; developed leaf curl virus resistant cotton; developed potato and sugar cane germ plasm for saline areas; identified and isolated salt-tolerance-conferring gene from bacterium; developed biofertilizers that make atmospheric nitrogen available to plants; produced pseudo-nodules on wheat roots; developed technology to produce Rhizobium Inoculum on commercial scale; developed process involving simultaneous saccharification and fermentation for production of ethanol from biomass, using cellulases from fungi; developed PCR-based diagnostic test for early detection of T.B. caused by the mycobacterium tuberculosis in clinical (sputum) samples; optimized and upgraded studies on local pilot plant to investigate biological treatment of textile industry waste; developed transposon mutagenesis system *Pseudomonas aeruginosa* and biosurfactant hyperproducers, biosurfactant non-producers and hexadecane negative mutants; developed microbial tests to determine potential mitogenicity and carcinogenicity in industrial effluents.
Main Research Facilities Available: Library; local area network, e-mail; animal house, greenhouse, fermentation/bioprocessing shed; controlled temperature and humidity rooms; walk-in cold rooms and freezers; cabinets; spectrophotometer, mono and double beam; atomic absorption spectrophotometer; scintillation counter; HPLCs with detectors and printers; gel electrophoresis; semimicro-kjeldahl digestion and distillation system; gas chromatographs, centrifuges, ultra centrifuges; Eppendroff centrifuges; FPLC; DNA sequencing; gene gun; DNA synthesizer; somatic hyberdizer, electroporating unit; cryo-freezers; pilot plant for detoxification of industrial effluents; laminar flow cabinets, fermentors, mineral bioprocessing columns; jaw crusher; dosing pumps; surface area meter; tensiometer; distillation columns; PCR and other routine equipment required for research/teaching molecular biology and recombinant DNA technology.
Future Development Plans: Develop transgenic plants for biotic-abiotic stress; culture collection; produce humanized monoclonal antibodies; create computer-controlled bioprocessing units, fabricate large pilot plant fermentors; design and fabricate fermentation controls.
Cooperation Arrangements with Developing Countries: China, Egypt; Bangladesh.
Other International Cooperation Arrangements: IAEA; US NSF; US NAS, BOSTID, USA; USAID; GBF; Germany; ENEA, Italy; UNIDO/ICGEB, Italy; USDA, ARS; USNSF; PAEC-KfK bilateral programme.

University of the Punjab Centre of Excellence in Molecular Biology (CEMB)

Address: Canal Bank Road, Thokar Niaz Baig, Lahore 53700, Pakistan. **Phone:** (+92 42) 522 1235, 5221350; **Fax:** (+92 42) 5164155.
Director/Head: S. Riazuddin.
Number of Research Scientists: 47; **Number of Staff:** 19.
Scientific Fields of Interest: Agriculture; Biology; Energy; Environment; Medical Sciences.
Main Lines of Research and Training Activities: Focus on molecular biology and recombinant DNA technology; conduct molecular biological research on unique and specific problems related to health, medicine, agriculture, industry and energy; create repository of DNA enzymes, linker molecules, cloning vehicles, novel bacterial strains for use by research groups at Centre and other DNA research laboratories in Pakistan; organize national and international seminars and conferences on science and technology exploring new ideas and innovative applications of knowledge on gene cloning and recombinant DNA.
Major Scientific Results or Products: Graduated 27 MPhil/PhD students; identified, characterized and supplied more than 1000 microbial strains for laboratory use; purified and supplied 14 restriction endonucleases for laboratory use; identified *Bacillus thuringiensis* (BT) strains for production of BT bioinsecticide; uncovered antifungal bacterial activities to combat chickpea pathogen; launched development of PCR based DNA procedures for diagnosis of genetic and infectious diseases.
Main Research Facilities Available: Ultracentrifuges; liquid scintillation counter; computers; medium ultra speed centrifuges; cold cabinets (4°C); fermentors (14 litres); bench top centrifuges; ultra cold cabinets (-85° C); oligonucleotide synthesizer; eppendroff centrifuges; spectrophotometers; amino acid analyser; cabinets/HPLC; orbital shakers; CO2 incubators/FPLC; DNA sequencing; electrophoresis; walk-in growth chamber, thermal cycler for PCR, library with 3000 journals.
Future Development Plans: Animal house; greenhouse; expand material production laboratory; establish virus research laboratory.

Cooperation Arrangements with Developing Countries: Manpower training from Bangladesh, Egypt, Turkey, Jordan; Sri Lanka, Malaysia, Philippines, Indonesia, Nepal, Sudan.
Other International Cooperation Arrangements: University of Washington, Seattle, USA; University of Cincinnati, USA; Cold Spring Harbor Laboratories, USA; PGS Laboratories, Belgium, University of Ottawa, Canada, IACR-Rothamsted, England.

Philippines

University of the Philippines National Institute of Molecular Biology and Biotechnology (BIOTECH)

Address: Los Baños College, Laguna 4031, Philippines. **Phone:** (+63 49) 5362721; 5362723; 5361620. **Fax:** (+63 49) 5362721; **E-mail:** red@bioech.uplb.edu.ph.
Director/Head: Reynaldo E. de la Cruz.
Number of Research Scientists: 54; **Number of Staff:** 91.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Energy; Chemistry; Engineering; Environment; Veterinary.
Main Lines of Research and Training Activities: *Research:* Biotechnology for Agriculture, Industry, Food, Animal and Human Health, and Environment. *Training:* Training, Conferences and Workshops.
Major Scientific Results or Products: Microbial based fertilizers: mycogroe, mykovan, BIO-N, nitroPlus, bio-organic fertilizer; growth hormones derived from coconut water; amino acids: lysine; enzymes: mannanase, protease, amylase, lipase; yeast strains for alcohol production; biopesticides from bacillus thuringiensis (2 products); plant diagnostic kits for virus and other pathogens; vaccines against haemorrhagic septicemia in cattle; tylosin; bioremediation: decolorization and deodorization of animal manure; removal of heavy metals; biodegradable plastics; tissue culture of orchids; secondary metabolites and novel products; mushrooms: volvariella, pleurotus; rennet.
Main Research Facilities Available: Pilot plant with fermentors; library; central analytical service laboratory; specialized laboratories in molecular biology, electron microscopy, tissue culture, immunology, vaccines, mycorrhiza and nitrogen fixation, environmental biotechnology, food biotechnology and biopesticide; microbial culture collection,
Future Development Plans: Strengthen research programmes in agriculture, health, food, feeds, environment; construct production facilities for commercial production of recombinant human and other vaccines; broaden links with other biotechnology centres and private sector.
Cooperation Arrangements with Developing Countries: Rockefeller Foundation, ACIAR, CIRAD.
Other International Cooperation Arrangements: National point of contact for UNESCO in microbiology and biotechnology; coordinator of Japan Society for the Promotion of Science in biotechnology.

Senegal

Centre de Recherche Ocanographique de Dakar-Thiaroye (CRODT)

Address: B.P. 2241, Dakar, Senegal. **Phone:** (+221) 340534/36; **Fax:** (+221) 342792.
Director/Head: Diafara Toure.
Number of Research Scientists: 15; **Number of Staff:** 29.
Scientific Fields of Interest: Marine Sciences.
Main Lines of Research and Training Activities: Biology and Ecology of the main aquatic species; study of status of exploited stocks and modelling; socioeconomic studies and bioeconomic modelling; environmental studies; fisheries management.

Major Scientific Results or Products: Knowledge of maximum sustainable yield and status of fish stocks; improvement in artisanal fishing yields.
Main Research Facilities Available: Research vessel, Louis Sauger (38-metre trawler built in Japan in 1985), equipped with scientific instruments for oceanography and echointegration studies; data-processing department with high powered IBM computer, 10 workstations, microcomputers (IBM PC, XT, AT and PS), graphic output unit; remote sensing department with satellite image processing unit.
Future Development Plans: Studies concerning socioeconomic and environmental impacts of artisanal fisheries; studies of tuna; applied and operational research.
Cooperation Arrangements with Developing Countries: Laboratories and international organizations at national and sub-regional level in Cameroon, Madagascar, Mauritania, Gambia, Ghana, Ivory Coast.
Other International Cooperation Arrangements: International organizations, including ORSTOM, UNESCO, FAO.

Tanzania

Tropical Pesticides Research Institute (TPRI)

Address: P.O. Box 3024, Arusha, Tanzania. **Phone:** (+255 57) 8042; **Telex:** 42002; **Fax:** (+255 57) 8217.
Director/Head: Franklin W. Mosha.
Number of Research Scientists: 45; **Number of Staff:** 255.
Scientific Fields of Interest: Agriculture; Biology; Biochemistry/Biophysics; Chemistry; Engineering/Technology; Environment; Veterinary Sciences; Medical Sciences.
Main Lines of Research and Training Activities: 1. Research on control of crop pests and vectors of animal and human diseases. 2. Monitoring of pesticide residues in food crops, animal feeds, environment and human. 3. Assessment of pesticide spray systems. 4. Training in pest management. 5. Pesticide quality control. 6. Preservation of plant germ plasm. 7. Maintenance of National Herbarium
Major Scientific Results or Products: Pest control packages involving integrated use of pesticides, natural products, traps and cultural practices made available to end-users; pesticide spray systems modified for increased efficiency and reduced dosage rates; certain pesticide use reduced or restricted to curb environment and health hazards.
Main Research Facilities Available: Chemical analytical equipment, spray aircraft, microscopes, computers; experimental field stations (3); hostel; conference hall.
Future Development Plans: Improve scientific skills through postgraduate training and collaboration with other scientists.
International Cooperation Arrangements: IDRC, WHO, IAEA, FAO, UNIDO.

Tunisia

Institut Pasteur de Tunis (IPT)

Address: 13, place Pasteur, B.P. 74, 1002 Tunis-Belvedere, Tunisia. **Phone:** (+216 1) 789-608; **Telex:** 14391 PASTU TN; **Fax:** (+216 1) 791-833.
Director/Head: Koussay Dellagi.
Number of Research Scientists: 45; **Number of Staff:** 87 technicians.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Environment; Marine Sciences; Veterinary Sciences; Medical Sciences; Biotechnology (vaccine production); Water microbiology; Microbiology and Biotoxins.

Main Lines of Research and Training Activities: Immunology of parasitic and viral disease (especially Hepatitis B, Leishmaniasis, Theileriosis and Echinococcosis); Characterization of genetic polymorphism of bacteria, viruses and parasites; Structural and immunological studies on scorpion toxins and viper venoms, improvement of antisera potency; Epidemiological surveillance of infectious diseases in the country (Poliomyelitis, Leishmaniasis and rabies); Detection and analysis of human genetic defects (hemoglobinopathies, genetic immune deficiencies); Organization of practical courses in immunology - microbiology and parasitology; 32 students are preparing a Master (15) or PhD (17) degree in the laboratories of the Institute.
Major Scientific Results or Products: Production of BCG and viral vaccines (human and veterinary) on cell cultures (rabies, measles, chickenpox viruses); publications on toxins, genetic polymorphism of parasites and mycobacteria, immunology of parasitic diseases; Institute is WHO Collaborative Center for Research and Training in both Immunology and Leishmaniasis; virology laboratory is WHO Regional Reference Center for Poliomyelitis.
Main Research Facilities Available: Library, which was founded in 1893, has annual budget of about $ 100,000 per year; field stations (2) for study of epidemiology of cutaneous and visceral Leishmaniasis; several laboratories equipped to use radioactive and molecular biology tools: cellular technology; electron microscope; cell sorter.
Future Development Plans: Development of molecular genetics of microorganisms and human diseases.
Cooperation Arrangements with Developing Countries: Centre de Biotechnologie SFAX, Tunisia; Pasteur Institutes of Morocco and Algeria; University of Medical Sciences in Tripoli, Libya.
Other International Cooperation Arrangements: IP Paris and International Network of Pasteur Institute; IAAE; European teams through EEC funding (SID III programme, Avicenne programme, ISC programme and INCO-DC), funding by TDR (WHO, Geneva), 1990-1996; Mediterranean countries for research on parasitic diseases begun in 1993 through NIH funding (USA).

Uruguay

Instituto de Investigaciones Biolgicas Clemente Estable (IIBCE)

Address: Avenida Italia 3318, Montevideo, Uruguay. **Phone:** (+598 2) 471616; **Fax:** (+598 2) 810045.
Director/Head: Horacio F. Laborde.
Number of Research Scientists: 32; **Number of Staff:** 38.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Medical Sciences.
Main Lines of Research and Training Activities: Cellular Biology: Protein metabolism in peripheral nerves; regeneration and protein synthesis in peripheral nervous system; innovation of pulmonary development; structural analysis of beta tubulin gene; localization and identification of specific proteins in meiosis; structure of chromosomes of human and related species. Microbiology and immunology: Symbiosis of Rhizobium and leguminous plants; biochemical, immunological, genetical and symbiotical characterization of nitrogen-fixing bacteria isolated in Uruguay; immunological activity of venoms from South American snakes; Neurobiology: Organization of neural circuits in different sensory systems; behaviour and plastic changes in the nervous system caused by lesions. Zoology: Biosystematics of Lycosidae and Mygaleomorphae; biological rhythms.
Major Scientific Results or Products: Publication of papers and communications to congresses.
Main Research Facilities Available: electron microscopes (2); ultracentrifuges (3); PCs IBM compatible (18); laminar flow chambers (4); -70° freezers (3); HPLC (5).
Future Development Plans: Anticipate construction of 1000 square metre research area, financed by BID loan, devoted mainly to biotechnological research; remodel present building.
Cooperation Arrangements with Developing Countries: University of Rio Grande do Sul, Brazil; University of Puebla, Mexico.
Other International Cooperation Arrangements: Swedish Agency for Research Cooperation with Developing Countries (SAREC), Sweden; International Foundation for Science (IFS), Sweden; Karolinska Institute, Sweden; European Economic Community; Japan International Cooperation Agency (JICA), Japan.

Venezuela

Instituto Venezolano de Investigaciones Cientficas (IVIC) Centro de Biofsica y Biologa Qumica (CBB)

Address: Apartado 21827, A-1020 Caracas, Venezuela. **Phone:** (+58 2) 5011020; **Fax:** (+58 2) 5041093.
Director/Head: Jesús R. Del Castillo.
Number of Research Scientists: 25; **Number of Staff:** 46.
Scientific Fields of Interest: Biology; Biochemistry/Biophysics; Physiology; Structural Biology.
Main Lines of Research and Training Activities: Ionic movements and bioenergetics of renal cells; Excitation-contraction coupling in skeletal muscle fibres; Molecular basis of muscle contraction; Mechanisms of ionic regulation in marine invertebrates; Myelin structure and interactions; Proton transport mechanisms in gastric mucosal cells; Water, ion and non-electrolyte transport systems in intestinal epithelial cells; Alimentary strategy in tropical herbivorous animals; Water, ion and non-electrolyte transport systems in renal tubules and other epithelia; Role of calcium ions in ischemic, anoxic and hypoxic cardiac muscle; Characterization of neuroactive compounds from marine sources; Role of cerebral tallus in pain modulation; Neuronal circuits in vertebrate retinal tissue; Mechanisms of neurotransmitter liberation; Regeneration of nervous system, with particular emphasis in retinal tissue; Regulation of ion transport mechanisms and others.
Major Scientific Results or Products: 45 publications in international journals in 1995; 48 publications in international journals in 1996.
Main Research Facilities Available: 14 research groups with a total working area of 1,600 m^2. Equipment includes: High sensitivity electrophysiological recording systems; 2 X-ray diffractometers with linear position sensitive detectors; Double beam and diode-array spectrophotometers; Micro-Spectrophotofluorimeters; Laser microspot confocal fluorescence; gas chromatography and mass-sensitive detectors; HPLC systems both for small molecules and macromolecules, chromatographic and electrophoretic equipment; transmission electron microscopes; micro-preparative and ultracentrifuges: lyophilizers; cell culture facilities; deep freezers and cold rooms, computer network for E-mail and On-line bibliography search through the central computing facility of the main library, internet connection.
Future Development Plans: Reinforcement of research oriented to molecular biology and other related areas; Doubling of physical infrastructure; Stronger financial support (via larger budgets assigned by the government or other funding institutions) for multi- or interdisciplinary projects.
Cooperation Arrangements with Developing Countries: All cooperation agreements and arrangements are through the parent institution, namely IVIC. The Centre has no direct contracts, except those related to individual grants for researchers or research groups.

Instituto Venezolano de Investigaciones Cientficas (IVIC) Centro de Microbiologa y Biologa Celular (CMBC)

Address: Apartado 21827, A-1020 Caracas, Venezuela. **Phone:** (+58 2) 5011111; **Telex:** 21338; **Fax:** (+58 2) 5011382.
Director/Head: Manuel Rieber.
Number of Research Scientists: 17; **Number of Staff:** 30.
Scientific Fields of Interest: Biology; Microbiology and Cell Biology.
Main Lines of Research and Training Activities: Hepatitis and Rotavirus molecular biology and epidemiology; cancer and cell biology; monoclonal antibodies in diagnosis of malaria; dimorphism in pathogenic fungi; vaccines for Leishmaniasis; immunology of schistosomiasis; molecular biology of mycobacteria; microorganisms in recovery of petroleum; plant viruses; nitrogen fixation.
Major Scientific Results or Products: Scientific publications in international journals.
Main Research Facilities Available: Electron microscopy; medical library; ultracentrifuges; tissue culture; biochemical and molecular biology essential equipment.
Future Development Plans: Improvement of human resources in molecular biology.
International Cooperation Arrangements: EEC.