UPM
UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

Institute of Bioscience
Universiti Putra Malaysia
Health | Innovation | Excellence

Vision
To be an international research center of excellence in bioscience and technology

Mission
To generate knowledge and innovation by pursuing high impact research in bioscience and technology for socio-economic advancement and nation building

Our Entities:

Laboratories:
- Laboratory of Vaccine and Biomolecules (VacBio)
- Natural Medicines and Products Research Laboratory (NaturMeds)
- UPM - MAKNA Cancer Research Laboratory (CANRES)
- Aquatic Animal Health and Therapeutics Laboratory (AquaHealth)

Strategic Units:
- Biodiversity Unit (UBD)
- Comparative Medicine & Technology Unit (COMeT)
- Microbial Culture Collection Unit (UNiCC)
- Microscopy Unit (EM)

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AGRICULTURE • INNOVATION • LIFE

BERILMU BERBAKTI
WITH KNOWLEDGE WE SERVE

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Research Programmes

Aquatic Animal Health and Therapeutics Laboratory (AquaHealth)

Fish Vaccine Technologies and Therapeutics
Deals with aquatic animal health concerns and preventive measures through vaccine and therapeutic methods.

Aquatic Health Management and Diagnostics
Encompasses all aspects of aquatic animal health issues which include host, environment and pathogen relationships on economically importance fish and shellfish species.

Laboratory of Vaccine and Biomolecules (VacBio)

Vaccine Technology and Diagnostic
Aims to develop improved rapid diagnostic tools and effective vaccines against emergent, zoonotic infectious agents and drug resistant pathogens, through advances in molecular diagnostics and vaccine design.

Biomolecular Engineering
Focuses on the application of engineering fundamentals to biological molecules (DNA, RNA, proteins, peptides and the constellation of small molecules made by cells).

Microbiome and Therapeutics
Focuses on the discovery and development of biotherapeutics agents for common and emerging diseases, and alternative to antibiotics.

Omics Bioinformatics
Focuses on analysis of a complete set of genetic elements (DNA, RNA) to understand life functions (proteins and metabolites) and find solutions to biological problems related to human civilization (food security, better health life, green environment) through big data analysis (bioinformatics).

Natural Medicines and Products Research Laboratory (NaturMeds)

Natural Product Chemistry and Metabolomics
Directed towards valorisation of natural products via advancing chemical and biological knowledge through multidisciplinary research.

Drug Discovery, Delivery and Therapeutics
Discovery of new drugs and development of new therapeutic techniques and products are the core pillars in the development of modern medicine.

Pharmacogenomics, Nutrigenomics and Nutraceutics
Focuses on the mechanism of action and interaction of bioactive compounds using omics technologies; the design, development and commercialization of novel nutraceutics and functional foods for the prevention and treatment of diseases.

UPM-MAKNA Cancer Research Laboratory (CANRES)

Cancer Stem Cell Biology
Aims to connect basic and translational research focusing on the unique biological processes shared by stem cells and malignant cells.

Cancer Immunology & Therapeutics
An extensive field of research to study the interactions between tumours as therapeutic targets for cancer treatment.

Comparative Cancer Biology
The comparative cancer biology program uses the correlations between cancer in humans and companion animals to generate new information about cancer and bring novel therapeutic options for human cancers.

Services

Plant-Based Services

Plant tissue culture

- Production of plant tissue culture (stage I – III)
- Plantlet (ex-lab)
- Subculture

Planting

- Plant identification
- Voucher specimen (dried/fresh)
- Plant sterilization
- Seedlings/potting plants (1' to 3')
- Plant medium
- Compost

Plant extracts

- Hydro/steam plant extraction (small & large scale)
- Essential oil
- Herbal bath (dried/fresh)

Plant analysis

- Proximate analysis – analysis of lipid, protein, moisture, ash and carbohydrate
- Antioxidant activities (DPPH scavenging activity, ABTS cation radical scavenging activity, ferric reducing power, β-carotene bleaching activity and iron chelating activity)
- Phenolic content (total phenolic content, total flavonoid content)
- Food (plant & animal) component analysis (ash, moisture and lipid)

Microbe-Based Services

- Public depository of bacteria
- Safe depository of bacteria
- Preservation of microorganisms
- Microorganism supply
- Isolation of bacteria
- Identification of bacteria
- Enumeration of bacteria
- Anti-microbial activity - disk diffusion assay, minimum inhibitory concentrations (MIC) & minimum bactericidal concentration (MBC)

Animal-Based Services

Cell culture

- Cytotoxicity assay (cancer cell lines and normal cells), cell cycle analysis, migration/scratch assay, reactive oxygen species assay

Fish

- Weaning area for stocking, hatching and nursing unit for fish
- Experimental area to accommodate studies on fish diseases
- Ichthyotoxicity (zebra fish/*Danio rerio* model)

Rodents

- Animal care, breeding and supplying mouse (under proposal)
- Expert techniques: surgery, bleeding, injection, oral gavage, necropsy, *in vivo* imaging, etc.
- Animal testing: anti-inflammation, anti-diabetic, anti-quorum sensing, low infection dosing
- Veterinary consultation

Molecular-Based Services

- Next generation sequencing system (NGS)
- Real-time PCR analysis
- Gene expression analysis
- Quantification of RNA/DNA
- Diagnosis of avian diseases virus
- Mammalian cells revival and maintenance service
- Mammalian cells storage facility
- Preparation tools for identification of proteins and nucleic acids

Facilities

- Cell culture facilities (biosafety level 2)
- Centrifugal partitioning chromatography (CPC)
- Chemiluminescence imaging system
- Conservatory park
- Essential oil extraction (hydro-distillation, steam-distillation)
- Flow cytometer
- Freeze dryer
- Gas chromatography mass spectrometer (GCMS)
- Herbarium
- High performance liquid chromatography (HPLC)
- High pressure chromatography protein purification and analysing system (AKTA Explorer)
- High pressure homogenizer (HPH)
- High speed centrifuge
- HPLC with fraction collector
- Inverted fluorescence microscope
- Large scale grinder
- Large scale rotary evaporator
- Large scale subcritical water extraction
- Liquid chromatography mass spectrometer (HR-LCMS)
- Microplate reader
- Microscope (inverted, fluorescence)
- Multimode microplate reader (absorbance, fluorescence, luminescence)
- Multiplex qPCR system
- Nano particle sizer and zeta potential system (zetasizer)
- Nanodrop
- Nuclear magnetic resonance (NMR) spectrometer
- Scanning electron microscope (field emission)
- Solvent extraction and fractionation
- Transmission electron microscope (high resolution)
- Ultracentrifuge
- UV-VIS spectrophotometer (microvolume)

Higher Institution Centre of Excellence (HICoE)

Development of innovative vaccines and diagnostics against animal diseases

This HICoE research programme aims to develop improved diagnostics and effective vaccines against emergent, zoonotic infectious agents and drug resistant pathogens, through advances in molecular diagnostics and vaccine design. In addition, novel probiotic microorganisms are also studied and evaluated for their potential as biotherapeutic agents and live vaccine delivery vehicle or adjuvants. Emphasis is also given on addressing fundamental issues such as gene regulation and cellular mechanisms in immunity and disease resistance based on functional genomics study of infectious pathogens and the host immune responses.

Poultry vaccines against Newcastle disease and infectious bursal disease commercialised by Malaysian Vaccines and Pharmaceuticals Sdn Bhd.

Patent Granted: An AntiCoagulant for fish blood sample (right). ViVac Vaccine to protect farm fishes from vibriosis (left).

Enhancing aquatic animal health through innovative vaccines and therapeutics

Growth in aquaculture industry has been hampered by fish diseases that have caused serious economic losses. This HICoE project of aquatic animal health focuses on novel approaches using advanced technologies such as molecular markers, diagnostic, vaccines and therapeutics in addressing aquatic animal disease problems in aquaculture. In addition, the use of microorganisms including bacteria, microalgae, zooplankton and other aquatic micro-invertebrates have shown great potentials in improving aquaculture production. Together with good management practices involving the use of environmentally friendly approaches, quality brood-stocks, and use of innovative vaccines and therapeutics, aquaculture production can be greatly improved.

Postgraduate Studies

Fascinating postgraduate research opportunities are available at Institute of Bioscience. Here, we are dedicated to train competent bioscience researchers and to develop new generation of scientific leaders. We offer research-oriented MSc and PhD programmes across the spectrum of bioscience. Students from all over the world are welcomed to work with us.

Detailed description on the postgraduate programmes at IBS can be found at ibs.upm.edu.my. Visit sgs.upm.edu.my for information on scholarship and enrolment.

Fields of Study:

- Cancer biology & oncology
- Aquatic biotechnology
- Molecular biotechnology
- Medical biotechnology
- Biotherapeutics
- Marine ecology and biodiversity
- Phytochemistry
- Medicinal chemistry
- Metabolomics
- Nanomedicine
- Vaccine & therapeutics
- Bioinformatics & system biology
- Cell biotechnology
- Immunobiology
- Enzyme biotechnology
- Industrial biotechnology
- Microbial biotechnology
- Marine and fresh water ecosystem
- Genetics
- Pharmacology & toxicology

Contact Us!

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