

Molecular Biology, the Science behind Biotechnology

Developing and Managing a Research Program:

The DLSU Laboratories

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College of Science

Molecular Biology, the Science behind Biotechnology

College of Science

CENSER

Academic Departments

- ASMS
- MBU
- HPCL
- Seed Bank
- Biodiversity
- Biology
- Chemistry
- Math
- Physics


MOLECULAR BIOLOGY UNIT

- DLSU's Vision
- Initial Funding (P20M)
- Infrastructure
 - **laboratory space**
 - **equipment**

Space

- “a small space to start big things”
- STRC 201, 203, 205 309





Equipment

- Basic Equipment
- State of the Art/specialized
 - D - HPLC
 - Real-Time PCR
 - Gradient PCR
 - Pulse Field Gel Electrophoresis
 - Spectral Imaging



MBU Central Working Area

Microbiology Lab



QPCR & PCR Area

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And now

The ^{Real} WORK



Developing a Research Program

Core Group

- **Biology (2)**
- **Chemistry (2)**
- **Mathematics**
- **Physics (2)**
- **COS Dean**

Conceptualization/Brainstorming

- **Mission / Vision**
- **Research Direction**
- **Personnel**
- **Funding**

MBU's Role

- **Academic Functions**
- **Research Functions**





Academic Function

- **provide facilities where students can do their thesis/dissertation experiments**
- **teaching lab**
- **assist department in developing new academic programs**

Research Function/Goal

- venue for faculty to do research in **Molecular Biology**
- link the university with other research institutions
- publish papers of international caliber

Research Direction

- short term (3 ~ 5 years)
- long term

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Research Direction

- **Basic Science**
- **Medical Science**

Research Direction

- Faculty Capabilities Expertise
- Equipment Availability
- Funding Resources

Long Term Research Goals

- DNA Bank for threatened/endangered Flora and Fauna of the Philippines
- Develop new technologies in Medical research and diagnostics

Research Program

- **evolving**
- **flexibility**
- **relevance**

Soul of MBU Research

DNA → RNA → PROTEINS
Genomics *Proteomics*

Central Dogma of Molecular Biology

Molecular Biology, the Science behind Biotechnology

ORGANISM

AREA

PROJECT

BANKING

DNA

Plant

Taxonomy

Genetics

RNA

Animal

Pharmacogenomics

Bioinformatics

PROTEINS

Microbes

Ecology

Biophysics

Disease Monitoring

Diagnostics

Microbiology

Why GENOMICS

Genome?

an organism's biological blueprint of DNA, chromosomes and genes

- **analysis of the full range of genes and gene products in an organism**
- **analysis of complete DNA sequences**
- **study of genes and their function**

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Largest numbers of threatened / endangered species reside in the TROPICS



Current Scenario

- **loss of biodiversity from extinctions**
- **decrease in access to genetic resources**



Corals



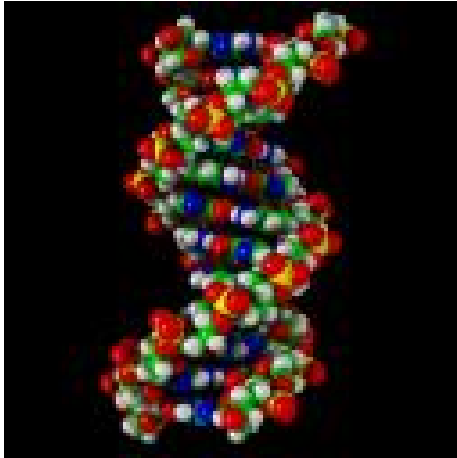
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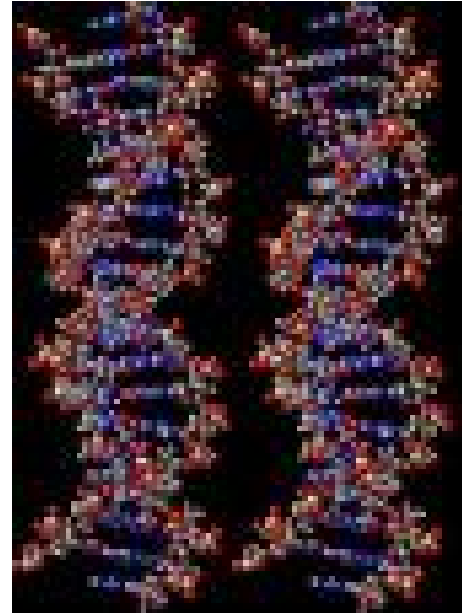


Tarsiers





DNA



What is a DNA BANK?

- Repository of DNA (Base) sequence
- Computer-based bank
- Tissue samples stored at -70°C (or lower)
- Ultralow freeaer or liquid Nitrogen
- DNA can be isolated from fresh/frozen tissue samples
- Preservation of purified DNA (for hundreds to thousands of years)

The **NEED** for DNA Banking

- While major efforts
- Botanical gardens, arboreta, zoological parks, seed banks, museums
- Relatively little effort
 - Collect and document DNA specimens as
 - GENETIC RESOURCES

Bioinformatics

- Building and manipulation of biological data base
- Essential for mining massive amount of genomic data knowledge about GENE STRUCTURE and GENE EXPRESSION
- BLAST (DNA/Protein)
- GRAIL (Genes)

Getting the Funding

- University Funding (URCO, CRC)
- Local Funding
- CHED, PCASTRD, PCHRD, NRCP, NGO's
- International Funding
- TWAS, WHO, WWF, JSPS, MONBUSHO
- International Linkages

Applying for Research Funding

- Good proposal
- Track record in research
- Qualified personnel
- Well-equipped lab facilities

How to make MBU Financially Viable?

- Conduct year-round training workshops
- Open facilities to outside Users
- Open Medical Diagnostic Facilities

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New Trends

Molecular Sciences

THANK YOU VERY MUCH