قسم التكنولوجيا الحيوية

السيد الأستاذ الدكتور / محمد عبد الكريم عبد ربه

عميد المعهد

تحية طيبة وبعد ،،،

يتشرف قسم التكنولوجيا الحيوية بأن يرسل لسيادتكم ميعاد ورشة عمل للقسم فى الفترة من ٢٠١٩/٣/٣١ وحتى ٢٠١٩/٤/٤وذلك تحت عنوان :

"Basic Techniques in Molecular Biology and Biotechnology "

برجاء التكرم بالنظر واتخاذ ماترونه سيادتكم لازما ،،،

وتفضلوا سيادتكم بقبول فائق الإحترام ،،،

رئيس قسم التكنولوجيا الحيوية

٢٠١٩/٣/١٠

ا.د/ هشام محمود سعيد

لعلم

Biotechnology Department

Institute of Graduate Studies and Research

University of Alexandria
Institute of Graduate Studies and Research
Department of Biotechnology

Workshop on "Basic Techniques in Molecular Biology and Biotechnology March 31-April 4th, 2019

Background. Molecular biology is the study of biology at the molecular level. The field overlaps with other areas of biology and chemistry, particularly genetics and biochemistry. Molecular biology revolves around the central dogma DNA → RNA → protein. Recent developments in the field of Biomolecular Sciences and Molecular Biology techniques have introduced a new dimension to the medical, pharmaceutical, agricultural and industrial research. It is very important for researchers especially those working on clinical and non-clinical medical professionals to acquire fundamental knowledge of different molecular biology techniques. The aim of this workshop is to provide researchers with basic training in molecular biology tools, bioinformatics techniques and scientific concept. The current workshop covers important molecular biology techniques like genomic DNA and RNA isolation from different sources, plasmid DNA isolation, restriction digestion of DNA, cDNA synthesis, cloning, transformation of bacterial cells with plasmid DNA, PCR, Real Time PCR, electrophoresis for nucleic acids and proteins, western blotting, sequencing techniques and basics of bioinformatics.

Other Objectives.

- To provide training in basic molecular biology techniques required in pharmacogenetic studies.
- To impart web-based training in basic concepts of bioinformatics.
- To impart theoretical knowledge on some of the recently developed molecular biology tools such as CRISPR.

Target Participants. This workshop is intended for research scientists, graduate and postgraduate students who require knowledge in molecular biology techniques, laboratories supervisors and technicians.

Theory Sessions.

- Nucleic acids structure, isolation and purification, quantification using different techniques, gene isolation, cloning and expression, detection of the cloned gene using different molecular tools and analysis of gene expression.
- Bases of Polymerase Chain Reaction (PCR) and Real Time PCR (RT-PCR) including; primer design for PCR and RT-PCR using computer-based programs, cloning of a PCR product for sequencing and expression in a suitable hosts and analysis of the PCR product to find out the possible open reading frames.
- Approaches to analysis of RNA (Methods for studying gene expression).
- DNA sequencing techniques old methods and next generation sequencing techniques.
- Introduction to Bioinformatics: what is bioinformatics, principles of protein structure, tertiary structure, quaternary structure, similarity of ternary and quaternary structure.
- Bioinformatics Databases: introduction, nucleotide sequence databases, protein sequence databases, sequence motif databases, protein structure databases, working with single sequence (nucleotides and proteins), structure of genes and genomes, distinguish between prokaryotic and eukaryotic genes, find information about a specific gene and interpret a GenBank entry.
- Nucleotide and protein alignments (BLAST & PSI-BLAST), multiple sequence alignment, phylogenetic tree generation and analysis, secondary structure prediction and protein-protein interaction networks.

Practical Sessions.

Day 1: 31-3-2019:

- DNA isolation and purification from different sources such as whole blood, gram-positive and gram-negative bacteria, animal tissue and plant.
- Isolation and purification of plasmid DNA.
- Isolation and purification of RNA from animal cells and whole blood.

Day 2: 1-4-2019:

- Synthesis of cDNA for gene quantification by RTPCR.
- Gel electrophoresis for nucleic acids.
- Determination of nucleic acids concentration using nanodrop.
- Digestion of DNA using restriction enzymes.
- Preparation of competent *E. coli* cells for transformation.
- Setting up a rapid ligation reaction.
- Polymerase chain reaction for isolation of a specific gene.

Day 3: 2-4-2019:

- Transformation of competent *E. coli* cells.
- Sodium dodecyl sulfate gel electrophoresis for protein.
- Western blotting technique.
- Bioinformatic practical session.

Day 4: 3-4-2019:

- Screening of transformants for positive clones using PCR.
- Complete western blotting of day 1.
- Analysis of gene expression by real time PCR.
- Bioinformatic practical session.

Day 5: 4-4-2019:

- Affinity purification of recombinant protein.
- Analysis of recombinant protein using SDS-PAGE and western blotting.
- Bioinformatic practical session.
- Catch up incomplete work of the training course.

Course Book. Basic Techniques in Molecular Biology and Biotechnology workshop book will contain recent materials for most of the topics covered in the course theoretically and practically. In addition, a CD contains most of the protocols and methodologies covered will be available.

Course includes.

- Certificate of Participation issued by Institute of Graduate Studies and Research, Alexandria University.

☐ Breakfast, lunch and Tea.

Workshop Fee. The registration fee for the workshop is 1200 Egyptian pounds.

Course Organizer.

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