UNIVERSITY OF NEW ENGLAND
Portland Campus

Introduction to Genomic and Molecular Genetic Methodologies

4 – 8 August 2014

In the post-human genome years, drugs and diagnostics will be directed to specific molecular targets. Molecular genetics is one of the most rapidly growing fields of biomedical science and has become integral to all fields of study in the life sciences. This workshop consists of lectures and laboratories designed to introduce current theory and the fundamental tools that underlie the most recent technologies in molecular genetics. The course goal is to give participants hands-on experience with a number of the techniques used in genomics as they are applied in all the life sciences. The lectures will provide much of the theory that forms the basis of these techniques.

Laboratory Techniques:

- Nucleic acid isolation
- Quantitation of nucleic acids
- Agarose gel electrophoresis
- Polymerase Chain Reaction
- Reverse transcription and cDNA synthesis
- Cloning and screening of PCR products
- Transformation & recovery of plasmid DNA
- siRNA gene knockdown
- Quantitative Real-time PCR – Gene arrays
- Genotyping and DNA sequencing
- ELISA and Protein activity assays

Lecture topics:

- Genomics and Pharmacogenomics
- Next Gen sequencing **NEW!**
- PCR theory and primer design
- Genotyping and Population Genetics
- MicroRNAs and siRNA Technologies
- Enzyme-Linked Immunosorbent Assays
- Array data analysis
- Gene expression - Quantitative PCR

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Genomics
Analytics
Proteomics
Core

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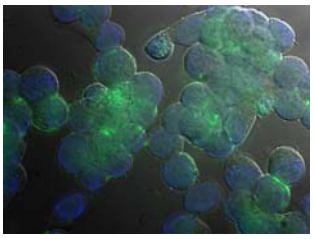

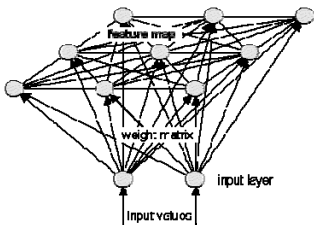

Genomic and Molecular Genetic Methodologies

Monday 4 Aug

9:00-9:30	Introduction: Continental Breakfast
9:30-11:30	**Lab**: Isolation & quantification of RNA
11:30-12:30	Lunch
12:30-1:30	**Lab**: Gel electrophoresis of total RNA
1:30-2:30	**Lecture**: Primer on DNA/RNA & genomes
2:30-3:00	Break
3:00-4:00	**Lecture**: Polymerase Chain Reaction
4:00-5:00	Discussion: Lab results

Tuesday 5 Aug

8:30-9:00	Continental Breakfast
9:00-10:00	**Lab**: cDNA synthesis
10:00-11:00	**Lecture**: MicroRNAs & siRNA technologies
11:00-12:00	**Lab**: Transfection of HeLa Cells w/ siRNA
12:00-1:00	Lunch
1:00-2:00	**Lecture**: Enzyme-Linked Immunosorbent Assay (ELISA)
2:00-2:30	**Lab**: ELISA – Cell treatment
2:30-3:30	**Lab**: RT-PCR
3:30-4:30	**Lecture**: Gene Expression Arrays I
4:30-5:00	**Lab:** ELISA – Cell Lysis

Wednesday 6 Aug

8:30-9:30	**Lab**: Genomic DNA Isolation (followed by Continental Breakfast)
9:30-10:30	**Lab:** ELISA – eNOS assay
10:30-12:00	**Lab**: Gel Fractionation of PCR products
12:00-1:00	Lunch
1:00-1:30	**Lab:** ELISA – eNOS assay
1:30-2:00	**Lab**: Cloning of PCR products – Ligation & Transformation
2:00-3:00	**Lab**: Genotyping for MDR1 3435T
3:00-4:00	**Lab:** ELISA – eNOS assay **Lab**: Cloning of PCR Products – Plating of transformed cells

Thursday 7 Aug

8:30-9:00	Continental Breakfast
9:00-10:30	**Lab:** Quantitative real-time PCR
10:30-11:30	**Lecture:** Gene Expression Arrays II
11:30-12:30	**Lab:** KDalert GAPDH assay
12:30-1:00	Lunch
1:00-3:00	**Lecture:** Population Genetics & Genotyping
3:00-4:00	**Lab**: PCR Array analysis
4:00-5:00	**Lab:** Positive colony selection and setup of overnight cultures

Friday 8 Aug

8:30-9:00	Continental Breakfast
9:00-10:30	**Lab**: Mini-preparation of plasmid DNA and restriction digestion
10:30-11:30	**Lab:** Gel fractionation of restriction digests
11:30-1:00	Lunch
1:00-2:00	**Lab:** Analysis of restriction digestions
2:00-3:00	**Workshop Conclusion and Evaluation**

REGISTRATION FORM: Genomic and Molecular Genetic Methodologies

Name _____ Title _____ Organization_____

Address _____

City_____ State/country _____ Postal Code_____

Telephone_____ Fax _____Email_____

Signature_____ Date _____

Please return to: Molecular Methodologies, Department of Pharmaceutical Sciences, College of Pharmacy, University of New England, 232 Pharmacy Bldg. 716 Stevens Ave, Portland, ME 04103, Phone: 207-221-4078 Fax: 207-523-1926. **Email: dbrazeau@une.edu**.

Course location: The course will be held at the University of New England, 203 Pharmacy Bldg, 716 Stevens Ave, Portland, ME.

Fee: Individual fee: $500 for students and UNE Faculty/staff, $1500 for faculty and researchers. This includes course documentation, laboratory supplies and reagents, and mid-session refreshments each day.

Registration: Please register ASAP in view of the limited course capacity of 20 participants. Confirmation of registration will be returned upon receipt, together with an invoice for the course fee. Registration will not be final until payment is received.

Cancellations: Cancellations with a full refund may be made until 14 July 2014. No refund is possible on cancellations received after this date. Substitutions may be made at any time.

Payment: Credit cards or checks made payable to: University of New England