Global Initiative for Academic Networks (GIAN) @ GNDU

Course: Cell Engineering for Biomedicine - Basics to Application

Overview

Life science research has transformed in last 2-3 decades. Conventional test tube biochemistry has been so well integrated with cell biology and cell engineering that it is a prerequisite now to understand the basics of cell engineering as early as graduate and post-graduate part of study and training. Several aspects of basic understanding of cellular senescence, immortalization and carcinogenesis and differentiation require understanding and engineering of cells in culture dishes. Furthermore, functional characterization of genes and proteins, targets of biomedicine, drug discovery and regenerative medicine enroll principles of cell engineering.

Objectives

The series of lectures aim to present the concepts, recent developments and applications of cell engineering based on the knowledge generated in the field of regulation of cell growth characteristics, immortalization and imaging. The course will cover:

(i) Basic principles of normal cell growth regulation (cellular senescence) and its deregulation during carcinogenesis
(ii) Use of the above knowledge in cancer therapeutics (generating short-lived cells)
(iii) Use of the above knowledge in regenerative and biomedicine (generating long-lived healthy cells)
(iv) Technologies relevant to cell engineering with reference to some model proteins (for example, tumor suppressor, oncogene and stress pathways)
(v) Tutorials and workshops on experimental training as well as writing and presenting the research results

Modules	Cell Engineering for Biomedicine - Basics to Application: Feb 06 -10, 2017
	06.02.2017 (PM - 1: 60 min): Introduction to Cell Engineering - Need, Seed and Solutions from the Studies on Regulation of Normal Cell Growth Controls a. Normal cell senescence markers and their manipulations b. Senescence as a tumor suppressor mechanism **07.02.2017 (AM: 120 min): Human Cell Culture Technologies for Senescence Research** a. Senescence of human cells

	b. Differentiation of human cells in culture c. Induction of senescence in cancer cells – a strategy for cancer therapeutics **07.02.2017 (PM: 120 min): Study of Tumor Suppressor and Oncogenic Pathways and their Relevance to Cancer Therapy** a. p53 tumor suppressor b. pRb tumor suppressor c. Stress and DNA damage response **08.02.2017 (AM: 120 min): Molecular Linking of Stress, Aging and Cancer - Its Manifestation in Cell Culture and Cell Engineering** a. Heat shock proteins as regulators of cell proliferation and stress signaling b. Heat shock protein, mortalin, in cell engineering technologies **08.02.2017 (PM: 60 min): Gene and Protein Overexpression and Knockdown Technologies for Cell Engineering** a. Ribozymes b. RNAi (RNA interference) c. miRNA (Micro RNA) d. Antibody **09.02.2017 (AM: 120 min): Cell Based Loss-of-Function Screenings for Gene Discovery, Characterizations and their Implications to Cell Engineering** a. siRNA library-based screenings b. Ribozyme-based screenings c. miRNA-based screenings **09.02.2017 (PM: 120 min): Cell Imaging and Cell Engineering** a. Illumination of cells with fluorochromes and quantum dots b. Real time assays **10.02.2017 (AM: 60 min): Training on Scientific Writing and Presentations** a. Using Endnote b. Preparing and presenting data AM = Start at 10:00 hrs. PM = Start at 13:00 hrs. PM-1 = Start at 15:00 hrs.
	Number of participants for the course will be limited to fifty
You should Attend if…	• Student at all levels (BSc/MSc/MTech/PhD) of Life Sciences including Biotechnology, Biochemistry and Molecular Biology, Botany, Microbiology, Human Genetics, Zoology etc. • Faculty from reputed academic institutions and technical institutions. • Researchers /Post-docs/ Research Associates from Universities, Govt and R&D laboratories
Fees	Participants from abroad: US $200 Participants from Academic Institutions in India: BSc students: Rs. 500/- MSc/MTech students: Rs. 1000/- PhD students: Rs. 1500/- Faculty members: Rs. 2000/- The above fee includes all instructional materials, computer use for tutorials, 24 hrs. free internet facility. Outstation participants will be provided with single bed accommodation

The Faculty

Dr. Renu Wadhwa* had her first PhD from the Guru Nanak Dev University, India and the second PhD from the University of Tsukuba, Japan. She had her post-doctoral training at the University of Newcastle Upon Tyne, England and RIKEN Japan. She has been working in Japan for last 26 years and leading a research team working on the mechanisms of Cell Proliferation Controls at the National Institute of Advanced Industrial Science & Technology (AIST), Japan. Her major research interest is to understand the molecular mechanism of aging and cancer, using normal and cancer cells as model systems, and has trained more than 30 researchers. She had cloned (i) a novel member of hsp70 family protein in 1993 and named it "mortalin". She has made several original findings describing the functional characteristics of this protein and its role in cancer and age-related disorders, (ii) a novel regulator of p53 tumor suppressor pathway and named it "CARF". Functional role of CARF in cell senescence and malignant transformation is one of the major themes in her laboratory, and has published several findings on this. Her group was the first one to investigate the molecular mechanism of anticancer activity in the leaf extract of Ashwagandha by modern molecular biology and bioinformatics strengths, and has demonstrated extremely important activities and their mechanisms of action using human cell culture assays. She has delivered more than 50 invited talks at international conferences. With excellent research and teaching strengths, Dr. Wadhwa will be serving as a GIAN Faculty for the program coordinated by Dr. Kaur at GNDU, Amritsar.

*Prime Senior Research Scientist and Leader, DBT (India)-AIST (Japan) International Laboratory for Advanced Biomedicine (DAILAB) at AIST, Tsukuba Science City, Japan

*Visiting Scientist, Children's Medical Research Institute, Sydney

*Adjunct Professor, Hanyang University, Seoul

Course Coordinator:

Prof. Gurcharan Kaur

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Prof. Gurcharan Kaur is the faculty of Medical Biotechnology in the Department of Biotechnology, Guru Nanak Dev University, Amritsar. She has important contributions in 'Neurosciences' in the area of Adult Brain Plasticity and Healthy Brain Ageing. Her recent research highlights are testing of some natural and synthetic products for their neuroprotective activities and developing *in vitro* protocols for testing their anti-neuroinflammatory and neuroregenerative potentials.

REGISTRATION CUM ACCOMODATION REQUEST FORM

(To reach electronically by 10th Jan 2017 and hard copy by 15th Jan 2017)
Cell Engineering for Biomedicine - Basics to Application

Feb. 06-10, 2017

Department of Biotechnology, Guru Nanak Dev University
Amritsar, Punjab

Name (Block Letters): ……M/F: ……

Designation/ Professional Title: ……..

Organization: ……

Address: ……
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Tel.: …….. . Mobile: ……..

E- mail: ……

Accommodation Required (Yes/ No): ……..

The Registration fee of Rupees ……has been paid via Demand Draft No……..in favour of The Registrar, Guru Nanak Dev University, Amritsar Through online/offline banking bearing Transaction No. …….. to Punjab & Sind Bank, Guru Nanak Dev University Campus (RTGS/IFSC code: PSIB0000288) A/Ct No. 02881000007953 of Guru Nanak Dev University. Demand Draft / Fee Receipt have been enclosed herewith.

Date: Signature