DEPARTMENT OF BIO AND NANO TECHNOLOGY
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY
HISAR-125001 (HARYANA)

ORGANIZES ONE WEEK WORKSHOP-COURSE

ON

MAMMALIAN REPRODUCTIVE BIOTECHNOLOGIES – TOOLS, TECHNIQUES & METHODS

11th December to 15th December, 2017

BROAD AREA: Reproductive Biotechnology/ Reproduction/ Biotechniques/ Reproductive Biology

OVERVIEW

Reproductive biology is a rapidly changing discipline that bridges basic science and clinical practice. The applied arm of this field, reproductive biotechnology, has far reaching economic and societal implications. In human medicine, the application is mainly as a treatment for infertility with over 2 million children born as a result of this technology since the advent of in vitro fertilization in 1977. In agriculture, the technology is used for breed improvement and selection of breeding stock. With the development of somatic cell nuclear transfer, the so called cloning technique, new challenges and opportunities have arisen including increasing the number of individuals with unique and valuable genomes, the creation of embryonic stem cells and the development of research models and tools. However, epidemiological studies in humans and retrospective studies in domestic animals have shown a number of abnormalities that appear to be associated with these technologies. To be able to appreciate the application, side effects and ethical issues surrounding reproductive biotechnologies it is necessary to understand the underlying biological principles upon which these techniques are founded. Therefore, this course is designed to introduce key concepts in reproductive biology and principles of emerging reproductive technologies.

Livestock contribute directly to livelihoods worldwide, providing food, but also non-food products, draught power and financial security. Livestock production already accounts for more than one third of the global agricultural GDP in developing countries, and this proportion is expected to increase. The rapidly increasing demand for livestock products, known as the "Livestock Revolution", has created opportunities for improving the welfare of at least some of the nearly one billion poor people who depend on livestock for their livelihoods. However, land degradation, environmental pollution, global warming, the erosion of animal genetic resources, water shortages and emerging diseases are all expected to present challenges to the growing global livestock sector.

Conventional technologies and biotechnologies in livestock have contributed immensely to increasing productivity, particularly in developed countries, and can help to alleviate poverty and hunger, reduce the threats of diseases and ensure environmental sustainability in developing countries.

OBJECTIVES

The primary objectives of the course are as follows:

i) To introduce the biological principles that form the basis for reproductive biotechnologies.
ii) To introduce current and emerging topics in reproductive biology.
iii) To provide a platform for discussion of current research in reproductive biotechnologies.
iv) To help students understand major ethical and socio-economic aspects of reproductive biology.
v) Help students understand the basic principles of scientific communication, oral and written, pertaining to reproductive physiology/medicine.

Mammalian Reproductive Biotechnologies – Tools, Techniques & Methods

11th December to 15th December, 2017

Module A: December 11, 2017 (MONDAY)

Reproductive Biology & Animal Reproductive Biotechnology Around Us

Inauguration: 9:00 AM

a. **Lecture 1**: 9:30 to 11:00 AM Hormones as double-edged swords
b. **Lecture 2**: 11:30 to 1:00 PM Inhibiting or augmenting fertility using hormones
c. **Problem Based Learning (PBL) Module 1:** 2:00 to 4:00 PM Computer Assisted Laboratory using simulated cases pertaining to endocrinological micromanipulation will be presented. Introduction to Ignite Talk Module, Dragons Den and Amazing Race

Module B: December 12, 2017 (TUESDAY)

Embryo Developmental Competence and Biomarkers of Development

a. **Lecture 3**: 9:30 to 11:00 AM Embryo arrest and apoptosis: Perspectives for animal production in India
b. **Lecture 4**: 11:30 to 1:00 PM Biomarkers of embryo health: Creating diagnostics for animal production augmentation in India
c. **Problem Based Learning (PBL) Module 2:** 2:00 to 4:00 PM Laboratory simulated cases using computer assisted technology pertaining to embryo arrest and/or assessing embryonic health will be presented

Module C: December 13, 2017 (WEDNESDAY)

Factors Affecting Reproduction in the Tropical Environment

a. **Lecture 5**: 9:30 to 11:00 AM Gene regulating oogenesis, oocyte maturation and embryo development: Cell biology of embryo development
b. **Lecture 6**: 11:30 to 1:00 PM Endocrinology of stress (heat/cold and climate change) in reproduction
c. **Problem Based Learning (PBL) Module 3:** 2:00 to 4:00 PM Ignite talks on current topics in Reproduction (Given out on during Module A).

Module D: December 14, 2017 (THURSDAY)

Micromanipulation of Gametes & Zygotes

a. **Lecture 7**: 9:30 to 11:00 AM Assisted Reproductive Biotechnologies – I (Artificial Insemination, Induction of ovulation, Embryo Transfer (SOET, MOET, OPU), In Vitro Fertilization, Semen Sexing)
b. **Lecture 8**: 11:30 to 1:00 PM Assisted Reproductive Biotechnologies – II (Embryo Cloning, Intra Cytoplasmic Sperm Injections, Gene Therapy, CRISPER/CAS9, Sperm cryopreservation, Germline preservation, Stem Cell, Chimera formation)
c. **Problem Based Learning (PBL) Module 4:** 2:00 to 4:00 PM **Repro Amazing Race** (This is an outside classroom activity): Team of two to three trainees will race in competition to answer puzzles or questions based on exhibits related to reproductive biology across the GJU campus. The exhibits would be related to topics covered during lectures and will help to review the topics covered. After answering the questions/solving a puzzle at the station, they will get a clue to go to the next station on campus and follow the same procedure. A total of six-eight stations will be set up. The team to answer all questions correctly in the shortest possible time will be winners and will be awarded special prize.

Module E: December 15, 2017 (FRIDAY)

Future of Reproductive Biotechnologies with focus on India

a. **Lecture 9**: 9:30 to 11:00 AM Changing face of reproductive biotechnologies with emerging technologies like Omics (proteomics, metabolomics and transcriptomics): Is India prepared?
b. **Lecture 10**: 11:30 to 1:00 PM Epigenetic modulation and reproduction: Protection of male germline against transposons, importance of epigenetic processes in the female germ line, mechanisms underlying the acquisition of DNA methylation patterns
c. **Problem Based Learning (PBL) Module 4:** 2:00 to 4:00 PM **Repro Dragon's Den:** In consultation with the instructors, students (divided into groups) will work on a topic in reproductive biology (after the intro lecture). The students should be assimilating the material presented in the course and come up with a new idea for a scientific grant or a business idea based on the problems facing the field and how will they solve the problems (given a chance and unlimited resources).

Number of participants for the course will be limited to fifty only.

You should attend if….

- You are an executive and researcher from manufacturing, service and government organizations including R&D laboratories in the area of reproduction/biotechnology.
- You are a student (at all levels including BSc/MSc/MVSc/PhD) or faculty from reputed academic institutions and technical institutions

Registration

The participants are required to get themselves register on GIAN web portal (http://www.gian.iitkgp.ac.in)

The course registration fee is separate. The participation fees (Demand draft drawn in favour of Registrar, GJUS&T, Hisar or NEFT/RTGS at PNB A/C No. 4674000100036542 IFSC: PUNB0467400) for taking the course is as follows:

Foreign delegates : US $500

Participants from Industry : ₹ 10,000/-

Participants from Indian Academic Institutions/ Research Organizations : ₹ 2,500/-

The above fee includes all instructional materials, computer use for tutorials and assignments, equipment usage charges, and internet facility. However, the participants will be provided with accommodation on payment basis, subject to availability.

Foreign Faculty

Dr. Pavneesh Madan is a faculty at the Ontario Veterinary College (OVC), University of Guelph (UofG). Dr. Madan pursued his doctoral studies at the University of British Columbia (UBC), under the supervision of Dr. Colin MacCalman and Dr. R. Rajamahendran in Vancouver, Canada. He completed his post-doctoral training at the University of Western Ontario (UWO), Canada in Dr. Andy Watson's Laboratory and joined OVC in the department of biomedical sciences and started his independent laboratory in 2008. His research interests include various aspects of reproductive biotechnologies including embryo gene expression, metabolomics, gene inhibition, genetic manipulation and animal cloning. Dr. Madan is also involved in graduate, undergraduate and (Doctor of Veterinary Medicine) DVM teaching. He is also a certified Veterinarian, licensed to practice veterinary medicine in North America. Through the help of funding from Canadian Foundation for Innovation, Dr. Madan has developed "Centre for Embryonic Health and Viability" (CEHV), which is undertaking cutting edge science in the field of early embryo development and embryo biotechnologies. Dr. Madan is a recipient of several research and teaching awards, which include Elizabeth Roxann Howland Fellowship (2000, 2001 & 2002), and Wyeth Award for Research Excellence (2004, 2005 & 2006). He is also a two-time winner of the Pfizer-Carl J. Norden Distinguished Teacher Award (2009 & 2013), which is the highest teaching award in the field of Veterinary Medicine.

Host Faculty

Prof. Neeraj Dilbaghi completed his Masters and Doctorate degree in Microbiology from CCS Haryana Agricultural University, Hisar and is presently working at the Department of Bio and Nano Technology, Guru Jambheshwar university of Science and Technology, Hisar, Haryana, India. Prof. Dilbaghi holds position of Director, UGC- Human Resource Development Centre, Institutional Coordinator of RUSA & Incharge, Radio-Ecology Centre of GJUS&T, Hisar. He has over 23 years of research and 20 years PG Teaching experience. During his professional career Dr. Neeraj Dilbaghi has guided nine Ph.D. and over 40 M.Tech. students. Presently, 8 Ph.D. students and one PDF are pursuing research under his guidance. His current research focuses on Microbial Biotechnology, Bionanotechnology, Nanosensors for healthcare and environmental applications, Nano medicine and Drug Delivery and Toxicological evaluation of nanomaterials. Prof. Neeraj Dilbaghi has published over 115 research papers in peer reviewed international and national journals of repute with over 1600 citations and H-index of 22. He is also the Life Member of Association of Microbiologists of India and Society for Conservation of Domestic Animal Biodiversity. Dr Dilbaghi has received several grants from national and international funding agencies like DST, UGC, BARC-BRNS, LSRB-DRDO etc to manage his research activities.

Course Co-Coordinator

Dr. Sandeep Kumar, Assistant Professor, is a researcher of international recognition at the Department of Bio and Nano Technology, Guru Jambheshwar University of Science and Technology, Hisar, Haryana, India. Dr. Sandeep Kumar has received his PhD degree from Punjab University, Chandigarh. His current research includes synthesis and characterization of nanomaterials, nano-carriers for healthcare applications, nanomaterials based sensors, biomaterials and nanotoxicity. Dr. Kumar has one patent and published more than 70 research papers in international journals of repute. Dr. Kumar has international and national sponsored research projects from different funding agencies like DST, DBT, DRDO etc. Dr. Kumar visited Hanyang University, Seoul, South Korea as a visiting Professor and also Australia, UK, Scotland, Bangkok under different schemes of Govt. of India. Dr. Kumar has recently received Haryana Yuva Vigyan Ratna Award 2015-16.

INTERNATIONAL WORKSHOP

on

"Mammalian Reproductive Biotechnologies – Tools, Techniques & Methods"

An event under

11th December to 15th December, 2017

Organized by

Department of Bio & Nano Technology
Guru Jambheshwar University of Science and Technology, Hisar

Course Co-ordinator
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(Sponsored by: GIAN-MHRD, Govt. of India)

REGISTRATION FORM

Personal Information: (write in capital letters)

1) Name of the Participant: Mr./Ms./Mrs./Dr./Prof._____
2) Gender:_____
3) Date of Birth:_____
4) Academic Qualification & Designation:_____
5) Institution/Organization:_____
6) Address for Communication:_____

   _____
7) E-Mail ID:_____
8) Mobile Number(s):_____
9) Payment Details (DD/NEFT/RTGS)
   (a) Demand Draft:_____

   _____

   (b) NEFT/RTGS:_____

   _____
10) Accommodation Required (Yes/No):_____
    (Note: GIAN is not providing food and accommodation for the participants)

Signature of the Participant

Duly Filled Registration form along with payment details (attached demand draft, if done) should be sent to the following Address:

Prof. Neeraj Dilbaghi

Course Coordinator
Department of Bio and Nano Technology
Guru Jambheshwar University of Science & Technology
Hisar (Haryana) PIN-125001
Email: biotechgian2017@gmail.com, ndnano@gmail.com

VENUE:
SEMINAR HALL,
CH. RANBIR SINGH
AUDITORIUM, GJUS&T, Hisar.