Quasquicentennial Retro Revival (2014-15)

National Workshop

on

Metagenomics and Nutrigenomics for Research and Teaching in Animal Nutrition in India

November 20-21, 2015

Organized by

ICAR-Indian Veterinary Research Institute, Izatnagar

IVRI

www.anft.org

Animal Nutrition Association Izatnagar

INVITATION

ICAR-Indian Veterinary Research Institute, Izatnagar, welcomes you to participate in the **National Workshop on Metagenomics and Nutrigenomics for Research and Teaching in Animal Nutrition in India** dealing with the significance of advanced molecular tools for understanding the rumen microbiology and nutrition at genetic level which is a present need to make livestock production more profitable. Celebration of the occasion also coincides with Quasquicentennial Retro Revival 2014-15, finishing the 125 years of the foundation of the Institute (IVRI).

INTRODUCTION

Livestock industry is an integral part of agriculture and is one of the main sources of livelihood for the farmers in India. The major part of the total inputs (70%) for livestock production is in the form of animal feed and therefore the economics of livestock industry largely depends upon the feed utilization efficiency of the animals. The lignocellulosic agricultural by-products are the major feed ingredients of animal feed. These feeds are degraded by the highly complex and diversified rumen microbial eco-system comprising of bacteria, protozoa, archaea, fungi and bacteriophages. These microbes act synergistically, antagonistically, mutualistically and symbiotically to make rumen an efficient biofermentor. Rumen is considered as one of the most efficient anaerobic systems for degradation of lignocellulosic feeds, nonetheless rumen microbes are able to extract only 60-65 per cent of potential energy from lignocellulosic feeds like cereal straws and stovers. In the rumen, methanogenesis is an essential metabolic process resulting in methane production. About 2-12 per cent of dietary energy is wasted in the form of methane which otherwise could be utilized by the animals for production purposes. Therefore, the feed energy is wasted in two ways which leads to great economic losses for the livestock industry and also methane being a potent green house gas contributes to environmental pollution. The gastrointestinal microbes also dictate status of animal health, therefore, imbalance in the microbial eco-system also reflects upon the performance of the animal.

Rumen microbiologists and nutritionists have been making efforts since long to minimize these loses but have succeeded only to a limited extent. The rumen is just like a black box which has to be decoded. The biggest challenge is the complexity of the microbial ecosystem and whatever we know about this micro-environment is based on the cultivable microbes which comprises only 10-12 per cent of the total. The knowledge on this micro-environment has been further enhanced with the advent of nucleic acids based technologies like PCR, analysis of PCR amplicon by several molecular techniques like restriction fragment length polymorphism (RFLP), denaturing gradient gel electrophoresis (DGGE), temperature gradient gel electrophoresis (TGGE), temporal temperature gradient gel electrophoresis (TTGE), terminal-restriction fragment length polymorphism (T-RFLP), construction of 16S rDNA or 18SrRNA clone libraries and sequencing. But all these techniques have limitations and therefore, it is difficult to have a true picture of a microbial community. Metagenomics is an advanced biotechnological tool which overcomes the limitations of PCR aided tools. Metagenomic studies make it possible to investigate the microbes in their

environments, the complex communities in which they normally live and make us understand the genetic composition and activities of various communities present in an environment. With the knowledge on micro environment, specific targets can be identified for manipulation of gastro-intestinal microbes to get the metabolic processes suppressed or stimulated.

The animal nutrition research is gradually proceeding towards molecular era and advanced molecular techniques are now being applied to resolve un-explained quarries of nutrition at gene level. Unlike conventional view of gene expression, in nutrigenomics, the feed is ingested and the active metabolites thus produced are responsible for switching on/off or upregulation/downregulation of genes indicating that nutrition is directly related to gene expression. By studying the changes in genes expressions due to specific nutrients, a metabolic process can be modified by using the nutrient through down or up-regulation of the genes. Therefore, there is a need to work on nutrigenomics by which various nutritional diseases/metabolic disorders can be prevented and / or clinically managed.

WHY THIS WORKSHOP ?

In ruminants, it is the rumen microbial consortium which enables the animals to thrive upon poor quality fibrous feed as energy source but until recently not much focus has been given on the teaching and research in rumen microbiology/biotecnology and animal nutrition at molecular level. Only sporadic work has been done on animal nutrition research at gene level during the last 1-2 decades. There is an urgent need to make students/teachers/ researchers aware of the application of metagenomic and nutrigenomic techniques in the subject. The workshop is proposed to be organized to have a thorough discussion among the experts, researchers and teachers of such areas to design action plan for the induction of these courses in animal nutrition teaching and research. The interactions in the workshop will also help in formulating new collaborative projects on these aspects of animal nutrition.

VENUE

ICAR-Indian Veterinary Research Institute, a premier national Institute of Indian Council of Agricultural Research is situated at Izatnagar, 8 km north of Bareilly Jn. on Mathura-Lalkuan broad gauge railway line. Izatnagar is a satellite town of Bareilly. You can also reach Izatnagar from Bareilly railway station by rickshaw or auto-rickshaw. Institute vehicle may be provided if prior information is given about the train of your arrival. The weather in November will be cool, temperature ranging between 15-25°C. You must bring light warm clothings with you.

CONTACT PERSONS

For any information and help please contact the organizing secretary. For transport and accommodation quarries, please contact the chairperson of the respective committees.

Date of workshop : November 20-21, 2015

No registration fee will be charged from the participants.

ORGANIZING COMMITTEE

Chief Patron : K.M.L. Pathak, DDG (AS), ICAR

Patron : R.K. Singh, Director, IVRI

Co-Patrons : V.P. Singh (JD, Academic), B.P. Mishra (JD, Research), V.K. Gupta (JD, CADRAD), Mahesh Chandra (JD, EE)

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SPONSORS

ICAR-Indian Veterinary Research Institute, Izatnagar

Animal Nutrition Association, Izatnagar

TECHNICAL SESSIONS

Technical Session I: Metagenomics of Rumen Microbes

Technical Session II: Nutrigenomics in Animal Nutrition

Technical Session III: Teaching of Rumen Microbiology, Metagenomics and Nutrigenomics in Animal Nutrition