

Proceedings of the First CAC meeting

The First Consortium Advisory Committee (CAC) Meeting of the NAIP subproject (C4/C30015) entitled “**Genetic basis of inferior sperm quality and fertility of crossbred bulls**” under NAIP (Comp-4) held on 10th August, 2009 at the Director’s Committee Room of NDRI, Karnal, Haryana, 132001. Dr. A Bandyopadhyay, National Coordinator- NAIP (Comp-4) desired to hold CAC meeting of two NAIP subprojects together [C4/C30015 and C4/C30014-entitled “Molecular Basis of Capacitation Like changes in the Assessment and Prevention of Cryodamage During Cryopreservation of Bovine Spermatozoa (Buffalo and Crossbred Bulls)] to share scientific knowledge and information among scientists of both the projects as well as to have valuable inputs from CAC Chairman and Members.

The following CAC members were present

- Chairman:** Dr. Syed N. Kabir, Deputy Director & Head, Reproductive Biology Research, Indian Institute of Chemical Biology, Kolkata
- Member:** Prof. Rajiva Raman, Cytogenetics Laboratory, Department of Zoology, Banaras Hindu University, Varanasi
- Member:** Dr. Atmaram H. Bandivdekar, Division of Biochemistry, National Institute for Research in Reproductive Health, Mumbai
- Ex Officio Member:** Dr. A.Bandyopadhyay, NC, Comp-4, NAIP
- Member secretary:** Dr. Indrajit Ganguly, CPI

The following CoPIs also attended the meeting:

- Dr. Umesh Singh (Director’s nominee), Principal Scientist, PDC, Meerut
- Dr. Sushil Kumar, Senior Scientist, PDC, Meerut
- Dr. S De, Senior Scientist, NDRI, Karnal
- Dr. T K Mohanty, Senior Scientist, NDRI, Karnal
- Dr. Subodh Kumar, Senior Scientist, IVRI, Izatnagar
- Dr. S K Ghosh, Senior Scientist, IVRI, Izatnagar

In addition, Dr. S L Goswami, Joint Director Research of NDRI, Karnal (Director’s nominee), distinguished CAC members Dr. G S Dhaliwal, Prof. and Head Animal Reproduction, College of Vety. Sci., Ludhiana; Dr. A J Dhami, Prof. Livestock Res. Station, AAU, Anand, Gujrat; CPI and CoPIs of another NAIP subproject (C4/C30014) also actively participated in the meeting and suggested line of action.

At the outset of the meeting, Dr. A. Bandyopadhyay, NC- NAIP (Comp-4) and Ex-officio member, CAC presented a brief introduction regarding the objective of the basic and strategic research component of NAIP (Comp-4), and detailed the important roles of CAC members in implementing the NAIP projects. He emphasized the need of having regular CAC meeting, and prior to it the CIC meeting to be held so that the proceedings of CIC can be made available to the CAC members. CAC will monitor and suggest the technical details for better output of the

project and will advise for the upcoming work plans. He advised the CPI, CCPIs and CoPIs to take utmost advantage of the guidance of CAC. He also stressed on stringent cooperation between each and every scientists involved in the project. He desired and emphasized to have active participation of all the CoPIs in the forthcoming CAC meetings, positively. All Co-PIs will also submit their sixth monthly targets and achievements to CPI and CCPI for better monitoring of the project.

Dr. Indrajit Ganguly, CPI, presented brief report as per the objectives, work allocation, financial outlay etc. of the subproject as a whole and particular to lead center PDC, Meerut.

CAC discussed various technical details of the project and recommended the following points to be taken up for the lead and co-operating centers:

- The 1st objective, “To study the inheritance of semen quality, freezability and fertility of crossbred bulls based on available information”, was discussed in details to explore the inheritance of seminal parameters as per available family lineage to find out cluster incompatibility, if any, among different crossbred groups, based on available pedigree information as well as seminal attributes. This objective should be completed within two to three months of time.
- CAC suggested that the MBRT test for semen evaluation should be dropped.
- For the 2nd objective, CAC recommended that differential gene expression pattern should be analyzed in two mature spermatozoal population (high and low motility group).
- For 3rd objective, “To study the effect of crossbred semen on embryonic development with special reference to Y chromosome microdeletion and epigenetic modification” the following suggestions were recommended by the committee:

Deletion and micro-deletion:

1. Human Y-based markers (may be deleted in infertile human being) in grouped (based on type of abnormalities) crossbred bulls (Human ortholog in bovine). Subsequently they may be tested for their presence and absence in *Bos taurus*, *Bos indicus* and cross bred bulls.
2. Known candidate genes present in *Bos taurus* and *Bos indicus* need to be screened for mutations, if time permits (selection of genes should be more frequently associated with supported literature in human and mouse).
3. Study of Synaptenemal Complex in *Bos taurus*, *Bos indicus* and *cross breed* testis for proper and improper X / Y pairing (Nanda and Raman 1987). 100 plates in the each types.

Epigenetics:

1. Imprinting status should be studied in sperms but not in the early embryo in relation to the semen quality.
 - a. Along with H19 the IGF2 DMR regions have to be analyzed in sperms (Bisulphite sequencing).

- b. Global methylation pattern of high and low quality semen producing animals (in sperms).
- CAC recommended target for lead and co-operating centers up to March 31st, 2010:

Target of PDC, Meerut

Objective 1: To study the inheritance of semen quality, freezability and fertility of crossbred bulls based on available information

Activities:

- a) Collection of available pedigree information as well as seminal attributes of Frieswal bulls
- b) Inheritance of seminal parameters as per available family lineage to find out cluster incompatibility, if any

Objective 2: To study the global gene expression of spermatozoa of crossbred bulls for identifying the up-regulated and down-regulated genes

- a) Grouping of Frieswal bulls into two contrasting classes (of sperm motility trait) based on secondary data
- b) Routine seminal parameters, HOST and livability tests for further confirmation of selected groups
- c) Fractionation of spermatozoal population (high and low motile) for transcriptome analysis using percoll gradient centrifugation
- d) Isolation of RNA from two different spermatozoal population
- e) Suppression-subtractive hybridization (SSH) to enrich libraries with transcripts that are differentially expressed between high- and low-motile sperm fractions will also be attempted

Target of NDRI, Karnal

Objective 1: To study the inheritance of semen quality, freezability and fertility of crossbred bulls based on available information.

- a) Collection of pedigree information and seminal attributes of Karan Fries bulls.

Objective 3: To study the effect of crossbred semen on embryonic development with special reference to Y chromosome microdeletion and epigenetic modification

- a) Human Y chromosome markers (may be deleted in infertile human being) to be tested in the crossbred bulls, *Bos indicus* and *Bos taurus* males (Human ortholog in bovine).

Target of IVRI, Izatnagar

Objective 1: To study the inheritance of semen quality, freezability and fertility of crossbred bulls based on available information

- a) Grouping of Vrindavani bulls into two contrasting classes (of sperm motility trait) based on secondary data
- b) Routine seminal parameters, HOST and livability tests for further confirmation of selected groups

Objective 2: To study the global gene expression in spermatozoa of crossbred bulls for identifying the up-regulated and down-regulated genes.

- a) Standardization of extraction of total RNA from fresh crossbred bull semen
- b) Standardization of preparation of cDNA from total RNA
- c) Initial microarray trials from sperm cDNA obtained from good and poor donor bulls using "cattle whole genome microarray"

The meeting ended with the vote of thanks to the chair.


Dr. S N Kabir 19/10/2009
Chairman, CAC



Dr. I Ganguly
CPI & Member Secretary