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RESEARCH / ACADEMIC BACKGROUND:

Feb 2012 - Till Date	PhD Researcher, Dr. Ari Pekka Mähönen's Group, UH, Finland.
Apr 2011 - Feb 2012	Senior Research Fellow, Dr. Imran Siddiqi Group , CCMB.
Feb 2011 - Apr 2011	Junior Research Fellow, Dr. Imran Siddiqi Group, CCMB.
Apr 2009 - Feb 2011	Project Assistant, Dr. Imran Siddiqi Group, CCMB.

2006-2008	M.Sc.,	Biotechnology, Bharathidasan University	8.0/10 GPA **
2003-2006	B.Sc.,	Biotechnology, Periyar University	71.00% *
2002-2003	H.Sc.,	Biology, Physics, Chemistry & Maths, State Board	70.50% *
2000-2001	SSLC.,	Mathematics & Biology, State Board, TN, India	81.40% *

**First Class with Distinction Plus (D+), *First Class

CONTRIBUTIONS / PUBLICATIONS:

- Poster presentation at **'XXI International Congress on Sexual Plant Reproduction'** at **University of Bristol**, U.K. during 2nd to 6th August 2010 titled, "Threshold Dependent Control of Haploid Gamete Formation by the dyad Gene of *Arabidopsis*". My contribution leads me third author position. (Manuscript is under preparation).

- Technical contribution to the paper titled, **"Synthetic clonal reproduction through seeds"** published in **Science** 18 February 2011: Vol.331 no.6019 p. 876 DOI:10.1126/science.1199682.

RESEARCH EXPERIENCE:

04/2009 to 02/2012 : Dr. Imran Siddiqi's Group, Centre for Cellular and Molecular Biology (CCMB), Hyderabad, AP, India. http://www.ccmb.res.in/

Dr. Imran Siddiqi's laboratory is interested in understanding of meiosis and gametogenesis in plants. We are using *Arabidopsis thaliana* as our model plant.

Regulation of Plant Meiosis and Gametogenesis: Meiotic Cell Cycle Progression

Project 1: Our lab reported that mutant of *DYAD* in *Arabidopsis* produces unreduced female gamete in which recombination is absent, a phenomenon called apomeiosis which is a crucial component to engineer apomixis in plants (**Ravi et. al., Nature 2008**). But the *dyad* plant is almost sterile. So, efficient unreduced gamete formation coupled with suppression of progression defect could lead to functional apomeiosis. To this end, identifying other players in this pathway by screening for suppressor/s of *dyad-1* could shed further information on control of meiotic progression. So far I have screened 240 pooled, 5hrs EMS treated mutant families (dyad/-) in their M2 generation by phenotype/dCAPS marker analysis, no putative candidates were identified and now, the screen with 9hrs EMS treated mutant seeds is in progress.

Alternatively, the arrest/progression defect of *dyad* could be due to a putative check point, given the fact that majority of the chalazal end dyad cells express a functional megaspore specific marker. Thus, over expressing cell cycle regulator/s may release the arrest of *dyad*. So, we made over expressing constructs for various cell cycle regulators under conditional inducible system. We are in the process of generating transgenic plants.

Project 2: "Threshold Dependent Control of Haploid Gamete Formation". SWI1/DYAD is required for early events of meiosis I in *Arabidopsis*. Mutation in SWI1/DYAD affects sister chromatid cohesion, recombination initiation and meiosis progression. A weak allele of SWI1/DYAD (*dyad*) leads to production of both reduced (~25%) and unreduced female gametes (60%) along with a few aneuploid gametes. The unreduced female gametes were previously shown to have formed without recombination. This bimodal distribution of female gametes led to the hypothesis of a plausible role of achiasmatic reductional segregation in haploid gamete formation in *dyad*. In this study, we have examined recombination in haploid female gametes. Our results show that haploid gametes undergo normal levels of recombination; ruling out achiasmatic reductional segregation as a mechanism for haploid gamete formation. Additional experiments support a threshold dependent mechanism for genome-wide control of recombination initiation and reductional chromosome segregation by SWI1/DYAD during meiosis. (Manuscript is under preparation for publishing this work).

Project 3: To understand the functions/role of meiotic specific genes (candidate genes) during meiosis in *Arabidopsis thaliana*, promoters of various meiotic specific genes like Functional Megaspore specific (FM1&FM2), Embryo Specific (ES1&ES2), DYAD and DMC were cloned under conditional inducible system. These stable lines can be used for further research purpose.

Meiotic Chromosome Organization:

Arabidopsis DUET is specific for male meiotic transcriptional regulation and chromatin/cytoskeletal organization. *duet* shows complete male sterility and while female gametophyte development is unaffected. The only recognizable region of DUET is "C-terminal PHD finger" which has the affinity to modified histones. Deletion of PHD domain is sufficient to confer male sterility. Our Biochemical analysis reveals that point mutation in the conserved amino acids of the PHD domain can change the affinity of this protein with modified histones. In this project I made transgenic plants with seven independent point mutations in the conserved PHD region and analyzed them in homozygous *duet* (sterile) background to score the effect in-vivo.

Along with the above-mentioned projects I also helped the PhD students and Post Doctoral Fellows as well as trained several summer students in the lab for their Cloning/Gateway, Ag-transformation, crossing, genotyping, marker analysis, Protein expression, Western blotting, and Flow cytometry for ploidy analysis.

12/2007 to 04/2008: Master Thesis Research, Dr. Bashir Mohammad Khan, Head of Bio-Chemical Division, National Chemical Laboratory (NCL), Pune, India. http://www.ncl-india.org/

Thesis Title: Cloning and Heterologous Expression of Lignin Biosynthetic Pathway Gene *4-Coumarate: CoA Ligase* (4CL) in *Leucaena leucocephala*.

Lignin is the most abundant component in plants next to cellulose content. Though it is essential for plant survival, Lignin has negative impact in paper and pulp industries while bleaching process. Thus transgenic plants, which have less lignin content, would help paper and pulp industries. Genes involved in Lignin biosynthesis pathway were knockdown individually and these knock down lines needed to be characterized. I have worked on one such gene namely 4CL involved in lignin biosynthesis. To characterize the level of expression of this protein in plants, I had cloned a fragment of this gene and expressed it for antibody production. These antibodies were used in ELISA against 4CL proteins which were isolated at different time points as well as different parts of the plant of *Leucaena leucocephala*.

05/2007 to 07/2007: Summer Thesis Research, Dr. Imran Siddiqi's Laboratory, Centre for Cellular and Molecular Biology (CCMB), Hyderabad, India. http://www.ccmb.res.in/

Thesis Title: Cloning and over expression of DYAD: A gene required for meiotic progression in *Arabidopsis thaliana*.

DYAD is a novel plant specific protein expressed in the early stages of megasporogenesis and is involving in the reductional chromosome segregation in *Arabidopsis thaliana*. In order to elucidate the function of DYAD, a biochemical approach was taken where full and several fragments of DYAD protein were cloned, expressed and induced at various time points.

LABORATORY SKILLS:

- PCR: Site Directed Mutagenesis, Genotyping, dCAPS and SSR marker analysis.
- Protein over expression and purification using Ni-NTA, GST Beads, Western Blotting.
- Flow cytometry for ploidy analysis, Meiotic spreads
- Nucleic acid (DNA, RNA) isolation from various sources, DNA Sequencing.
- Standard recombinant DNA techniques, ; Gateway cloning, Manual cloning involving Restriction digestion, Ligation, etc.,
- Gel Electrophoresis: Native and SDS-PAGE, Agarose gel.
- Basic Spectrometric, Microbiological and Plant tissue culture and Microscopy techniques.
- *Arabidopsis* Genetics, Crossing, Promoter GUS analysis, RNAi, Ag-mediated transformation.
- Basic Bioinformatics Tools.

HONORS / FELLOWSHIPS:

- Received Department of Biotechnology-Senior Research Fellowship (DBT-SRF, Govt of India) from April 2011 to March 2012 for conducting research works in Centre for Cellular and Molecular Biology (CCMB), under the supervision of Dr. Imran Siddiqi on “Identification of genes from *Arabidopsis* for engineering of apomixis”.
- Received Council for Scientific and Industrial Research (CSIR, Govt of India) Project Assistant-II Fellowship from April 2009 to March 2011 for the research work on “Apomixis Technologies for Increasing Yield of Food Crops in Developing Countries” under the supervision of Dr. Imran Siddiqi in Centre for Cellular and Molecular Biology.
- Selected for Summer Training Research Program from 15th May to 15th July 2007 at Centre for Cellular and Molecular Biology under the supervision of Dr. Imran Siddiqi , Hyderabad, AP, India.

AWARDS:

- 1st Position in State level, 'Workshop on Science Writing' organized by Dept of Science & Technology (DST), Indian Science Writers Association (ISWA) and NCSTC, Govt of India, New Delhi. 8-12 Dec 2004.
- Selected 1st Position in state level and presented an oral paper at '4th National Science Communication Congress 2004' at Gwalior, MP, organized by National Council for Science and Technology Communication (NCSTC), New Delhi. 20-24 Dec 2004.
- 1st Position in District level (Salem) Essay competition organized by Ministry of Non-conventional Energy Source, Rajiv-Gandhi Memorial Celebration 2004, New Delhi. 20th August 2005.
- 2nd Place in Science exhibition 'Model: DNA replication' in 'Biotech Bonanza 2004' at AVS College, Salem, TN.
- 2nd Place in Oral presentation "HIV-AIDS awareness in India" at 'Bio-thirst' 13th Dec 2003 conducted by AVS College, TN.

EXTRA CURRICULAR ACTIVITIES / HOBBIES:

- Learning new languages and interested in communicating with new people for sharing thoughts and ideas in general as well as scientific.
- 2nd Place in District level oral competition organized by Junior Chamber Jaycee on 10th Sep 2005, Erode.
- 1st Position in Essay, Poems (2004 & 2005 respectively), 3rd Position in Drama, Solo Singing (2005) Annual Day Celebrations in AVS College, Periyar University, Tamil Nadu.

REFERENCES:

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