CURRICULUM VITAE

SIVAKUMAR PANGULURI
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Personal:

Born on June 04, 1976
Indian Citizen
Married

Education:

Ph.D.	Bio-Technology	C.C.S. University, Meerut	N.A	2004
M.Sc.	Bio-Technology	Andhra University, Visakhapatnam, AP.	66.8 %	1999
B.Sc.	Bio-Technology	Andhra University, Visakhapatnam, AP.	70.6 %	1997
Intermediate	Biology, Physics and Chemistry	J.B.College, Kavali, AP.	70.6%	1993
10th	Biology, Social sciences and Maths	V.B.H. School, Kavali, AP.	75%	1991

Field of Research:

Cloning and Genetic engineering for transgenic development for pest resistance as well as drought resistance in pigeonpea, molecular marker studies for pigeonpea biodiversity and tissue specific promoter isolation and characterization in pigeonpea.

Research Experience:

As a PhD candidate

Ph.D work was carried out at National Research Centre on Plant Biotechnology (NRCPB), IARI, under co-chairmanship of *Dr P. Ananda Kumar*, Principal Scientist.
Thesis submitted to Division of Biotechnology, C.C.S.University, Meerut, under the chairman ship of *Prof. P.C.Sharma*.

Thesis: "*Genetic engineering and genetic biodiversity in pigeonpea* ***(Cajanus cajan L.)***".

Pigeonpea (*Cajanus cajan* (L.) Millsp.) is one of the major grain legume (pulse) crops of the tropics and subtropics, yielding nutritious protein rich seeds for human consumption and animal feed. Being highly recalcitrant to regeneration among all the plant species tropical grain legumes are more difficult to transform. Improvement of legumes by genetic engineering requires procedures to regenerate them *in vitro*. Studies on various regeneration protocols that are available to find the most efficient for *Agrobactereium* mediated transformation has been done. By using *Mannitol dehydrogenase* (*MtlD*) gene, drought resistant transgenic pigeonpea was developed through Agrobacterium mediated transformation. A green tissue specific promoter (*rbcS3A*) was isolated from pigeonpea and pea through PCR and their sequence analysis; tissue specificity, light indusibility, stage specificity and its strength were compared by using GUS gene in transgenic tobacco. Wild relatives of pigeonpea serve as a rich source of disease resistance genes that can be introgressed into the cultivars. However, development of improved types through hybridisation and recombination of available variability in pigeonpea and other species of *Cajanus* have met with limited success. Further research efforts need to concentrate on developing a good understanding of genetic systems controlling qualitative and quantitative characters. Genetic diversity of various pigeonpea cultivars as well as two of its wild relatives has been studied by using various PCR based markers like AFLP, RAPD, URP's, SSR's and STMS; also analysed to find the best marker system in pigeonpea, for further studies, like gene tagging and genome mapping.

Advisor: Prof P. C Sharma, Dean, School of Biotechnology, G.G.S. Indraprastha University, New Delhi.

Key Skills:

Laboratory	Cloning, isolation of novel genes/ promoters by PCR and their characterization, Electrophoresis of DNA and Proteins, Tissue culture for transformation, construction of genomic libraries, colony hybridisation, Southern hybridisation, Northern hybridisation, western hybridisation, ELISA, Molecular markers like AFLP, RAPD, SSR, STMS, CAP's and URP's, Spectrophotometer, radio labelling techniques, microarray, mammalian cell line culturing, transfection techniques, RNAi, Chip-assay (chromatin immuno-precipitation assay), Ligand binding assay, EMSA, and gene switching.
Analytical Packages	NTSYS (2.0e), RAPDistance, DNASTAR, Exome, Vector NTi, TIGR MeV (for Micro-array analysis) and other scientific software like BLAST and FASTA.
Computer Knowledge	Windows 98, 2000, XP; MS Office (Word, Power-point, Excel), Database (MS Access), Photoshop, Swish.
Languages	Fluent in English, Hindi, Telugu and Tamil Beginner's level in French and Russian.
Communication	Good technical writing of research articles and reports, good compilation and oral presentation skills.
Personal	Self-motivating and capable of persistent independent as well as group work. Well organised and willing to work flexibly.

Awards and Honours:

- CSIR National Eligibility Test 2001 – for lectureship and Research any where in India.
- ICAR-NATP Senior Research Fellowship 2000- 2004.
- Consulting editor of Contemporary Who's Who (American Biographical Society)

Seminar / Conference Presentations:

P. S. Kumar, P. A. Kumar, K. Janaiah and P. C. Sharma (2003). AFLP fingerprinting to access genetic diversity in pigeonpea (*Cajanus cajan* (L.) Millsp.) and its wild relatives. Seventy third annual sessions on The National Academy of Sciences, India. Pp-15.

Ritu paruti, **P. S. Kumar**, P. A. Kumar and P. C. Sharma (2003). RAPD diversity in pigeonpea (*Cajanus cajan* (L.) Millsp.) and related species. Seventy third annual sessions on The National Academy of Sciences, India. Pp-05.

P. C. Sharma, **P. S. Kumar**, R. Paruthi, K. Janaiah, J. N. Govil and P. A. Kumar (2004). AFLP and RAPD fingerprinting in Pigeonpea and related species. Legumes for the benefit of Agriculture, Nutrition and the Environment: their genomics, their products and their improvement. Palais Des Congress, Dijon, France. pp-171.

Linga S. Rao, P. Usha Rani, P. S. Deshmukh, P. A. Kumar and **S. K. Panguluri** (2005). RAPD and ISSR fingerprinting in cultivated chickpea [*Cicer arietinum* (L.)] and wild species. First International Conference on *Crop Wild Relative* Conservation and Use, Italy.

Referred Publications:

Anderson Paul, S. R. Sharma, T. V. S. Sresty, Suma Baisaria, **P. S. Kumar**, P. Parthasaradhi, Roger Frutos, I. Altosaar and P. Ananda Kumar* (2005). Transgenic cabbage (*Brassica oleracea* var. *capitata*) resistant to Dimondback moth (*Plutella xylostella*). Ind. J. Biotech. 4: 72-77.

S. K. Panguluri, K. Janaiah, J. N. Govil, P. A. Kumar and P. C. Sharma (2006). AFLP fingerprinting in pigeonpea (Cajanus cajan (L.) Millsp.) and its wild relatives. Genet. Res. Crop Evol. 53: 523-531.

Ritu Bhalla, Monika Dalal, **Siva. K Panguluri**, Borra Jagadish, Ajin. D. Mandoaker, A. K. Singh and Polumetla. A. Kumar* (2005). Isolation, characterization and expression of a novel vegetative insecticidal protein gene of *Bacillus thuringiensis*. FEMS Microbiol. Lett. 243:467-472.

S. K. Panguluri, J. Sridhar, B. Jagadish, P. C. Sharma and P. A. Kumar (2005). Isolation and characterization of a green tissue-specific promoter from pigeonpea [*Cajanus cajan* (L.) Millsp.]. Ind. J. Exp. Biol 43: 369-372.

Tazo Abraham, **S. K. Panguluri**, B. Jagadish, J. Sridhar, R. Mukesh and P. A. Kumar (2005). AFLP fingerprinting of some elite Indian cotton genotypes. Plant Cell Biology and Molecular Biology.

Srinivasa Rao Linga, Usha Rani papineni, Deshmukh P.S, Ananda Kumar Polumetla and **Siva Kumar Panguluri***. RAPD and ISSR fingerprinting in cultivated chickpea [Cicer arietinum (L.)] and wild species (2005). International Journal of Plant Sciences (Communicated).

S.K.Panguluri and S.R.Palli. Effects of ligands on ecdysone-inducible mammalian expression system in 293 and RKO cell lines. Manuscript under preparation.

S.K.Panguluri and S.R.Palli. Development and characterization of highly efficient ecdysone based single-receptor gene switches for mammalian system. Manuscript under preparation.

Books/Reviews:

Rajani Jaiswal**, P. S. Kumar**, M Z abdiin and P. Ananda Kumar* (communicated on January 2004). Chapter:21.Genetic Transformation of Grain Legumes. In; Plant biotechnology and its applications in tissue culture. I.K. International Private Ltd. New Delhi.pp:243-283.

Extracurricular activities:

Got many first prizes at college levels in classical music- Instrumental (**Flute**), pencil drawing and painting.

Current Research:

Working as Postdoctoral Scholar in Department of Entomology, University of Kentucky, Lexington, KY, since January 2005.

Ecdysone based gene switch in mammalian system for medical use

Ecdysteroids (Ec) are signaling molecules widespread in the animal as well as in the plant kingdom (Lafont and Wilson, 1992). However, they do not occur naturally in vertebrates, a feature that makes them suitable as ligands in medical gene switch applications due to the reduced likelihood of pleiotropic effects.
Insect EcR can heterodimerize with retinoid X receptor (RxR) and transactivate genes that are placed under the control of Ecdysone response element (EcRE) in various cellular backgrounds including mammalian cells (Palli et al. 2003).

A chimeric protein composed of GAL4 DNA binding protein fused to an Ecdysone receptor protein and a VP16 activation domain fused with retinoid X receptor (RxR) along with a gene of interest under the control of a response element (here EcRE) not recognized by natural nuclear hormone receptors. Binding of specific inducer to the receptor complex leads to its activation and consequently to the transcriptional upregulation of any gene of interest located downstream of the synthetic response element. An optimal gene switch should have low or no basal expression in the absence of ligand, high induced expression in the presence of ligand, rapid switch-off response after removal of the inducer and specific response to inducer with no pleiotropic effects.
The current version of EcR based gene switches does not have some of the desired characteristics of an optimal gene switch like high background in the absence of ligand, low sensitivity with the and pleiotropic effects of gene switch compounds/ ligands used.
To overcome these problems, the present investigation was carried out with the following objectives.

1. Studies on Two-hybrid gene switch and development of an efficient mono-receptor gene switch.
2. Studies on pleiotropic effects of gene switch compounds and ligands.

Techniques used:

1. Cloning
2. Transfection in mammalian cells
3. Micro-array
4. Analysis of micro-array data with TIGR MeV software
5. Electro Mobility Shift Assay (EMSA)
6. Chromatin Immuno Precipitation Assay (ChIP-Assay)
7. Ligand Binding Assay
8. RNAi
9. Quantitative Real Time PCR (QRT-PCR)

Achievements:

1. Pleiotropic effects of various gene switch components and different ligands were analyzed.
2. An efficient monoreceptor gene switch (VGE), with less pleiotropic effects was developed and characterized.
3. An efficient two-hybrid gene switch, which is highly sensitive to ligand even at very low concentrations (which will help in reducing the pleiotropic effects of ligands on mammalian cells) was developed and characterized.
4. The mechanism of functioning of EcR based gene switch was studied.

References:

Lafont, R. D. and Wilson, I. D. (1992). The Ecdysone Handbook. Chromatographic society, Nottingham, UK.

Palli, S. R., Kapitskaya, M. Z., Kumar, M. B. and Cress, D. E. (2003). Improved Ecdysone receptor-based inducible gene regulation system. Eur. J. Biochem. (270): 1308-1315.

Kumar, M. B., Fujimoto, T., Potter, D. W., Deng, Q. and Palli, S. R. (2002). A single point mutation in ecdysone receptor leads to increased ligand specificity: implications for gene switch applications. PNAS (99) 23: 14710-14715.

References:

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Other Details:

Father's name	:	P.S.R.Murthy
Place of birth	:	Chirala, Andhra Pradesh
Sex	:	Male
Hobbies	:	Reading Psychology and philosophical books and listening and playing classic music
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