

SATHYA VELMURUGAN
(Maiden Name: Sathya Arunachalam)
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CURRENT POSITION: SCIENTIST C

- National Institute of Animal Biotechnology (NIAB), D. No. 1-121/1, 4th and 5th Floors, Axis Clinical Building, Miyapur, Hyderabad, 500 049. Tel. 040 – 23049414. Email: sathya.velmurugan@niab.org.in.

EDUCATION

- Sep 2006 to Sep 2009 – **PhD** in Biomedical Sciences, at the Laboratory of Neuroendocrinology, Centre for Integrative Physiology, College of Medicine and Veterinary Medicine, University of Edinburgh, UK. Supervisors: Prof. John A Russell and Prof. Gareth Leng. **PhD Thesis:** “Actions of appetite regulating peptides on the supraoptic nucleus oxytocin neurones”. Worked on NPY, leptin, CCK and secretin mediated electrophysiological changes in the SON in rats.
- Aug 2003 to Sep 2005 – **Master of Veterinary Science (MVSc)**, specialization in Animal Reproduction, Gynaecology and Obstetrics, at the Dept. of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary Sciences, Punjab Agricultural University, Ludhiana, India. Supervisors: Prof. Sushil Prabhakar and Prof. Vinod K Gandotra. OCPA: 8.62/10. **MVSc Dissertation:** “Studies on oxidative stress in dystocia affected buffaloes”. Worked on amelioration of stress and oxidative stress by administration of corticosteroids and antioxidants in periparturient buffaloes.
- Sep 1997 to July 2003 – **Bachelor of Veterinary Science (BVSc)** at Madras Veterinary College, Tamil Nadu University of Veterinary and Animal Sciences, Chennai, India. OGPA: 8.7/10

POST-DOCTORAL RESEARCH EXPERIENCE

- September 2011 to May 2013: **Post-doctoral research** (Rosalind Franklin University of Medicine and Science, North Chicago). Worked on ameliorating ischemia-reperfusion injury through controlled reoxygenation in adult rat cardiomyocytes. Principal Investigator: Dr. Raul J Gazmuri.
- Nov 2009 to August 2011: **Post-doctoral research** (Rush University Medical Center, Chicago). Worked on diastolic Ca²⁺ leak mechanisms in control and heart failure rabbit models. Principal Investigator: Dr. Thomas R Shannon.

CURRENT RESEARCH INTERESTS

- **Reproductive physiology:** (1) Regulation of female reproductive axis by Kisspeptin and its potential therapeutic applications in infertility (2) Development of oestrus detection kit based on hormonal profiles in buffaloes.
- **Sperm biology:** (1) Flow Cytometry based evaluation of *in vitro* sperm function tests to assess fertility level of bovine spermatozoa (2) Mitochondrial bioenergetics of spermatozoa and its correlation with fertility.
- **Neuroendocrinology:** (1) To establish an *in vivo* electrophysiology lab to study hypothalamic neurons involved in reproduction (2) To study the interaction between satiety peptides and reproductive hormone peptides at neuronal level.

TECHNICAL SKILLS

- *In-vivo* extracellular electrophysiology and *in vivo* microdialysis in anaesthetized rats
- *In situ* hybridization and immunohistochemistry of brain slices
- Radioimmunoassay
- Live cell imaging
- Adult rat and rabbit cardiomyocytes isolation, primary culture and adenoviral transduction
- Voltage clamp in adult cardiomyocytes
- HPLC, ELISA, Western blot

TEACHING EXPERIENCE

- Practical demonstration: Physiology and Practical Skills in Biomedical Sciences in the University of Edinburgh (2007 and 2008).
- Facilitation of group discussions: Medical Biology in the University of Edinburgh (2008).

- Science Communication: In the National Museum of Scotland for Edinburgh International Science Festival (2007 and 2008).
- Workshop on Protein Fingerprinting at Greenock Academy, UK (2007).

SCHOLARSHIPS

- **Overseas Research Students (ORS)** Award from the Scottish Funding Council – For PhD (2006 - 2009).
- College of Medicine and Veterinary Medicine **PhD Studentship** by the University of Edinburgh – For PhD (2006 - 2009).
- Award of **Junior Research Fellowship** by the Indian Council of Agricultural Research – For MVSc (2003 - 2005).
- Best Cadet **Merit Scholarship** from the National Cadet Corps (NCC), India – for BVSc (2000).
- Tamil Nadu Chief Minister's First Graduate **Merit Scholarship** – for BVSc (1997 - 2003).

AWARDS

- Three **International Travel Awards** for attending conferences (2008-09): from the Physiological Society, British Society of Neuroendocrinology (BSN) and World Congress on Neurohypophyseal Hormones (WCNH).
- Award for **Best Extempore** Presentation in 21st Annual Convention of Indian Society for Study of Animal Reproduction, India (2005).
- Awards for **Best Oral** Presentation in 20th and 21st Annual Convention of Indian Society for Study of Animal Reproduction, India (2004 and 2005).
- **Merit** Certificate for MVSc (2005).
- **Gold Medals** for highest marks in Veterinary Microbiology and Poultry Science in BVSc (2003).

PUBLICATIONS

From post-doctoral research:

1. **Velmurugan S**, Radhakrishnan J, Baetiong A, Gazmuri RJ (2013) Amelioration of ischemia-reperfusion injury in adult rat cardiomyocytes by controlled reoxygenation and NHE-1 inhibition (*Manuscript in preparation*).
2. Miao Y, Edelheit A, **Velmurugan S**, Lesjak VB, Radhakrishnan J, Gazmuri RJ (2013) Estrogen Fails to Facilitate Resuscitation from Ventricular Fibrillation in Rats (*Manuscript in preparation*).
3. Curran J, Tang L, Roof SR, **Velmurugan S**, Millard A, Shonts S, Santiago D, Perryman M, Mohler PJ, Ziolo MT and Shannon TR (2013) Nitric oxide mediates increased diastolic sarcoplasmic reticulum calcium release in response to adrenergic agents (*Manuscript in preparation*).

From PhD:

1. **Velmurugan S**, Russell JA and Leng G (2013) Systemic leptin increases the electrical activity of supraoptic nucleus oxytocin neurones in virgin and late pregnant rats. *Journal of Neuroendocrinology* 25 (4): 383-90.
2. **Velmurugan S**, Brunton PJ, Leng G and Russell JA (2010) Circulating secretin activates supraoptic nucleus oxytocin and vasopressin neurons via noradrenergic pathways in the rat. *Endocrinology* 151 (6): 2681-88.
3. Brunton PJ, **Arunachalam S** and Russell JA (2009) Control of neurohypophysial hormone secretion, blood osmolality and volume in pregnancy. *Journal of Physiology and Pharmacology*, 59 (Suppl 8): 29-45.
4. Tobin VA, Bull PM, **Arunachalam S**, O'Carroll AM, Ueta Y and Ludwig M (2008) The effects of apelin on the electrical activity of hypothalamic magnocellular vasopressin and oxytocin neurons and somatodendritic peptide release. *Endocrinology* 49 (12): 6136-45.

From MVSc:

1. **Arunachalam S**, Prabhakar S, Arora AK and Ghuman SPS (2010) Alterations in polymorphonuclear leukocyte functions during periparturient period in buffaloes. *Indian Journal of Animal Sciences*, 80(1): 12-16.
2. Prabhakar S, **Arunachalam S** and Brar PS (2010) Improving reproductive efficiency of dairy animals with reference to prevalent field problems. *Intas Polivet* 11(1): 1-6.
3. Honparkhe, M., Ghuman, S.P.S., Ajeet Kumar and **Arunachalam S** (2008) Delivery of a macerated buffalo fetus by left flank laparohysterotomy. *Indian Journal of Animal Reproduction* 29:115-116.
4. **Arunachalam S**, Prabhakar S, Sangha SPS and Ghuman SPS (2007) Vitamin E and selenium supplementation reduces plasma cortisol and oxidative stress in dystocia affected buffaloes. *Veterinary Research Communications* 31(7):809-18.

5. **Arunachalam S** and Prabhakar S (2006) Haematological changes in dystociac buffaloes following dexamethasone administration vis-à-vis normal parturition. *Indian Journal of Animal Sciences* 77(4): 300-33.
6. **Arunachalam S**, Mahajan A and Prabhakar S (2006) Dystocia in a buffalo due to a foetal monster accompanying hydrops amnii. *Indian Journal of Animal Reproduction* 27(1): 96-97.
7. Mahajan A, **Arunachalam S** and Prabhakar S (2006) A case of arthrogyrosis in a buffalo calf causing dystocia. *Indian Journal of Animal Reproduction* 27(1): 86-87.
8. Honparkhe M, Singla VK, Singh J, Bedi M, **Arunachalam S** (2006). Post parturient uterine prolapse in a bitch. *Indian Journal of Animal Reproduction* 27:91-92.
9. **Arunachalam S**, Prabhakar S, Ghuman SPS (2005) Effect of dexamethasone administration on cortisol concentration and biochemical profile in buffaloes suffering from dystocia. *Animal Reproduction* 2(4): 233-39.
10. Prabhakar S and **Arunachalam S** (2005) Effects of stress on reproduction. (Eds. Ghuman SPS and Dhaliwal GS) In: *Proceedings of Advanced Training Course on Recent Concepts in Physio-pathology of Animal Reproduction*. Centre of Advanced Studies in Veterinary Gynaecology and Reproduction, Punjab Agricultural University, Ludhiana. p63-68.

From BVSc:

1. Varalakshmi S, Vidhya M and **Sathya Arunachalam**, Venkatesh G, Balasubramanian S, Jayaprakash R and Devanathan TG (2004) Delivery of a Holstein Friesian calf with multiple skeletal abnormalities. *Veterinary Record* 154: 28.

Abstracts from post-doctoral research

1. Marked attenuation of cell injury by substrate availability during ischemia (2013) Velmurugan S, Radhakrishnan J, Baetiong A, Gazmuri RJ. *Scientific Sessions - American Heart Association, Dallas, USA (Poster)* Circulation 128: A340.
2. NHE-1 inhibition reduces rigor and hypercontracture in isolated cardiomyocytes during ischemia and reperfusion (2013) Velmurugan S, Radhakrishnan J, Baetiong A, Gazmuri RJ. *Scientific Sessions - American Heart Association, Dallas, USA (Poster)* Circulation 128: A186.
3. Miao Y, **Velmurugan S**, Borovnik-Lesjak V, Radhakrishnan J, Gazmuri RJ (2012) Escalating doses of β -estradiol fail to improve resuscitation outcomes in a rat model of ventricular fibrillation and closed chest resuscitation. *Scientific Sessions - American Heart Association, Los Angeles, USA (Oral)*. Circulation 126: A15679.
4. Miao Y, **Velmurugan S**, Borovnik-Lesjak V, Radhakrishnan V, Gazmuri RJ (2012) β -Estradiol fails to reverse post-resuscitation myocardial dysfunction in male sprague-dawley rats. *Scientific Sessions - American Heart Association, Los Angeles, USA (Oral)*. Circulation 126: A15214.
5. Whitehouse K, Borovnik-Lesjak V, Miao Y, Baetiong A, **Velmurugan S**, Currie B, Radhakrishnan J, Gazmuri RJ (2012) Effects of erythropoietin during hemorrhagic shock in a swine model. *Scientific Sessions - American Heart Association, Los Angeles, USA (Oral)*. Circulation 126: A18674.
6. Ashley Millard, **Velmurugan S**, Thomas Shannon, Stephen Shonts (2012) Akt regulation of diastolic Calcium release from the sarcoplasmic reticulum of cardiac myocytes. *The 29th annual Rush University forum for research and clinical investigation*, Rush University Medical Center, Chicago, USA (Poster).
7. Stephen Shonts, **Velmurugan S**, Ashley Millard and Thomas R. Shannon (2012) Inhibition of Akt attenuates isoproterenol-induced RyR-dependent diastolic Ca^{2+} release in rabbit ventricular myocytes. *56th Annual Meeting of the Biophysical Society*, San Diego, USA (Poster). Biophysical Journal 102: 3, 509a-510a.
8. **Velmurugan S**, Jerry Curran and Thomas R. Shannon (2011) Inhibition of Akt Reverses the Isoproterenol-enhanced Diastolic Calcium Leak in Rabbit Ventricular Myocytes. *Basic and Cardiovascular Sciences Meeting – American Heart Association, New Orleans, USA (Poster)*. Circulation 124: A10720.
9. Stephen Shonts, **Velmurugan S**, Michael Fill and Thomas R. Shannon (2011) Tetracaine is a potent inhibitor of SR Ca leak in ventricular cardiac myocytes. *55th Annual Meeting of the Biophysical Society*, Baltimore, USA (Poster). Biophysical Journal 100: 3, 416a.

Abstracts from PhD

1. **Velmurugan S**, Leng G and Russell JA (2009) Secretin, a brain-gut peptide, influences the electrical activity of supraoptic nucleus (SON) neurons via noradrenergic pathways in female rats. *Neuroscience 2009*, Chicago (Poster). **Travel award won** from the British Society of Neuroendocrinology.

2. **Velmurugan S**, Brunton, PJ, Leng G and Russell JA (2009) Secretin and leptin increase the electrical activity of supraoptic nucleus (SON) neurons in female rats: Comparison to CCK-induced excitation. *Neuropeptides – 19th Neuropharmacology Conference*, Chicago (Poster). **Travel award won** from the British Society of Neuroendocrinology.
3. **Velmurugan S**, Brunton, PJ, Leng G and Russell JA (2009) Systemic secretin increases the electrical activity of supraoptic nucleus (SON) OT neurones and stimulates oxytocin (OT) secretion in the rat. *7th World Congress on Neurohypophyseal Hormones (WCNH)*, Kitakyushu, Japan (Poster). **Travel award won** from WCNH.
4. **Velmurugan S**, Leng G and Russell JA (2009) Regulation of supraoptic nucleus (SON) oxytocin neurones by leptin and secretin in female rats *British Society of Neuroendocrinology Annual Meeting 2009*, University of Edinburgh, UK (Poster).
5. **Velmurugan S**, Leng G and Russell JA (2009) Secretin influences the electrical activity of supraoptic nucleus (SON) neurones in female rats via adrenergic pathways. *Annual Neuroscience Day meeting 2009*, University of Edinburgh, UK (Poster).
6. Russell JA, **Arunachalam S**, Brunton PJ (2008) Altered control of neurohypophysial hormones and blood osmolality and volume in pregnancy. *The 24th Congress of the Polish Physiological Society*, University of Life Sciences, Lublin, Poland.
7. **Arunachalam S**, Leng G and Russell JA (2008) Effect of systemic leptin administration on supraoptic nucleus oxytocin neurones: Influence of fasting and pregnancy in the rat. *British Society for Neuroendocrinology Annual Meeting 2008*, University of Bristol, UK (Poster).
8. **Arunachalam S**, Russell JA and Leng G (2008) Systemic leptin administration increases the electrical activity of supraoptic oxytocin neurones in urethane anaesthetized female rats. *The Young Physiologists Symposium and the Main Meeting of the Physiological Society*, University of Cambridge, UK (Poster). **Travel award won** from the Physiological Society.
9. **Arunachalam S**, Sabatier N, Brunton PJ, Leng G and Russell JA (2007) Centrally administered Neuropeptide Y (NPY) increases the firing rate of supraoptic oxytocin neurones. *6th World Congress on Neurohypophyseal Hormones (WCNH)*, Regensburg, Germany (Poster).
10. **Arunachalam S**, Sabatier N, Brunton PJ, Leng G and Russell JA (2007) Centrally administered Neuropeptide Y (NPY) increases the firing rate of supraoptic oxytocin neurons in urethane-anaesthetized late pregnant and non-pregnant rats. *British Society of Neuroendocrinology Annual Meeting 2007*, University of Nottingham, UK (Oral).

Abstracts from MVSc

1. **Arunachalam S**, Prabhakar S, Prahlad Singh, Ghuman SPS and Dhaliwal GS (2005) Assessment of oxidative stress in dystocia affected buffaloes and its alleviation. *Proceedings of XXI Annual Convention of Indian Society for Study of Animal Reproduction*, Jammu. p228 (Oral).
2. **Arunachalam S**, Prabhakar S, Ghuman SPS, Mishra Y (2005) Plasma cortisol concentration in calves delivered from uterine torsion affected buffaloes. *Proceedings of XXI Annual Convention of Indian Society for Study of Animal Reproduction*, Jammu. p229 (Oral).
3. **Arunachalam S**, Prabhakar S, Ghuman SPS, Mishra Y (2005) Effects of administration of dexamethasone on clinical parameters and survivability in dystocia affected buffaloes. *Proceedings of XXI Annual Convention of Indian Society for Study of Animal Reproduction*, Jammu. p229 (Oral).
4. **Arunachalam S**, Prabhakar S and Dhaliwal GS (2004) Success of treatment and dam survival in dystocia affected buffaloes. *Proceedings of XX Annual Convention of Indian Society for Study of Animal Reproduction*, Durg. p198 (Oral).