

M. Rezaul Karim

PERSONAL INFORMATION

Nationality: Bangladeshi
Date & Place of birth: 1st January 1980, Comilla, Bangladesh.



Current Position: **Assistant Professor**
Dept. of Biotechnology and Genetic Engineering
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JOB RESPONSIBILITIES

Teaching and Research:

Running courses

- BGE 101 Fundamentals of biotechnology and genetic engineering
- BGE 105 Basic biochemistry
- BGE 106 Pharmaceutical microbiology
- BGE 201 Basic genetics
- BGE 301 Microbial genetics
- BGE 304 Advanced molecular biology
- BGE 306 Developmental biology
- BGE 309 Biosafety, ethics and regulation in biotechnology
- BGE 407 Genetic engineering
- BGE 110 Biology laboratory and field work
- BGE 111 Biochemistry laboratory
- BGE 312 Techniques in molecular biology
- BGE 412 Genetic engineering laboratory

ACADEMIC ACTIVITIES

- 2012-2014** **Postdoctoral research fellow at Doshisha University, Japan**
Research Title: The antioxidant response and longevity-promoting transcription factor, NRF/CNCC, regulates lipid storage in *Drosophila* fat body Cells
- 2012** **Postdoctoral research fellow at The Johns Hopkins University, USA**
Research Title: Developing a FRET-based reporter assay system for high-throughput screening of AMPK modulators.

- 2006-2011** **Ph.D.**
RIKEN Brain Science Institute, Wako-shi, Saitama.
(Candidacy of April 2007- September 2011)
Affiliated University
(Saitama University, Japan
Department of Biochemistry and Molecular Biology)
- Ph.D. thesis title:** Morphological analysis of *Drosophila* larval peripheral sensory neuron dendrites and axons using genetic mosaics.
Supervisor: Dr. Adrian W. Moore
- 2003-2005** **M. Sc. (thesis group)**
Biochemistry and Molecular Biology
University of Chittagong, Bangladesh.
Result- First class (position 2nd)
- M. Sc. thesis title:** Characterization of insulin secretion in type 2 diabetic subjects. Biomedical Research Group, BIRDEM, Dhaka, Bangladesh.
Supervisor: Liaquat Ali, MBBS, Ph.D.
- 1998-2003** **B. Sc. Honours (Biochemistry)**
University of Chittagong, Bangladesh.
Result: First class (position 2nd)

PROFESSIONAL APPOINTMENTS

- 2006-2007** Technical Staff
Disease Mechanism Research Core,
RIKEN Brain Science Institute
Saitama, Japan

AWARDS AND FELLOWSHIPS

- 2014 Research Fellowship for Young Scientists Group B, MEXT, Japan
- 2013 The Kato Memorial Bioscience Grant for International Travel Fellowship,
Doshisha University, Japan
- 2011 Successfully completed one year training program on Brain Science provided
by RIKEN Brain Science Institute.
- 2003 **Fellowship Award**, Dutch Bangla Bank Foundation Scholarship, Bangladesh.
- 2000 **Merit Scholarship** (Bac. Sc. Hons), University of Chittagong, Bangladesh.
- 1995 **Junior School Merit scholarship** (5th Grade), People's Republic of
Bangladesh Govt. Scholarship.

PUBLICATIONS

1. **Karim MR**, Taniguchi H, Kobayashi A. Constitutive activation of *Drosophila* CncC transcription factor reduces lipid formation in the fat body. **BBRC**. June 3, 2015
2. **Karim MR**, Haruta T, Oda H, Taniguchi H. Imaging of cell movement in *Drosophila* gastrulation using E-cadherin reporter transgenic flies. **J. Vis. Exp.** (under review).
3. **Karim MR**, Endo K, Moore AW, and Taniguchi H. Whole mount immunolabeling of olfactory receptor neurons in the *Drosophila* antenna. **J. Vis. Exp.** 87, May 4, 2014
4. Tsuchiya Y, Taniguchi H, Ito Y, Morita T, **Karim MR**, Ohtake N, Fukagai K, Ito T, Okamuro S, Iemura S, Natsume T, Nishida E, and Kobayashi A. The CK2-Nrf1 axis controls the clearance of ubiquitinated proteins by regulating proteasome gene expression. **Mol. Cell. Biol.** 33, 17, pp.3461-72, Sep 2013.
5. **Karim MR** and Moore AW. Convergent local identity and topographic projection of sensory neurons. **J Neurosci** 23;31(47):17017-27, Nov 2011
6. Endo K, **Karim MR** *, Taniguchi H*, Krejci A , Kinameri E, Seibert M, Ito K, Bray SJ, Moore AW. Chromatin modification of Notch targets in olfactory receptor neuron diversification. **Nat Neurosci.** 25;15(2):224-33, Dec 2011. *= equally contributed.

(Recommended by Faculty of 1000 Biology), Introduced by *Sci. Signal.* 5 (210), ec43. and *Nat Neurosci.* 2012 15:174-6.



7. **Karim MR** and Moore AW. Morphological analysis of *Drosophila* larval peripheral sensory neuron dendrites and axons using genetic mosaics. **J Vis Exp.** 7;(57):e3111, Nov 2011
8. Yalgin C, **Karim MR**, Moore AW. Immunohistological labelling of microtubules in sensory neuron dendrites, tracheae, and muscles in the *Drosophila* larva body wall. **J Vis Exp.** 10;(57). Pii:3662, Nov 2011
9. **Karim MR**, Zinnat R, Akter S, Islam S, Biswas KB, Rahman MH, Ali L. Characterization of Insulin Secretion in Type 2 Diabetic Subjects. **Bang J Med Biochem;** 02(1):21-25, 2009.

ORAL PRESENTATIONS

1. **Karim MR** and Moore AW. Convergent local identity and topographic projection of sensory neurons. The 34th Annual Meeting of the Japan Neuroscience Society, Pacifico Yokohama, 14th -17th Sep, 2011.
2. **Karim MR** and Moore AW. Integration of Separate Knot- and Cut- Promoting Prepatterning Pathways to Generate Class-Specific *Drosophila* Multidendritic Neuron Characteristics. The 9th Japanese *Drosophila* Research Conference, Yamaha Resort Tsumagoi, Japan, 2009

3. **Karim MR** and Moore AW. Organizing Nervous System Architecture: Genetic Control of *Drosophila* Dendritic Arborisation Neuron Number, Position, and Identity. Neurofly 2008, Wurzburg, Germany, 6-10th Sep 2008.
4. **Karim MR** and Moore AW. Organizing Nervous System Architecture: Genetic Control of *Drosophila* Dendritic Arborisation Neuron Number, Position, and Identity. RIKEN BSI Joint Retreat (National), Karuizawa, Japan, 2008
5. **Karim MR** and Moore AW. Hedgehog and Wingless Signalling Control Multiple Sequential Steps of Neuronal Development in the *Drosophila* Peripheral Nervous System. JDRC8 (The 8th Japanese *Drosophila* Research Conference), Awaji Yumebutai International Conference Center, Japan, 2007.

POSTER PRESENTATIONS

1. Karim MR, Taniguchi H, Kobayashi A. The antioxidant response and longevity-promoting transcription factor Nrf/CncC regulates lipid storage in *Drosophila* fat body cells. The 23rd European *Drosophila* Research Conference (EDRC 2013), Barcelona, Spain, 16-19th October, 2013
2. Karim MR and Moore AW. Elucidating the genetic networks that organize *Drosophila* class-specific MD neuron development. 43rd Annual Meeting for the Japanese Society of Developmental Biologists (JSDB), Kyoto, Japan, 21-23rd June 2010
3. Karim MR and Moore AW. Hedgehog and Wingless Signalling Control the Development of Neural Precursor Cells in the *Drosophila* PNS. RIKEN BSI Joint Retreat (National), Karuizawa, Japan, November 2007.
4. Karim MR and Moore AW. Positional Information and Neuron Identity in the *Drosophila* PNS. UK-APDBN Joint Meeting on "Development and the Emergence of Function in the Nervous System", Kobe, Japan 8-10th February 2007
5. Karim MR and Moore AW. Positional Information and Neuron Identity in the *Drosophila* PNS. RIKEN BSI Joint Retreat (National), Shinrin-koen, Saitama, Japan 2006.
6. Karim MR and Moore AW. Positional Information and Neuron Identity in the *Drosophila* PNS. RIKEN BSI, CDB, DRI, RCAI Joint Retreat (National), Atami, Shizuoka, Japan, 11-12th May 2006.
7. Karim MR, Zinnat R and Ali L. Characterization of Insulin Secretion in Type 2 Diabetic Subjects. Diabetes and Endocrine Conference, Patna, India, 2005.

INVITED TALK

1. **Karim MR.** Convergent local identity and topographic projection of sensory neurons. Developmental Signalling Unit, Okinawa Institute of Science and Technology (OIST), Okinawa, Japan, 9th June 2011.
2. **Karim MR.** Organizing Nervous System Architecture: Genetic Control of *Drosophila* Dendritic Arborisation Neuron Number, Position, and Identity. Department of Life Science, Marie Curie University, Paris, France, 2nd September 2008.

LABORATORY SKILLS

1. Immunohistochemistry (*Drosophila* embryo, larvae, pupae, and adult antennae)
2. Cryosection of *Drosophila* antennae.
3. In situ hybridization of *Drosophila* embryo.
4. Reporter assays in cell culture system.
5. Immunoprecipitation and Western blotting.
6. Immunocytochemistry.
7. Cell cultures, cell transfections and establishment of stable cell lines.
8. PCR, RT PCR, Real time PCR, cloning and bacterial expression for protein purification.
9. Confocal Microscopy (Nikon, Leica SP2, SP5).

LIST OF MEMBERSHIPS

1. General member of Japanese Society of Developmental Biologists (JSDB), Japan.
2. General member of Japan Neuroscience Society.
3. General member of Graduate Biochemistry Society, University of Dhaka, Bangladesh.

REFERENCES

1. **Professor Dr. Md. Alauddin**

Vice-chancellor

Mawlana Bhashani Science and Technology University

Santosh, Tangail-1902

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2. **Md. Tofazzal Islam, PhD**

Professor

Department of Biotechnology

Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur-1706

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Summary of Ph.D. research projects

Delineating the genetic networks of Transcription factor (TF) regulated neuron structural and functional diversity is crucial for a complete understanding of the neuronal development; it is also clinically important as disrupted neuron morphology is a common feature of Mental retardation. My Ph.D. research focused on the genetic regulation of neurogenesis during *Drosophila* Peripheral Nervous System (PNS) development. Particularly I examined the role of two morphogens, Hedgehog (HH) and Wingless (WG), where I found that both HH and WG act locally to promote post-mitotic neuron formation. Next, I investigated the role of Iroquois family TF, Mirror, in controlling the class specific neuron characteristics. Surprisingly I have found that Mirror controls some characteristic features, including dendritic shape and axonal projection of one class IV neuron between two in a region specific manner and thus controls the larval behaviour, which explains the underlying functional neuronal circuit.

In my second project during my Ph.D., I investigated the Notch mediated cell fate regulation in Olfactory Receptor Neuron (ORN) development in fly antennae. Here we have shown that in *Drosophila*, *Evi1/Prdm16* proto-oncogene homologue Hamlet plays an important role in the neural fate decision of ORNs via Notch signalling pathway. In vitro analysis showed that Hamlet modifies the binding of Notch/Su (H) transcriptional regulator complex to its direct targets such as the *E (spl)* genes.

Future research interests and motivations

My Ph.D. researches have been focused studying on neuronal development, particularly using the model of *Drosophila melanogaster*. I studied the genetic networks that regulate the neurogenesis in *Drosophila* Peripheral Nervous System (PNS). I also studied how Notch pathway regulates cell fate decision, using both flies' genetic and cellular approaches. I have learned to use the powerful *Drosophila* genetics as a tool for developmental studies. On the other hand, I also used cell culture and molecular biology methods in my experiments to examine the molecular mechanisms of Notch pathway. The insights into the role of Notch signalling in cell fate regulation, have led to development of my interest in further understanding molecular signalling pathways. For example, Notch pathway is conserved throughout the animal kingdom; Notch is not only important in regulating development, but it is also involved in various human cancers. In future, I would like to focus on studying small molecules signalling pathways related to human cancer disease.