




## Faculty Details proforma (Dr. Namita Agrawal)

Title	<b>Dr.</b>	First Name	<b>Namita</b>	Last Name	<b>Agrawal</b>	Photograph
Designation	<b>Professor</b>					
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<b>Educational Qualifications Ph.D</b>						
Degree	Institution				Year	
Ph.D.	<b>Devi Ahilya Vishwavidyalaya, Indore, India</b>				<b>1995</b>	
M.Phil. / M.Tech.	-					
PG	<b>Devi Ahilya Vishwavidyalaya, Indore, India</b>				<b>1987</b>	
UG	<b>Magadh University, Bodhgaya</b>				<b>1985</b>	
Any other qualification						
<b>Career Profile</b>						
Dept of Zoology, University of Delhi		Professor	June 2015-till date			
Dept of Zoology, University of Delhi		Associate Professor	March 2008- May 2015			
Dept of Dev and Cell Biol, University of California, USA		Project Scientist	May-November 2008 June-July 2009 June-July 2010 June-July 2011			
Dept of Dev and Cell Biol, University of California, USA		Research Specialist	2004-2007			
Dept of Dev and Cell Biol, University of California, USA		Post Doctoral fellow	2001-2004			

Dept of Dev and Cell Biol,  
University of California, USA

Post Doctoral fellow

March-November 2000

#### Areas of Interest / Specialization

Neurodegenerative diseases, such as Huntington Disease, Parkinson Disease, ALS (amyotrophic lateral sclerosis), and Alzheimer Disease are devastating progressive conditions that disproportionately affect adults beyond their fifth decade of life. These and other neurological degenerative diseases are largely heritable and affect well over 100 million people worldwide. There exists no efficacious treatment for these diseases, and the prognosis is extremely poor for those diagnosed with these debilitating conditions.

We are interested in understanding the mechanism and treatment of neurodegeneration in human with particular focus on the polyglutamine diseases including Huntington's Disease. We have humanized flies (*Drosophila*) by inserting mutant human disease genes such as the Huntington's gene into flies. We found that one can mimic the pathology seen in human with good fidelity in flies so that they can be considered as a good model system..

We are using this transgenic fly model to explore several questions related to neurodegeneration that includes evaluation of metabolism, role of inclusion body, effect of post translational modification and finally testing of various phytochemical for the suppression of disease pathology. We hope that the answer to the questions addressed in various projects conducted in the lab would lead to the better understanding of the disease mechanism that can bring us closer to the effective treatment strategy in human patients.

In addition, we are also addressing toxicity issues related to nanoparticles used in day to day life using *Drosophila* as a model system.

With the above theme of research we have published research papers in peer reviewed journals like Science, PNAS, Development, JCB etc and presented our work previously and recently in several International conferences (listed below).

#### Subjects Taught

- a. Developmental Biology
- b. Genetics and Cytogenetics

#### Research Guidance

*1. Supervision of Doctoral Thesis, under progress:*

**Three**

List against each head (If applicable) (as Illustrated with examples)

**1. Research papers published in Refereed/Peer Reviewed Journals**

1. **Agrawal, N.**, Joshi, S., Kango, M., Saha, D., Mishra, A. and Sinha, P. (1995). Epithelial hyperplasia of imaginal discs induced by mutations in *Drosophila* tumor suppressor genes: Growth and pattern formation in genetic mosaics. *Dev.Biol.* **169**, 387-398.
2. **Agrawal, N.**, Kango, M., Mishra, A. and Sinha P. (1995). Neoplastic transformation and aberrant cell-cell interactions in genetic mosaics of *lethal(2)giant larvae (lgl)*, a tumor suppressor gene of *Drosophila*. *Dev.Biol.* **172**, 218-229.
3. Mishra, A., Radhakrishnan, V., **Agrawal, N.** and Sinha, P. (1997). Mitosis in neoplastic and hyperplastic imaginal discs of *Drosophila*. *J. Genet.* **76** (3), 209-220.
4. Shashidhara, L.S., **Agrawal, N.**, Bajpai, R., Bharathi, V. and Sinha, P. (1999). Negative regulation of dorsoventral signaling by the homeotic gene *Ultrabithorax* during haltere development in *Drosophila*. *Dev.Biol.* **212**, 491-502.
5. Mishra, A., **Agrawal, N.**, Banerjee, S., Sardesai, D., Dalal, J.S., Bhojwani, J. and Sinha, P. (2001). Spatial regulation of *Delta* expression mediates NOTCH signalling for segmentation of *Drosophila* legs. *Mechanism of Development.* **105**, 115-127.
6. Perrin, L., Bloyer, S., Ferraz, C., **Agrawal, N.**, Sinha, P. and Dura J.M. (2003). The leucine zipper motif of *Drosophila* AF10 homologue can inhibit PRE-mediated repression : Implication for leukemogenic activity of human MLL-AF10 fusions. *Molecular and Cellular Biology.* **23** (1), 119-130.
7. Steffan, J.S., **Agrawal, N.**, Pallos, J., Rockabrand, E., Trotman, L.C., Slepko, N., Illes, K., Lukacsovich, T., Zhu, Y.Z., Cattaneo, E., Pandolfi, P.P., Thompson, L.M., Marsh, J.L. (2004). SUMO modification of Huntingtin and Huntington's disease pathology. *Science.* **304** (5667), 100-104.
8. **Agrawal, N.**, Pallos, J., Slepko, N., Apostol, B.L., Bodai, L., Chang, Ling-Wen., Chiang, Ann-Shyn., Marsh, J.L., Thompson, L.M. (2005). Identification of combinatorial drug regimens for treatment of Huntington's disease using *Drosophila*. *PNAS.* **102** (10), 3777-3781.
9. Jaiswal, M., **Agrawal, N.** and Sinha P. (2006). Fat and Wg signaling oppositely regulate epithelial cell-cell adhesion and distal wing development in *Drosophila*. *Development.* **133**, 925-933.

10. Thompson, L.M., Aiken, C., Kaltenbach, L.S., **Agrawal, N.** *et al.* (2009). IKK phosphorylates Huntingtin and targets it for degradation by the proteasome and lysosome. *J. of Cell Biology.* (online December 21, 2009).
11. Sontag E., Lots G., **Agrawal, N.** *et al.* (2012). Methylene blue modulates Huntingtin aggregation intermediates and is protective in Huntington's disease models. *J. of Neuroscience.* **32(32)**, 11109 –11119.
12. Barbaro, B., Lukacsovich, T., **Agrawal N.** *et al.* (2015). Comparative study of naturally occurring huntingtin fragments in *Drosophila* points to Exon 1 as the most pathogenic species in Huntington's Disease. *Human Molecular Genetics.* **24**, 913-925.
13. Anjalika, C., Paliwal, N., Aditi, K., Raj, A. and **Agrawal, N.** (2015). A combination of dimethyl sulfoxide (DMSO) and methyl paraben (nipagin) in *Drosophila* food affects survival rate. *DIS.* **98**, 16-18.
14. Raj, A., Shah, P. and **Agrawal, N.** (2015). Silver nanoparticle affects flying ability of fruit flies. *DIS.* **98**, 18-20.
15. Lakra, P., Chatterjee, M., Chongtham, A., Aditi., K. and **Agrawal, N.** (2015). *Aloe vera*, a phytochemical ameliorates Huntington's disease pathology in *Drosophila* model. *Int. J. Sci. Res.* **4**, 365-367.
16. Anjalika, C. and **Agrawal, N.** (2016). Curcumin modulates cell death and is protective in Huntington's disease. *Nature Scientific Reports* **6**, 18736 DOI: 10.1038/srep18736
17. Raj, A., Shah, P. and **Agrawal, N.** (2016). Ingestion of Gold Nanoparticles (AuNPs) affects Survival in *Drosophila* in A Dose Dependent Manner. *Int. J. Sci. Res.* **5**, 544-546.
18. Aditi, K., Shakarad, M.N. and **Agrawal, N.** (2016). Altered lipid metabolism in *Drosophila* model of Huntington's disease. *Nature Scientific Reports.* **6**, 31411 DOI:10.1038/srep31411
19. Raj, A., Shah, P. and **Agrawal, N.** (2017). Dose-dependent effect of silver nanoparticles (AgNPs) on fertility and survival of *Drosophila*: An *in-vivo* study. *PlosOne.***12**, e0178051
20. Raj, A., Shah, P. and **Agrawal, N.** (2017). Sedentary behavior and altered metabolic activity by AgNPs ingestion in *Drosophila melanogaster*. *Nature Scientific Reports.* **7**, 15617 DOI:10.1038/s41598-017-15645-6
21. Shah, P., Raj, A., Singh, A. and **Agrawal, N.** (2018) Growing concerns for a safe dose of silver nanoparticles. *Int. J. Sci. Res.* **7**.

22. Lakra, P., Aditi, K. & **Agrawal, N.** (2019) Peripheral Expression of Mutant Huntingtin is a Critical Determinant of Weight Loss and Metabolic Disturbances in Huntington's Disease. *Sci Rep* 9, 10127. <https://doi.org/10.1038/s41598-019-46470-8>
23. Raj A., Shah P., Singh A. & **Agrawal, N.** (2020). Discriminatory alteration of carbohydrate homeostasis by AuNPs ingestion in *Drosophila*. *Toxicology and Industrial Health*. (Accepted for publication).
24. Chauhan, N., Shrivastava, N. K., **Agrawal, N.**, & Shakarad, M. N. (2020). Wing patterning in faster developing *Drosophila* is associated with high ecdysone titer and wingless expression. *Mechanisms of Development*, 103626. <https://doi.org/10.1016/j.mod.2020.103626>
25. Jyoti, **Agrawal, N.**, & Shrivastava, A. (2020). An interplay between immune responses and neurodegenerative diseases progression: An assessment using *Drosophila* as a model. *Journal of Neuroimmunology*, 577302. <https://doi.org/10.1016/j.jneuroim.2020.577302>

## 2. Books and Book chapters

1. **Agrawal, N.** & Shah, P.(Editors). *Toxicology of Nanoparticles: Insights from Drosophila*. Springer Nature 2020. ISBN- 978-981-15-5221-3, 978-981-15-5522-0 (e-book).
2. Lakra, P. and **Agrawal, N.** (2019). Metabolic Alterations Amalgamated with Huntington's Disease. In Mousumi Mutsuddi and Ashim Mukherjee (Eds), *Insights into Human Neurodegeneration: Lessons Learnt from Drosophila*. eBook ISBN: 978-981-13-2218-1 Springer Singapore. doi:10.1007/978-981-13-2218-1.
3. Chatterjee, M., and **Agrawal, N.** (2019) Post-translational Modifications: A Mystery to Unravel Huntington's Disease Prognosis. In M. Mutsuddi and A. Mukherjee (Eds), *Insights into Human Neurodegeneration: Lessons Learnt from Drosophila*. eBook ISBN: 978-981-13-2218-1. Springer, Singapore. DOI: 10.1007/978-981-13-2218-1

## 3. Research papers accepted in Refereed/Peer Reviewed Conferences

1. Singh, A., Aditi, K. and **Agrawal, N.** "Deciphering the role of key metabolic genes regulating lipid homeostasis in *Drosophila* model of Huntington's disease. (2018). 59<sup>th</sup> Annual *Drosophila* Research Conference, Philadelphia, USA.
2. Lakra, P., Aditi, K. and **Agrawal, N.** "Emerging role of mutant huntingtin in metabolic activity in *Drosophila*". (2017). 25<sup>th</sup> European *Drosophila* Research Conference, London, UK.

3. Lakra, P., Aditi, K. and **Agrawal, N.** “Detrimental effects of mutant huntingtin beyond neurons: Alteration of metabolic activity in *Drosophila*”. (2017). 58th Annual *Drosophila* Research Conference, San Diego, CA, USA.
4. Chatterjee, M. and **Agrawal, N.** “Phosphorylation of serine residues of mutant huntingtin contributes to metabolic function in Huntington’s disease in *Drosophila*”. (2017). 58th Annual *Drosophila* Research Conference, San Diego, CA, USA.
5. Chatterjee, M. and **Agrawal, N.** “Phosphorylation of serine residues of mutant huntingtin ameliorates HD pathogenesis”. (2017). IndoUS Workshop and International Symposium on Biological Timing and Health issues in the 21st Century, Delhi, India.
6. Lakra, P., Aditi, K. and **Agrawal, N.** “Emerging role of mutant huntingtin in metabolic activity in *Drosophila*”. (2017). IndoUS Workshop and International Symposium on Biological Timing and Health issues in the 21st Century, Delhi, India.
7. Lakra, P., Chatterjee, M. and **Agrawal, N.** “*Aloe vera*, a phytochemical ameliorates Huntington’s disease pathology in *Drosophila* model”. (2015). Biennial Indian *Drosophila* Research Conference, InDRC, IITK, India.
8. Aditi, K., Shakarad, M. N. and **Agrawal, N.** “Curcumin modulates altered lipid metabolism in a *Drosophila* model of Huntington’s disease”. (2015). Biennial Indian *Drosophila* Research Conference, InDRC, IITK, India.
9. Aditi, K., Shakarad, M. N. and **Agrawal, N.** “Curcumin modulates lipid metabolism in a *Drosophila* model of Huntington’s disease”. (2015). Tokyo International Conference on Life Science & Biological Engineering (ILSBE), Tokyo, Japan.
10. Aditi, K., Shakarad, M. N. and **Agrawal, N.** “A study of altered lipid metabolism in Huntington’s disease using transgenic *Drosophila* as a model system”. (2015). The 2nd International Biotechnology, Chemical Engineering and Life Science Conference (IBCELC), Hokkaido, Japan.
11. Raj, A., Shah, P. and **Agrawal, N.** “Impact of silver nanoparticle (SNP) on reproduction and development of *Drosophila*”. (2015). The 2nd International Biotechnology,

12. Anjalika, C., and **Agrawal, N.** “Phytochemical Withanolide (WL-A): A potent suppressor of Huntington’s disease in transgenic *Drosophila* model”. (2014). 55<sup>th</sup> Annual *Drosophila* Research Conference, San Diego, CA, USA.
13. **Agrawal et al.** “Curcumin, a potent phytochemical for the treatment of Huntington’s disease using *Drosophila* as a model system”. (2013). 54<sup>th</sup> Annual *Drosophila* Research Conference, USA.
14. **Agrawal et al.** “Suppression of progressive motor neuron degeneration by Diferuloylmethane (Curcumin) in transgenic *Drosophila* expressing mutant human gene of neurodegenerative disease.” (2012). 53<sup>rd</sup> Annual *Drosophila* Research Conference, USA.
15. **Agrawal et al.** “Modification of Serines in Httex1p suppresses Huntington’s disease (HD) pathogenesis in *Drosophila*”. (2011). 52<sup>nd</sup> Annual *Drosophila* Research Conference, San Diego, CA, USA by Genetics Society of America.
16. A.C. Cooper., **Agrawal, N. et al.** “Identification of benzamide-class HDAC inhibitors with efficacy in preclinical models of Huntington’s Disease”. *NeuroScience 2011*, Washington, DC, USA.
17. **Agrawal, N., et al.** (2006). “Modification of lysines in Httex1p alters sub-cellular accumulation and affects HD pathogenesis in *Drosophila*”. HDF Meeting 2006, Cambridge, MA, USA.
18. **Agrawal, N., et al.** (2004). “Pharmacological prevention of Huntington’s disease using combination drug treatment in *Drosophila*”. HDF Meeting 2004, Cambridge, MA, USA.
19. **Agrawal, N., et al.** (2002). “Ultrabithorax Homeotic Gene Pattern Halteres in *Drosophila* by compromising its Organizer Activity”. *American Dros. Res. Conf.* USA 43 Suppl.: 1021A
20. **Agrawal, N., et al.** (2001). “The heparan sulfate proteoglycan *Syndecan* exhibits multiple modes of action in developing tissues”. *American Dros. Res. Conf.* USA, 42:475A
21. Sinha, P., Mishra, A., **Agrawal, N., et al.** (2001). “Spatial regulation of DELTA expression mediates NOTCH signaling for segmentation of *Drosophila* legs”. *American Dros. Res. Conf.* USA. 42: 50.

22. Jaiswal, M., **Agrawal, N.**, Sinha, P. *et al.* (2001). “Implication of Dpp signaling in tumorigenesis in *Drosophila*”. *American Dros. Res. Conf. USA*, 42: 225C
23. Sinha, P. and **Agrawal, N.** (2000). “Growth dependent regulation of haltere patterning by the Ultrabithorax Homeotic gene”. *American Dros. Res. Conf. USA*, 41: 519B
24. Sinha, P., and **Agrawal, N.** (1999). “Haltere Development in *Drosophila* involve negative regulation of growth by *Ultrabithorax* homeotic gene”. *Europ. Dros. Res. conf.*, Germany, 16: 44
25. Shashidhara L.S., **Agrawal, N.**, Sinha, P. *et al.* (1999). “Negative regulation of dorsoventral signaling by the homeotic gene *Ultrabithorax* during haltere development in *Drosophila*”. *American Dros. Res. Conf. USA*, 40: 728A
26. **Agrawal, N.**, Sinha P. *et al.* (1998). “Hyperplastic mutations in the fruit fly - connecting growth and patterning”. *Dros. tumor supp. Genes.*

#### Conference Organization/ Presentations

*List against each head(If applicable)*

##### **Organization of a Conference**

- Organized a training workshop for *Drosophila* genetics practical teaching for Delhi University College teachers from 13<sup>th</sup> to 14<sup>th</sup> November **2010** at the Department of Zoology, University of Delhi.
- Organized a training workshop for *Drosophila* genetics teaching for Delhi University College teachers in **2011** at the Department of Zoology, University of Delhi.
- Organized a training workshop for *Drosophila* genetics teaching for Delhi University College teachers in **2013** at the Department of Zoology, University of Delhi.

#### Research Projects (Major Grants/Research Collaboration)

1. R&D Doctoral research Grant – University of Delhi (2016)
2. R&D Doctoral research Grant – University of Delhi (2015)
3. R&D Doctoral research Grant – University of Delhi (2014)
4. R&D Doctoral research Grant – University of Delhi (2013)
5. R&D Doctoral research Grant – University of Delhi (2012)
6. R&D Doctoral research Grant – University of Delhi (2011)
7. R&D Doctoral research Grant – University of Delhi (2010)




8. Testing of phytochemicals for the treatment of neurodegenerative diseases using *Drosophila* as a model system. DU/DST- PURSE GRANT (2010)
9. R&D Doctoral research Grant - University of Delhi (2009)
10. R&D Doctoral research Grant - University of Delhi (2008)

#### Awards and Distinctions

1. Post Doctoral Research Fellowship from University of California, Irvine USA from 2000-2004
2. Research Specialist, University of California, Irvine USA 2004-2007
3. Visiting Scientist, University of California USA 2008-2011.

#### Association With Professional Bodies

1. **Memberships**  
Genetics Society of America, USA

 14<sup>th</sup> July 2020