




## Faculty Details proforma for DU Web-site

Title	Professor	First Name	Umesh	Last Name	Rai	Photograph
Designation		<b>Professor</b>				
Address		Department of Zoology, University of Delhi, Delhi-110 007				
Phone No	Office	011-27666389				
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<b>Educational Qualifications</b>						
Degree		Institution			Year	
B.Sc. (Zoology)		Banaras Hindu University			1977	
M.Sc. (Zoology)		Gorakhpur University			1980	
Ph.D.		Banaras Hindu University			1986	
<b>Career Profile</b>						
2006-till date: Professor, Department of Zoology, University of Delhi						
1998-2006: Reader, Department of Zoology, University of Delhi						
1992-1998: Lecturer, Department of Zoology, University of Delhi						
1988-1992: CSIR – Research Associate, Department of Zoology, Banaras Hindu University						
<b>Administrative Assignments</b>						
December, 2010 to May, 2016: Director, South Campus, University of Delhi						
<b>Areas of Interest / Specialization</b>						
Comparative Immuno-endocrinology and Reproductive Physiology						
<b>Subjects Taught</b>						
<ul style="list-style-type: none"> <li>• Comparative Endocrine Physiology</li> <li>• Biology of Reproduction</li> </ul>						
<b>Time table of the subjects taught during the current semester</b>						
<b>S.No.</b>	<b>Subject</b>	<b>Days</b>	<b>Time</b>	<b>Classroom</b>		
1.	Biology of Reproduction	<b>Theory:</b> 1 hour x 3 days x 15 weeks= 45 hours <b>Practicals:</b> 4 hours x 1day x 15 weeks= 60 hours	10.30-11.25 a.m.  13.00-16.55 p.m.	Seminar room  Lab no. 35 Reproductive Biology laboratory		

<b>Dissertation:</b> 4.5      12.30-16.55 p.m. hours x 2 days x 15 weeks= 135 hours	Lab no. 107 Comparative Immuno- Endocrinology laboratory
<b>Research Guidance</b>	
<ol style="list-style-type: none"> <li>1. Awarded/Submitted Ph.D.s under supervision- 16</li> <li>2. Awarded M.Phils under supervision- 06</li> </ol>	
<b>Publications Profile</b>	
<ol style="list-style-type: none"> <li>1. Gautam M, Bhattacharya I, Rai U, Majumdar S.S. 2018 Hormone induced differential transcriptome analysis of Sertoli cells during postnatal maturation of rat testes. PloS One 13(1), e0191201.</li> <li>2. Priyam M, Tripathy M, Rai U, Ghorai, S. M. 2018 Divergence of protein sensing (TLR 4, 5) and nucleic acid sensing (TLR 3, 7) within the reptilian lineage. Molecular phylogenetics and evolution 119, 210-224.</li> <li>3. Pandey M, Ghorai S. M, Rai U 2018 Bisphenol A mediated effects on innate immunity in freshwater teleost spotted snakehead <i>Channa punctatus</i> murrel. Fisheries science 84(1), 25-31.</li> <li>4. Tripathy M, Rai U 2017 Temporal expression and gonadotropic regulation of aromatase and estrogen receptors in the ovary of wall lizard, <i>Hemidactylus flaviviridis</i>: Correlation with plasma estradiol and ovarian follicular development. Steroids 128, 23-31</li> <li>5. Tripathy M, Priyam M, Rai U 2017 Repertoire of bone morphogenetic proteins and growth/differentiation factors in ovary of the Indian wall lizard (<i>Hemidactylus flaviviridis</i>) with emphasis on differential expression and gonadotropic regulation of bmp15 and gdf9. General and Comparative Endocrinology 253 13-24</li> <li>6. Roy A, Basak R, Rai U 2017 De novo sequencing and comparative analysis of testicular transcriptome from different reproductive phases in freshwater spotted snakehead <i>Channa punctatus</i>. PLoS One 12(3): e0173178</li> <li>7. Singh V, Priyam M, Tripathy M, Rai U 2017 Purification and identification of 25-hydroxycholesterol in a reptile: Seasonal variation and hormonal regulation. General and Comparative Endocrinology 0016-6480</li> <li>8. Sarkar H, Arya S, Rai U, Majumdar SS 2016 A Study of Differential Expression of Testicular Genes in Various Reproductive Phases of <i>Hemidactylus flaviviridis</i> (Wall Lizard) to Derive Their Association with Onset of Spermatogenesis and Its Relevance to Mammals. PLoS One 11(3):e0151150</li> <li>9. Priyam M, Tripathy M, Rai U, Ghorai SM 2016 Tracing the evolutionary lineage of pattern recognition receptor homologues in vertebrates: An insight into reptilian immunity via de novo sequencing of the wall lizard splenic transcriptome. Veterinary Immunology and Immunopathology: Volume 172</li> <li>10. Basak R, Roy A, Rai U 2016 Seasonality of reproduction in male spotted murrel <i>Channa punctatus</i>: correlation of environmental variables and plasma sex steroids with histological changes in testis. Fish Physiol Biochem. 2016 Oct;42(5):1249-58</li> <li>11. Gautam M, Mathur A, Khan MA, Majumdar SS, Rai U 2013 Transcriptome Analysis of Spermatogenically Regressed, Recrudescent and Active Phase Testis of Seasonally Breeding Wall Lizards <i>Hemidactylus flaviviridis</i>. PLOS ONE 8: e58276</li> <li>12. Bharti S, Misro MM, Rai U 2013 Clomiphene citrate potentiates the adverse effects of estrogen on rat testis and down-regulates the expression of steroidogenic enzyme genes. Fertility and Sterility 99: 140-148</li> <li>13. Dhall M, Chaturvedi MM, Rai U, Kapoor S 2012 Sex-dependent effects of the UCPI -3826 A/G polymorphism on obesity and blood pressure. Ethn Dis. Spring 22: 181-4</li> </ol>	

14. Kumar S, Rai U 2011 Dynorphin regulates the phagocytic activity of splenic phagocytes in wall lizards: involvement of a  $\kappa$ -opioid receptor- coupled adenylate-cyclase-cAMP-PKA pathway. *Exp Biol.* 214: 4217-22
15. Kumar S, Mondal S, Rai U 2011  $\beta$ -Endorphin inhibits phagocytic activity of lizard splenic phagocytes through  $\mu$  receptor-coupled adenylate cyclase- protein kinase A signaling pathway *Gen. Comp. Endocrinol.* 171: 301-308
16. Kumar S, Rai U 2011 Immunomodulatory role of substance P in the wall lizard *Hemidactylus flaviviridis*: An in vitro study. *Neuropeptides* 45: 323-328
17. Kumar S, Rai U 2011 Neuropeptide Y, an orexigenic hormone, regulates phagocytic activity of lizard splenic phagocytes *Peptides* 32: 1324-1329
18. Bharti S, Misro MM, Mathur A, Rai U 2011 Role of estrogen in the regulation of spermatogenesis in the Indian wall lizard *Hemidactylus flaviviridis*. *Gen. Comp. Endocrinol.* 172: 225-233
19. Singh, R, Rai U 2011 Immunomodulatory role of urotensins in teleost *Channa punctatus*. *Gen. Comp. Endocrinol.* 170: 613-621
20. Singh, R, Rai U 2010 Opioid and non-opioid receptor-mediated immunoregulatory role of Leucine-enkephalin in teleost *Channa punctatus*. *Fish & Shellfish Immunol.* 28: 872-878
21. Singh R, Rai U 2010 Kappa-opioid receptor-mediated modulation of innate immune response by dynorphin in teleost *Channa punctatus*. *Peptides* 31: 973-978
22. Singh, R. Rai U 2009 Delta opioid receptor mediated immunoregulatory role of methionine-enkephalin in freshwater teleost *Channa punctatus* (Bloch). *Peptides* 30: 1158-1164
23. Roy B, Rai U 2009 Genomic and non-genomic effect of cortisol on phagocytosis in freshwater teleost, *Channa punctatus*: an in vitro study. *Steroids* 74: 449-455
24. Roy B, Rai U 2008 Immunoregulatory role of leptin and its signalling mechanism: an in vitro study in freshwater teleost *Channa punctatus* (Bloch)
25. Roy B, Singh R, Kumar S, Rai U 2008 Diurnal variation in phagocytic activity of splenic phagocytes in freshwater teleost *Channa punctatus*: melatonin and its signalling mechanism. *J. Endocrinol.* 199: 469-478
26. Khan UW, Rai U 2008 Paracrine role of testicular macrophages in control of Leydig cell activities in the wall lizard, *Hemidactylus flaviviridis*. *Gen. Comp. Endocrinol.* 156: 44-50
27. Roy, B. and Rai, U. (2008). Role of adrenoceptor-coupled second messenger system in sympatho-adrenomedullary modulation of splenic macrophage functions in live fish, *Channa punctatus*. *Gen. Comp. Endocrinol.* 155, 298-306.
28. Khan UW, Rai U 2008 Role of gonadotropin and Leydig cell-secreted paracrine factors in the control of testicular macrophage activity in the wall lizard *Hemidactylus flaviviridis*. *Dev. Comp. Immunol.* 32: 348-355
29. Singh R, Rai U 2008 Beta-endorphin regulates diverse functions of splenic phagocytes through different opioid receptors in freshwater fish *Channa punctatus* (Bloch): an in vitro study. *Develop. Comp. Immunol.* 32: 330-338
30. Khan UW, Rai U 2007 Differential effects of histamine on Leydig cell and testicular macrophage activities in wall lizards: precise role of H1/H2 receptor subtypes. *J. Endocrinol.* 194: 441-448
31. Hareramadas, B. and Rai, U. (2006). Cellular mechanism of estrogen-induced thymic involution in wall lizard: caspase-dependent action. *J. Exp. Zool.* 305A: 396-409
32. Hareramadas B, Rai U 2005 Mechanism of androgen-induced thymic atrophy in the wall lizard *Hemidactylus flaviviridis*: an in vitro study. *Gen. Comp. Endocrinol.* 144: 10-19
33. Khan UW, Rai U 2005 Endocrine and paracrine control of Leydig cell steroidogenesis and proliferation in the wall lizard: an in-vitro study. *Gen. Comp. Endocrinol.* 140: 109-115
34. Khan UW, Rai U 2004 In-vitro effect of FSH and testosterone on Sertoli cell nursing function in wall lizard *Hemidactylus flaviviridis* (Rüppell). *Gen. Comp. Endocrinol.* 136: 225-231

35. Roy B, Rai U 2004 Dual mode of catecholamine action on splenic macrophage phagocytosis in wall lizard, *Hemidactylus flaviviridis*. Gen. Comp. Endocrinol. 136: 180-191
36. Khan UW, Rai U 2004 Inter-relationship among testicular cells in wall lizard *Hemidactylus flaviviridis* (Rüppell): an ultrastructural seasonal and experimental study. Ind. J. Exp. Biol. 42: 378-388
37. Hareramadas B, Rembhotka, GW, Rai U 2004 Glucocorticoid-induced thymocyte apoptosis in wall lizard *Hemidactylus flaviviridis*. Gen. Comp. Endocrinol. 135: 293-299
38. Rai U, Nirmal BK 2003 Significance of regional difference in ion concentrations in lizard, *Hemidactylus flaviviridis* (Rüppell): assessment of ionic influence on sperm motility in vitro. Ind. J. Exp. Biol. 41: 1431-1435
39. Mondal S, Rai U 2002 Dose and time-related in vitro effects of glucocorticoid on phagocytosis and nitrite release by splenic macrophages of wall lizard *Hemidactylus flaviviridis*. Comp. Biochem. Physiol. 132C: 461-470
40. Mondal S, Rai, U 2002 In vitro effect of sex steroids on cytotoxic activity of splenic macrophages in wall lizards (*Hemidactylus flaviviridis*). Gen. Comp. Endocrinol. 125: 264-271
41. Hareramadas B, Rai U 2001 Thymic structural changes in relation to seasonal cycle and testosterone administration. Ind. J. Exp. Biol. 39: 629-635
42. Mondal S, Rai U 2001 In vitro effect of temperature on phagocytic and cytotoxic activities of lizard's splenic macrophages. Comp. Biochem. Physiol. 129A: 391-398
43. Nirmal, BK, Rai U 2000 Epididymal protein secretion and its androgenic control in wall lizards *Hemidactylus flaviviridis* (Rüppell). Ind. J. Exp. Biol. 38: 720-726
44. Mondal S, Rai U 1999 Sexual dimorphism in phagocytic activity of wall lizard's splenic macrophages and its control by sex steroids. Gen. Comp. Endocrinol. 116: 291-298
45. Savita, Rai U 1998 Sex steroids hormones modulate the activation of murine peritoneal macrophages: receptor mediated modulation. Comp. Biochem. Physiol. 119C: 199-204
46. Nirmal BK, Rai U 1997 Epididymal influence on the acquisition of sperm motility in the gekkonid lizard, *Hemidactylus flaviviridis*. Arch. Androl. 39: 105-110
47. Rai U, Kaur S 1996 Localization of phospholipid and phosphatases in the epididymal spermatozoa of Indian wall lizard, *Hemidactylus flaviviridis* (Rüppell). Mol. Androl. 8: 67-72
48. Rai U, Haider S 1995 Effect of cyproterone acetate on FSH and testosterone influenced spermatogenesis, Leydig cells and epididymis in the Indian wall lizard, *Hemidactylus flaviviridis* (Rüppell). Europ. J. Morphol. 33: 443-455
49. Rai U, Haider S 1992 Short term effects of antiandrogens on recrudescence and reproductively active testes of Indian wall lizard, *Hemidactylus flaviviridis* (Rüppell). Ind. J. Exp. Biol. 30: 865-870
50. Rai U, Haider S 1991 Testis and epididymis of the Indian wall lizard (*Hemidactylus flaviviridis*): Effects of flutamide on FSH and testosterone influenced spermatogenesis, Leydig cells and epididymis. J. Morphol. 209: 133-142
51. Rai U, Haider S 1991 Adrenal and testis relationship in the Indian wall lizard, *Hemidactylus flaviviridis* (Rüppell). Ind. J. Exp. Biol. 29: 315-318
52. Rai U, Haider S 1989 Effect of mammalian pituitary gonadotropins on the sexually quiescent ovary of Indian wall lizard, *Hemidactylus flaviviridis* (Rüppell). J. Zool. (London) 217 (A): 341-348
53. Haider S, Rai U 1987 The epididymis of the Indian wall lizard (*Hemidactylus flaviviridis*) during sexual cycle and in response to mammalian pituitary gonadotropins and testosterone. J. Morphol. 191: 151-160
54. Haider S, Rai U 1986 Effect of cyproterone acetate and flutamide on the testis and epididymis of Indian wall lizard, *Hemidactylus flaviviridis* (Rüppell). Gen. Comp. Endocrinol. 64: 321-329
55. Rai U, Haider S 1986 Effects of mammalian pituitary gonadotropins and testosterone on the testis of sexually quiescent

Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). J. Zool. (London) 210 (A): 251-259

56. Rai U, Haider S 1985 Some aspects of adrenal histology and histochemistry in the fresh water turtle, *Lissemys punctata granosa*. Zool. Jb. Anat. 113: 101-110
57. Rai U, Haider S 1985 Distribution of adrenaline and noradrenaline chromaffin cells in the adrenal gland of a fresh water turtle, *Lissemys punctata granosa*. Current Science 54: 47-49
58. Rai U, Haider S 1984 Histochemical, histoenzymological and experimental studies of adrenal gland of an Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). Zool. Jb. Anat. 112: 351-362
59. Haider S, Rai U 1984 Histoenzymology and cytophysiology of adrenal gland in a water snake, *Natrix piscator*. Zool. Jb. Anat. 111: 433-448
60. Singh NK, Singh RJ, Rai U 1984 Early versus delayed operation for acute cholecystitis. Journal of the Indian Medical Association, Volume 82, Issue 10, Pages 356-359

#### Publications in the Last one year

1. Gautam M, Bhattacharya I, Rai U, Majumdar S.S. 2018 Hormone induced differential transcriptome analysis of Sertoli cells during postnatal maturation of rat testes. PLoS One 13(1), e0191201.
2. Priyam M, Tripathy M, Rai U, Ghorai, S. M. 2018 Divergence of protein sensing (TLR 4, 5) and nucleic acid sensing (TLR 3, 7) within the reptilian lineage. Molecular phylogenetics and evolution 119, 210-224.
3. Pandey M, Ghorai S. M, Rai U 2018 Bisphenol A mediated effects on innate immunity in freshwater teleost spotted snakehead *Channa punctatus* murrel. Fisheries science 84(1), 25-31.
4. Tripathy M, Rai U 2017 Temporal expression and gonadotropic regulation of aromatase and estrogen receptors in the ovary of wall lizard, *Hemidactylus flaviviridis*: Correlation with plasma estradiol and ovarian follicular development. Steroids 128, 23-31
5. Tripathy M, Priyam M, Rai U 2017 Repertoire of bone morphogenetic proteins and growth/differentiation factors in ovary of the Indian wall lizard (*Hemidactylus flaviviridis*) with emphasis on differential expression and gonadotropic regulation of bmp15 and gdf9. General and Comparative Endocrinology 253 13-24
6. Roy A, Basak R, Rai U 2017 De novo sequencing and comparative analysis of testicular transcriptome from different reproductive phases in freshwater spotted snakehead *Channa punctatus*. PLoS One 12(3): e0173178
7. Singh V, Priyam M, Tripathy M, Rai U 2017 Purification and identification of 25-hydroxycholesterol in a reptile: Seasonal variation and hormonal regulation. General and Comparative Endocrinology 0016-6480

#### Conference Organization/ Presentations (in the last three years)

1. Kumari, B., Bakshi, A., Dotania, K. and Rai, U. (2017). International Symposium on Recent Advances in Comparative Endocrinology, Madras Christian College, Chennai, India pp. 8
2. Tripathy, M. and Rai, U. (2017). International Symposium on Recent Advances in Comparative Endocrinology, Madras Christian College, Chennai, India.
3. Bakshi, A and Rai, U. (2017). International Symposium on Recent Advances in Comparative

Endocrinology, Madras Christian College, Chennai, India.

4. Bakshi, A and Rai, U. (2017). International Conference on Reproductive Biology and Comparative Endocrinology and The 35th Annual Meeting of The Society for Reproductive Biology and Comparative Endocrinology, University of Hyderabad, India pp. 29
5. Sarkar, H., Rai, U. and Majumdar, SS. (2016). Gordon Research Conference on meiosis, New London, NH, USA pp.28
6. Sarkar, H., Rai, U. and Majumdar, SS. (2016). Gordon Research Conference on meiosis, New London, NH, USA pp.28
7. Basak, R., Roy, A. and Rai, U. (2016). 8th congress of AOSCE-From comparative to translational research, Korea University, College of Medicine, Seoul, Korea pp. 57
8. Priyam, M., Ghorai, SM. and Rai, U. (2015). International Symposium on Comparative Endocrinology and Integrative Physiology, University of Kerala, Karivattom, Thiruvananthapuram, India pp.22
9. Tripathy, M. and Rai, U. (2015). International Symposium on Comparative Endocrinology and Integrative Physiology, University of Kerala, Karivattom, Thiruvananthapuram, India pp.23
10. Basak, R., Roy, A. and Rai, U. (2015). National Symposium on Comparative Endocrinology and Reproductive Biology, Department of Zoology, Visva-Bharti, Santiniketan, India.
11. Tripathy, M. and Rai, U. (2015). National Symposium on Comparative Endocrinology and Reproductive Biology, Department of Zoology, Visva-Bharti, Santiniketan, India pp.11
12. Priyam, M., Ghorai, SM. and Rai, U. (2015). National Symposium on Comparative Endocrinology and Reproductive Biology, Department of Zoology, Visva-Bharti, Santiniketan, India pp.9
13. Bakshi, A., Maurya, SK., Basak, R., Roy, A., Pandey, M. and Rai, U. (2015). National Symposium on Comparative Endocrinology and Reproductive Biology, Department of Zoology, Visva-Bharti, Santiniketan, India pp.10
14. Priyam, M., Ghorai, SM. and Rai, U. (2015). Indian Subcontinent Region Decision Sciences Institute Meet, Murcia, Spain.

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

2017-2019: DBT research project, Understanding signaling mechanism of inflammation in teleost *Channa punctatus*

2017-2019: EMR-SERB, DST research project, Understanding the mechanism of onset of reproductive activity in seasonally breeding reptile *Hemidactylus flaviviridis* : an emphasis on the role of the kisspeptin system

2015-2016: Effect of *Aeromonas hydrophila* infection on *kiss* and *kiss receptor* expression in immune organs of *Channa punctatus*

2014-2015: De novo sequencing of ovarian transcriptome of wall lizard, *Hemidactylus flaviviridis*

2013-2014: University of Delhi, Expression and Signaling of Toll-like receptor 2 in splenocytes of wall lizard, *Hemidactylus flaviviridis*

2012-13: University of Delhi, Expression analysis of Follicle stimulating hormone receptor and Luteinizing

hormone receptor in the ovary of wall lizard, *Hemidactylus flaviviridis*

2011-2013: DU-DST PURSE, Detection, expression and hormonal regulation of testicular genes involved in activation and inactivation of spermatogenesis in freshwater fish *Channa punctatus*

2011-2012: University of Delhi, Pathogen induced Toll-like receptors and pro-inflammatory cytokines gene expression in spleen of fresh water teleost *Channa punctatus*

2007-2009: DST research project, A study of bi-directional communication between Leydig cells and immune cells in the testis of wall lizard, *Hemidactylus flaviviridis*

2003-2006: ICAR research project, Endocrine control of macrophage activities in live fish *Channa punctatus*

2003-2006: UGC major research project, Neuroendocrine control of phagocytic, cytotoxic and inflammatory activities of splenic macrophages in wall lizard *Hemidactylus flaviviridis* Ruppell

2000-2004: DST research project, Humoral and cellular control of testicular function in wall lizard, *Hemidactylus flaviviridis*

1994-1998: UGC major research project, Role of epididymis in relation to maturation of spermatozoa in Indian wall lizard *Hemidactylus flaviviridis* Ruppell

#### Awards and Distinctions

- Council member of the International Federation of Comparative Endocrine Societies (2006-2010)
- Council Member of the Asia and Oceania Society for Comparative Endocrinology (2009-till date)
- Fellow of The National Academy of Sciences, India (2008)
- Council member of the Indian Society for Comparative Endocrinology (2003-2006)

#### Association With Professional Bodies

- Indian Society for Comparative Endocrinology (ISCE)
- Asia and Oceania Society for Comparative Endocrinology (AOSCE)
- International Federation of Comparative Endocrine Society (IFCES)

#### Other Activities

Organised National symposium/ conferences/ workshops:

- National symposium on “Trends in research on hormones, reproduction and animal productivity” in 1998 sponsored by Ministry of Environment and Forests
- National symposium on “Comparative Endocrinology and Reproductive Physiology: Retrospect and prospect” in 2005 sponsored by Council of Scientific and Industrial Research (CSIR)
- Seminar-cum-workshop on “Comparative Endocrinology and Reproductive Physiology” in 2006
- Workshop on “Techniques for Endocrine Research” in 2012