Curriculum Vitae

PROF. UMESH RAI
Vice-Chancellor,
University of Jammu
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Former Head, Department of Zoology, University of Delhi
Former Director, South Campus, University of Delhi

EDUCATION

- **Banaras Hindu University**
  Doctor of Philosophy in Zoology (1986)

- **Gorakhpur University**
  Master of Science, Zoology (1980)

- **Banaras Hindu University**
  Bachelor of Science (1977)

PROFESSIONAL EXPERIENCE

- **Senior Professor**, Department of Zoology, University of Delhi (18th July 2018 – till date)

- **Professor**, Department of Zoology, University of Delhi (July 2006 – 17th July, 2018)

- **Reader**, Department of Zoology, University of Delhi (1998-2006)

- **Lecturer**, Department of Zoology, University of Delhi (1992-1998)

- **CSIR – Research Associate**, Department of Zoology, Banaras Hindu University (1988-1992)

HONOURS

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

ROLES REFLECTING LEADERSHIP CAPABILITY

- **Currently, Head of the Department of Zoology, University of Delhi** (January 2020- till date)
- **Director, South Campus, University of Delhi (Equivalent to Rector position of a University)** (December 2010 to May 2016)
- **Chairman, Unassigned Grant**, **University of Delhi** (December 2010 to May 2016)
- **Chairperson of UGC-nominated Expert Committee for recognition of Baba Mast Nath University**, Rohtak (2015)
- **Chairperson of Indian Council of Medical Research (ICMR)-nominated Project Review Group** of Reproductive Biology and Fertility Regulation (March, 2019- till date)
- **Member of Advisory Committee,** Division of Reproduction, Maternal and Child health to review extra-mural and intra-mural research programme (22nd November, 2018)
- **Member of Expert committee** to review concept proposals received in the area of Reproduction, Maternal and Child health (28th January, 2018)
- **Member of Advisory Committee for UGC-Human Resource Development Centre Osmania University,** Hyderabad (2016)
- **Member, Data Safety Management Board cum Experts committee meeting of RISUG clinical trials, Indian Council of Medical Research (ICMR),** Government of India (2018)

- **Member of Expert Committee for conferment of autonomous status to Government Dungar College,** Bikaner, Rajasthan (2015)

- **Non-official member of National Biodiversity Authority formulated by Ministry of Environment, Forest and Climate Change** (2016 - 2019)

- **Member of University Court, University of Delhi** (2007 to till date)

- **Member of Academic Council and Executive Council of University of Delhi** (2010 to 2016) > **Member of Faculty of Science, University of Delhi** (1995 to 1998 and 2001to 2004)

- **Member of Studies/ Research studies of Nagaland University**, Kohima, Nagaland (1997 to 2000)

- **Member of Studies/ Research studies of Pandit Ravishankar Shukla University**, Raipur, Chhattisgarh (2008 to 2009)

- **Member, Board of studies Department Research Council, Department of Zoology, University of Delhi** (December 2007- April 2008, May 2016- May 2018, August 2018 - Till date)

- **Resident Tutor, Jubilee Hall Hostel, University of Delhi** (1996 to 2000)

ADMINISTRATIVE ACHIEVEMENTS

- During my tenure as Director, South Campus, University of Delhi, I actively participated in bringing a paradigm shift in the educational programs of the University.

    - Successful implementation of **the semester system** (2011)

    - Formulation and implementation of **Four Year Undergraduate Programme with multiple exit options** (2013) where focus was given to enhance creativity, analytical ability, skills development and entrepreneurship so that students may be empowered with leadership qualities and self-reliance.

    - **Choice Based Credit System** (2015)

- Creation of **Cluster Innovation Centre** (2011) to serve as a hub of innovation activities facilitating and guiding the development of ideas into applications that can benefit the society at large.

- Foundation of **Electropreneur Park** (2015) at South Campus, University of Delhi in association with Software Technology Parks of India (STPI, Govt. of India) and Indian Electronics & Semiconductor Association to create an ecosystem for encouraging R&D, innovation and entrepreneurship in the sector of electronic system design & manufacturing

- Formulation and implementation of **MoU between University of Delhi and STPI, Govt. of India** (2013) to encourage interaction between academia and industry: incubation, training, ICT and IT-enabled services

- **MoU among University of Delhi, Delhi, University of Kashmir, Srinagar and Islamic University of Science and Technology, Awantipore** (2011) to encourage national integration through education.

- For the first time in India, **meta University** and **meta college** was implemented by the University of Delhi (2012) for dissolving boundaries in evolving education.

- Implementation of **Innovation Project Scheme** (2012-2016) to encourage undergraduate students and faculty in colleges towards innovation and transdisciplinary research.

- Organizing **Gyanodaya Express (College on Wheels)** to encourage education beyond classroom. Approximately one thousand students embarked on an educational journey (total 5 trips) across various parts of our country.

OTHER INITIATIVES

- Organization and execution of **Antardhwani**, a three-day annual event where we witnessed University of Delhi in its full grandeur and glory. It provided an interactive platform for the students and faculty of the University and its constituent colleges.

- Planning and execution of the **Sound and Light show** that was focused on rich heritage and contribution of Delhi University in National freedom movement.

ACADEMIC ACHIEVEMENTS

- **Mentored 18 Ph.D. and 6 M.Phil. students** who are faculty members or scientists in National and International Institutes

- **Several Extra Mural Research Projects** funded by agencies *viz*. DST, DBT, ICAR, ICMR and UGC.

Major Research Projects:

1. 2021-2024: ICMR research project, Unravelling possible role of asprosin in male reproduction: hormonal correlation with asprosin and its receptor in mice (Principal Investigator)

2. 2019-2022: ICMR research project, Comparative analysis of Leydig cell functions induced by electromagnetic sources (as Co-Principal Investigator)

3. 2018-2021: 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 (as Co-Principal Investigator)

4. 2017-2020: DBT research project, Understanding signaling mechanism of inflammation in teleost *Channa punctatus* (as Co-Principal Investigator)

5. 2011-2015: DBT major project, A comparative study of testicular genes expressed during summer (regression) and winter (active phase) in wall lizard to identify gene(s) associated with onset of spermatogenesis, and functional genomic studies using transgenic mouse model to find their importance in animal virility (as Principal Investigator)

6. 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* (as Principal Investigator)

7. 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* (as Principal Investigator)

8. 2003-2006: ICAR research project, Endocrine control of macrophage activities in live fish *Channa punctatus* (as Principal Investigator)

9. 2003-2006: UGC major research project, Neuroendocrine control of phagocytic, cytotoxic and inflammatory activities of splenic macrophages in wall lizard *Hemidactylus flaviviridis* Ruppell (as Principal Investigator)

10. 2000-2004: DST research project, Humoral and cellular control of testicular function in wall lizard, *Hemidactylus flaviviridis* (as Principal Investigator)

11. 1994-1998: UGC major research project, Role of epididymis in relation to maturation of spermatozoa in Indian wall lizard *Hemidactylus flaviviridis* Ruppell (as Principal Investigator

Minor Research Projects:

R&D Research Grant, University of Delhi, since 2007 every year

1. 2012-2013: University of Delhi, Expression analysis of Follicle stimulating hormon receptor and Luteinizing hormone receptor in the ovary of wall lizard, *Hemidactylus flaviviridis*

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

3. 2014-2015: University of Delhi, De novo sequencing of ovarian transcriptome of wall lizard, *Hemidactylus flaviviridis*

4. 2015-2016: University of Delhi, Effect of *Aeromonas hydrophila* infection on kiss and kiss receptor expression in immune organs of *Channa punctatus*

LIST OF RESEARCH PUBLICATIONS

- **73 research papers** published in Internationally-reputed peer reviewed journals, **4 book chapters** and **9 papers in proceedings**

FULL-LENGTH RESEARCH PAPERS:

1. Jangid P, Rai U, Sharma RS, Singh R. 2022 The role of non-ionizing electromagnetic radiation on female fertility: A review. **Int J Environ Health Res.** **h**ttps://doi.org/10.1080/09603123.2022.2030676

2. Basak R, Banerjee A, **Rai U** 2021 Demystifying Bisphenol A-Induced Alterations in Hypothalamic-Pituitary-Ovarian Functions Leading to Polycystic Ovarian Syndrome. **Proceedings of the Zoological Society 74, 466478.** Doi: https://doi.org/10.1007/s12595-021-00407-0

3. Singh V, Tripathy M, **Rai U** 2021 Testicular 25-hydroxycholesterol: An alternate substrate for steroidogenesis in reptiles. **General and Comparative Endocrinology 314, 113906.** Doi: https://doi.org/10.1016/j.ygcen.2021.113906

4. Dotania K, Tripathy M, **Rai U** 2021 A comparative account of nesfatin-1 in vertebrates. **General and Comparative Endocrinology 312, 113874.** Doi: https://doi.org/10.1016/j.ygcen.2021.113874

5. Bakshi A, Singh R, **Rai U** 2021 Trajectory of leptin and leptin receptor in vertebrates: Structure, function and their regulation. **Comparative Biochemistry and Physiology Part-B 257, 110652.** Doi: https://doi.org/10.1016/j.cbpb.2021.110652

6. Bakshi A, **Rai U** 2021 Seasonality, sex-specificity and transcriptional regulation of hepatic leptin system in spotted snakehead *Channa punctata*. **General and Comparative Endocrinology 310, 113821.** Doi: https://doi.org/10.1016/j.ygcen.2021.113821

7. Chuphal B, Rai U, Kumar R, Roy B 2021 Molecular and functional characterization of spotted snakehead NOD1 with an emphasis on structural insights into iE-DAP binding motifs employing advanced bioinformatic tools. **Journal of Biomolecular Structure and Dynamics, 1-13.** Doi: https://doi.org/10.1080/07391102.2021.1898472

8. Himanshi, Rai U, Singh R 2021 Radiofrequency radiation: a possible threat to male fertility. **Reproductive Toxicology 100, 90-100.** Doi: https://doi.org/10.1016/j.reprotox.2021.01.007T

9. Sarkar R K, Sharma S S, Mandal K, Wadhwa N, Kunj N, Gupta A, Pal R, **Rai U**, Majumdar S S 2020 Homeobox transcription factor *Meis1* is crucial to Sertoli cell mediated regulation of male fertility. **Andrology 9(2), 689-699.** Doi: https://doi.org/10.1111/andr.12941

10. Bakshi A, **Rai U** 2020 Reproductive phase-dependent variation, sexually dimorphic expression and sex steroids-mediated transcriptional regulation of *lep* and *lepr* in lymphoid organs of *Channa punctata*. **Scientific Reports 10, 1-11.** Doi: https://doi.org/10.1038/s41598-020-57922-x

11. Bakshi A, **Rai U** 2019 Tissue-specific sexual dimorphism in the expression of *kisspeptin* and its receptors in spotted snakehead *Channa punctatus*. **Current Science 116, 802-810**

12. Basak R, Roy A, **Rai U** 2018 In silico analysis, temporal expression and gonadotropic regulation of receptors for follicle stimulating hormone and luteinizing hormone in testis of spotted snakehead *Channa punctatus*. **Journal of Fish Biology 93, 53-71.** Doi: https://doi.org/10.1111/jfb.13727

13. Roy A, Basak R, **Rai U** 2018 In silico analysis, seasonal variation and gonadotropic regulation of *jag1* and its receptor *notch1* in testis of spotted snakehead *Channa punctatus*. **General and Comparative Endocrinology 266, 166-177.** Doi: https://doi.org/10.1016/j.ygcen.2018.05.014

14. Gautam M, Bhattacharya I, Rai U, Majumdar SS 2018 Hormone induced differential

transcriptome analysis of Sertoli cells during postnatal maturation of rat testes. **PLoS ONE 13 (1), e0191201.** Doi: https://doi.org/10.1371/journal.pone.0191201

15. Priyam M, Tripathy M, Rai U, Ghorai SM 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.** Doi: https://doi.org/10.1016/j.ympev.2017.11.018

16. Pandey M, Ghorai SM, **Rai U** 2018 Bisphenol A mediated effects on innate immunity in freshwater teleost spotted snakehead *Channa punctatus* murrel. **Fisheries Science 84, 25-31.** Doi: https://doi.org/10.1007/s12562-017-1148-3

17. 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.** Doi: https://doi.org/10.1016/j.steroids.2017.10.005

18. 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.** Doi: https://doi.org/10.1016/j.ygcen.2017.08.015

19. 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.** Doi: https://doi.org/10.1371/journal.pone.0173178

20. 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 247, 130-137.** Doi: https://doi.org/10.1016/j.ygcen.2017.01.024

21. Sarkar H, Arya S, **Rai U**, Majumdar SS 2016 A Study of Differential Expression of Testicular Genes in Various Reproductive Phases of *Hemidactylus flaviviridis* (Wall Lizard) to Derive Their Association with Onset of Spermatogenesis and Its Relevance to Mammals. **PLoS One 11(3), e0151150.** Doi: https://doi.org/10.1371/journal.pone.0151150

22. 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 172, 26-37.** Doi: https://doi.org/10.1016/j.vetimm.2016.03.002

23. Basak R, Roy A, **Rai U** 2016 Seasonality of reproduction in male spotted murrel *Channa punctatus*: correlation of environmental variables and plasma sex steroids with histological

changes in testis. **Fish Physiology and Biochemistry 42(5), 1249-58.** Doi; https://doi.org/10.1007/s10695-016-0214-6

24. Bharti S, Misro MM, Rai U 2014 Quercetin supplementation restores testicular function and augments germ cell survival in the estrogenized rats. **Molecular and Cellular Endocrinology 383(1-2), 10-20.** Doi: https://doi.org/10.1016/j.mce.2013.11.021

25. 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 *Hemidactylus flaviviridis*. **PLoS One 8, e58276.** Doi: https://doi.org/10.1371/journal.pone.0058276

26. 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.** Doi: https://doi.org/10.1016/j.fertnstert.2012.08.050

27. Dhall M, Chaturvedi MM, Rai U, Kapoor S 2012 Sex-dependent effects of the UCP1 -3826 A/G polymorphism on obesity and blood pressure. **Ethnicity & Disease 22, 181-4**

28. Soundararajan R, Prabha P, Rai U, Dixit A 2012 Antileukemic potential of *Momordica charantia* seed extracts on human myeloid leukemic HL60 cells. **Evidence-Based Complementary and Alternative Medicine Article ID 732404.** Doi: https://doi.org/10.1155/2012/732404

29. Kumar S, **Rai U** 2011 Dynorphin regulates the phagocytic activity of splenic phagocytes in wall lizards: involvement of a κ-opioid receptor- coupled adenylate-cyclase-cAMP-PKA pathway. **Journal of Experimental Biology 214, 4217-22.** Doi: https://doi.org/10.1242/jeb.062935

30. Kumar S, Mondal S, **Rai U** 2011 β-Endorphin inhibits phagocytic activity of lizard splenic phagocytes through μ receptor-coupled adenylate cyclase- protein kinase A signaling pathway. **General and Comparative Endocrinology 171, 301-308.** Doi: https://doi.org/10.1016/j.ygcen.2011.02.008

31. Kumar S, **Rai U** 2011 Immunomodulatory role of substance P in the wall lizard *Hemidactylus flaviviridis*: An in vitro study. **Neuropeptides 45, 323-328.** Doi: https://doi.org/10.1016/j.npep.2011.07.001

32. Kumar S, **Rai U** 2011 Neuropeptide Y, an orexigenic hormone, regulates phagocytic activity of lizard splenic phagocytes. **Peptides 32, 1324-1329.** Doi: https://doi.org/10.1016/j.peptides.2011.04.012

33. Bharti S, Misro MM, Mathur A, **Rai U** 2011 Role of estrogen in the regulation of

spermatogenesis in the Indian wall lizard *Hemidactylus flaviviridis*. **General and Comparative Endocrinology 172, 225-233.** Doi: https://doi.org/10.1016/j.ygcen.2011.03.007

34. Singh, R, **Rai U** 2011 Immunomodulatory role of urotensins in teleost *Channa punctatus*. **General and Comparative Endocrinology 170, 613-621.** Doi: https://doi.org/10.1016/j.ygcen.2010.11.021

35. Singh, R, **Rai U** 2010 Opioid and non-opioid receptor-mediated immunoregulatory role of Leucine-enkephalin in teleost *Channa punctatus*. **Fish & Shellfish Immunology 28, 872-878.** Doi: https://doi.org/10.1016/j.fsi.2010.02.007

36. Singh R, **Rai U** 2010 Kappa-opioid receptor-mediated modulation of innate immune response by dynorphin in teleost *Channa punctatus*. **Peptides 31, 973-978.** Doi: https://doi.org/10.1016/j.peptides.2010.01.009

37. Singh, R. **Rai U** 2009 Delta opioid receptor mediated immunoregulatory role of methionine-enkephalin in freshwater teleost *Channa punctatus* (Bloch). **Peptides 30, 1158-1164.** Doi: https://doi.org/10.1016/j.peptides.2009.02.016

38. 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.** Doi: https://doi.org/10.1016/j.steroids.2008.12.013

39. 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. **Journal of Endocrinology 199, 469-478.** Doi: http://dx.doi.org/10.1677/JOE-08-0270

40. Khan UW, **Rai U** 2008 Paracrine role of testicular macrophages in control of Leydig cell activities in the wall lizard, *Hemidactylus flaviviridis*. **General and Comparative Endocrinology 156, 44-50.** Doi: https://doi.org/10.1016/j.ygcen.2007.10.006

41. 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*. **General and Comparative Endocrinology 155, 298-306**. Doi: https://doi.org/10.1016/j.ygcen.2007.05.008

42. 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*. **Developmental & Comparative Immunology 32, 348-355.** Doi: https://doi.org/10.1016/j.dci.2007.07.001

43. 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. **Developmental & Comparative Immunology 32, 330-338.** Doi: https://doi.org/10.1016/j.dci.2007.06.005

44. 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. **Journal of Endocrinology 194, 441-448.** Doi: https://doi.org/10.1677/JOE-06-0225

45. Hareramadas B, **Rai U** 2006 Cellular mechanism of estrogen-induced thymic involution in wall lizard**:** caspase-dependent action. **Journal of Experimental Zoology 305A, 396-409.** Doi: https://doi.org/10.1002/jez.a.260

46. Hareramadas B, **Rai U** 2005 Mechanism of androgen-induced thymic atrophy in the wall lizard *Hemidactylus flaviviridis***:** an in vitro study. **General and Comparative Endocrinology 144, 10-19.** Doi: https://doi.org/10.1016/j.ygcen.2005.04.016

47. Khan UW, **Rai U** 2005 Endocrine and paracrine control of Leydig cell steroidogenesis and proliferation in the wall lizard**:** an in-vitro study. **General and Comparative Endocrinology 140, 109-115.** Doi: https://doi.org/10.1016/j.ygcen.2004.10.009

48. Khan UW, **Rai U** 2004 In-vitro effect of FSH and testosterone on Sertoli cell nursing function in wall lizard *Hemidactylus flaviviridis* (Rüppell). **General and Comparative Endocrinology 136, 225-231.** Doi: https://doi.org/10.1016/j.ygcen.2003.12.015

49. Roy B, **Rai U** 2004 Dual mode of catecholamine action on splenic macrophage phagocytosis in wall lizard, *Hemidactylus flaviviridis*. **General and Comparative Endocrinology 136, 180-191.** Doi: https://doi.org/10.1016/j.ygcen.2003.12.023

50. Khan UW, **Rai U** 2004 Inter-relationship among testicular cells in wall lizard *Hemidactylus flaviviridis* (Rüppell)**:** an ultrastructural seasonal and experimental study. **Indian Journal of Experimental Biology 42, 378-388.**

51. Hareramadas B, Rembhotka, GW, **Rai U** 2004 Glucocorticoid-induced thymocyte apoptosis in wall lizard *Hemidactylus flaviviridis*. **General and Comparative Endocrinology 135, 293-299.** Doi: https://doi.org/10.1016/j.ygcen.2003.10.015

52. **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*. **Indian Journal of Experimental Biology 41, 1431-1435**

53. 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*. **Comparative Biochemistry and Physiology 132C, 461-470.** Doi: https://doi.org/10.1016/S1532-0456(02)00114-X

54. Mondal S, **Rai, U** 2002 *In vitro* effect of sex steroids on cytotoxic activity of splenic macrophages in wall lizards (*Hemidactylus flaviviridis*). **General and Comparative Endocrinology 125, 264-271.** Doi: https://doi.org/10.1006/gcen.2001.7744

55. Hareramadas B, **Rai U** 2001 Thymic structural changes in relation to seasonal cycle and testosterone administration. **Indian Journal of Experimental Biology 39, 629-635**

56. Mondal S, **Rai U** 2001 *In vitro* effect of temperature on phagocytic and cytotoxic activities of lizard's splenic macrophages. **Comparative Biochemistry and Physiology 129A, 391-398.** Doi: https://doi.org/10.1016/S1095-6433(00)00356-1

57. Nirmal BK, **Rai U** 2000 Epididymal protein secretion and its androgenic control in wall lizards *Hemidactylus flaviviridis* (Ruppell). **Indian Journal of Experimental Biology 38, 720-726**

58. Mondal S, **Rai U** 1999 Sexual dimorphism in phagocytic activity of wall lizard's splenic macrophages and its control by sex steroids. **General and Comparative Endocrinology 116, 291-298.** Doi: https://doi.org/10.1006/gcen.1999.7370

59. Savita, **Rai U** 1998 Sex steroids hormones modulate the activation of murine peritoneal macrophages**:** receptor mediated modulation. **Comparative Biochemistry and Physiology 119C, 199-204.** Doi: https://doi.org/10.1016/S0742-8413(97)00207-7

60. Nirmal BK, **Rai U** 1997 Epididymal influence on the acquisition of sperm motility in the gekkonid lizard, *Hemidactylus flaviviridis*. **Archives of Andrology 39, 105-110.** Doi: https://doi.org/10.3109/01485019708987908

61. **Rai U,** Kaur S 1996 Localization of phospholipid and phosphatases in the epididymal spermatozoa of Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). **Molecular Andrology 8, 67-72**

62. **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* (Ruppell). **European Journal of Morphology 33, 443-455**

63. **Rai U,** Haider S 1992 Short term effects of antiandrogens on recrudescent and reproductively active testes of Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). **Indian Journal of**

Experimental Biology 30, 865-870

64. **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. **Journal of Morphology 209, 133-142. .** Doi: https://doi.org/10.1002/jmor.1052090202

65. **Rai U,** Haider S 1991 Adrenal and testis relationship in the Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). **Indian Journal of Experimental Biology 29, 315-318**

66. **Rai U,** Haider S 1989 Effect of mammalian pituitary gonadotropins on the sexually quiescent ovary of Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). **Journal of Zoology (London) 217 (A), 341-348.** Doi: https://doi.org/10.1111/j.1469-7998.1989.tb02492.x

67. 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. **Journal of Morphology 191, 151-160.** Doi: https://doi.org/10.1002/jmor.1051910206

68. Haider S, **Rai U** 1986 Effect of cyproterone acetate and flutamide on the testis and epididymis of Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). **General and Comparative Endocrinology 64, 321-329.** Doi: https://doi.org/10.1016/0016-6480(86)90065-1

69. **Rai U,** Haider S 1986 Effects of mammalian pituitary gonadotropins and testosterone on the testis of sexually quiescent Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). **Journal of Zoology (London) 210 (A), 251-259.** Doi: https://doi.org/10.1111/j.1469-7998.1986.tb03633.x

70. **Rai U,** Haider S 1985 Some aspects of adrenal histology and histochemistry in the fresh water turtle, *Lissemys punctata granosa*. **Zoologische Jahrbücher. Abteilung für Anatomie und Ontogenie der Tiere (Zool. Jb. Anat.) 113, 101-110**

71. **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**

72. **Rai U,** Haider S 1984 Histochemical, histoenzymological and experimental studies of adrenal gland of an Indian wall lizard, *Hemidactylus flaviviridis* (Ruppell). **Zoologische Jahrbücher. Abteilung für Anatomie und Ontogenie der Tiere (Zool. Jb. Anat.) 112, 351-362**

73. Haider S, **Rai U** 1984 Histoenzymology and cytophysiology of adrenal gland in a water snake, *Natrix piscator*. **Zoologische Jahrbücher. Abteilung für Anatomie und Ontogenie der Tiere (Zool. Jb. Anat.) 111, 433-448**

CHAPTERS IN BOOKS

A. Published by NISCAIR, CSIR for e-Book on Reproductive Biology

1. Rai, U. and Roy, B. (2007). "Sex determination and differentiation in vertebrates".
2. Rai, U. and Kumar, S. (2007). "Pregnancy".

B. Narosa publication

1. Rai, U. and Khan, U.W. (2010). Endocrine and paracrine control of testicular functions in reptiles. In "Gonadal and non-gonadal actions of gonadotropins, eds. Kumar, A., Rao, C.V., Chaturvedi, P.K. Narosa Publishing House, New Delhi, India, chapter 13, p.146-156.

C. Academic Press

1. Rai, U., Kumar, S. and Roy, B. (2010). Hormonal control of testicular functions in reptiles. In "Hormones and Reproduction in Vertebrates, Vol 3, eds., Norris, D.O. and Lopez, K.H., Academic Press (In Press).

PROCEEDINGS IN INTERNATIONAL SYMPOSIUM/ CONGRESS

1. Nirmal, B. K. and Rai, U. (1999). Studies on the biochemical components of lizard's epididymis: influence of energy substrates on the motility of spermatozoa. 3rd Int. Symp. of Asia and Oceania society for Comp. Endocrinol., Republic of Korea, pp.177-183.
2. Mondal, S. and Rai, U. (1999). Dose-dependent effects of sex steroids on lizard's splenic macrophage phagocytic activity. 3rd Int. Symp. of Asia and Oceania society for Comp. Endocrinol., Republic of Korea pp.482-488.
3. Rai, U. and Mondal, S. (2000). Sexual dimorphism in functional activity of lizard's splenic macrophages. 4th Congress of the Asia and Oceania Society for Comparative Endocrinology (AOSCE), Taiwan, pp.360-369.
4. Khan, U.W. and Rai, U. (2004). Effect of FSH and testosterone on lactate production by Sertoli cells of wall lizard *Hemidactylus flaviviridis*. 5th Congress of AOSCE, Nara, Japan, 200-202.14
5. Hareramadas, B. and Rai, U. (2004). In vitro effect of corticosterone on lizard thymocytes. 5th Congress of AOSCE, Nara, Japan, 230-232.
6. Roy, B. and Rai, U. (2004). Dose-related genomic and non-genomic action of catecholamines on splenic macrophage phagocytosis in wall lizard. 5th Congress of AOSCE, Nara, Japan, 233-235.

7. R. Singh and Rai, U. (2006). In vitro effect of β-endorphin on splenic phagocyte activities in male *Channa punctatus*. 5th Inter Congress Symposium of AOSCE, Bangkok, Thailand, 125-128.
8. Hareramadas, B. and Rai, U. (2006). Estrogen-induced thymic atrophy in the wall lizard, *Hemidactylus flaviviridis*. 5th Inter Congress Symposiumf AOSCE, Bangkok, Thailand, 267-275.
9. Rai, U. and Khan, U.W. (2008). Endocrine and paracrine control of Leydig cell activities in reptiles. International Conference on "Molecular and Clinical aspects of gonadal and non-gonadal actions of gonadotropins"AIIMS, New Delhi, India.

NATIONAL/INTERNATIONAL CONFERENCES / SYMPOSIA/ COLLOQUIUM / WORKSHOPS

A. Organized:

1. National symposium on "Trends in research on hormones, reproduction and animal productivity" in 1998 sponsored by Ministry of Environment and Forests
2. National symposium on "Comparative Endocrinology and Reproductive Physiology: Retrospect and prospect" in 2005 sponsored by Council of Scientific and Industrial Research (CSIR)
3. Seminar-cum-workshop on "Comparative Endocrinology and Reproductive Physiology" in 2006
4. Workshop on "Techniques for Endocrine Research" in 2012
5. International Colloquium on "Regulatory Mechanism underlying Behavior, Physiology and Development" in 2021 sponsored by University Grants Commission – Special Assistance Programme – Centre of Advanced Study (UGC-SAP-CAS

B. Chair-person in national / international conferences:

1. International Conference entitled Humboldt Kolleg on Comparative Endocrinology and Physiology (ICCEP), RTM Nagpur University, Nagpur, India (2019)
2. International Symposium on Recent Advances in Comparative Endocrinology, Madras Christian College, Chennai, India (2017)
3. International Conference on Role of microbe-plant-animal interaction in human health, INSCR ICC, University of Delhi, Delhi, India (2017)
4. International Conference on Reproductive Health with Emphasis on Strategies for Infertility, Assisted Reproduction and Family Planning organized by ICMR, New Delhi (2017)
5. National Symposium on Comparative Endocrinology and Reproductive Biology organized by VisvaBharati, Santiniketan (2015)
6. National Symposium on Comparative Endocrinology and Reproductive Physiology, organized by the Institute of Science, Mumbai (2009)
7. International Congress on Bioimmunoregulatory Mechanisms Associated with Reproductive Organs: Relevance in Fertility and in Sexually Transmitted Infections (2009), organized by NII, New Delhi
8. International Conference organized in AIIMS, New Delhi (2008)

9. National Symposium organized in the Dept. of Zoology, B.H.U. (2007)
10. Int. Symp. held in Dept. of Animal Sciences, University of Hyderabad (2005)
11. 15th International Congress of Comparative Endocrinology held in Boston (2005)
12. XXI SRBCE meeting held in Dept. of Zoology, B.H.U (2003)
13. 4th International Congress of the AOSCE, Taipei, Taiwan (2000)
14. Satellite Symp. of the XIII ICCE, Dept. of Zoology, Nagpur University (1997)

C. Invited Lectures:

1. International Conference on Comparative Endocrinology and Physiology (ICCEP), RTM Nagpur University, Nagpur (2019)
2. International Conference organized by Department of Animal Sciences, School of Life Sciences, University of Hyderabad, Hyderabad (2009)
3. XX National Symposium on Chronobiology, Pt. Ravishankar Shukla University, Raipur (2008)
4. International Conference organized in AIIMS, New Delhi (2008)
5. 6th International Congress of the AOSCE, North Bengal University (2007).
6. National Symposium organized in the Dept. of Zoology, B.H.U. (2007).
7. National workshop organized by dept. Zoology, AMU, Aligarh (2005)
8. Lecture-workshop organized under the auspices of Indian Academy of Sciences (2005)
9. National Colloquium in Dept. of Zoology, BHU, Varanasi (2002)
10. Fourth International Congress of the AOSCE, Taipei, Taiwan (2000)
11. National Symposium in the Dept. Zoology, Utkal University (1998)

D. Papers Presented or Accepted for Presentation in National/International Conferences / Symposia/ Colloquium

1. Haider, S. and Rai, U. (1983). XII European Comparative Endocrinology Conference, Sheffield.
2. Rai, U. and Haider, S. (1983). Proc. 70th Indian Science Congress.
3. Rai, U. and Haider, S. (1984). Proc. 71st Indian Science Congress.
4. Rai, U. and Haider, S. (1984). Proc. 71st Indian Science Congress.
5. Rai, U. and Haider, S. (1984). Symposium on Comparative Endocrinology, B.H.U.
6. Rai, U. and Haider, S. (1985). 72nd Indian Science Congress.
7. Rai, U. and Haider, S. (1986). 73rd Indian Science Congress.
8. Rai, U. and Haider, S. (1988). All India Symp. On Comparative Endocrinology, Nagpur University
9. Rai, U. and Haider, S. (1988). Symposium on Recent trends in comparative endocrinology, B.H.U.
10. Rai, U. and Haider, S. (1989). Symposium on Recent Advances in Endocrinology.
11. Savita and Rai, U. (1996). Symp. on Emerging Frontiers in Hormone Research, B.H.U.
12. Nirmal, B. K. and Rai, U. (1996). Symp. on Emerging Frontiers in Hormone Research, B.H.U.

13. Mondal, S. and Rai, U. (1997). Satellite symposium of the XIII International Congress of Comparative Endocrinology, Nagpur University.
14. Rai, U. (1998). National Symposium on Advances in Endocrine Research and its Relevance to Biotechnology, Utkal University.
15. Nirmal, B. K. and Rai, U. (1998). National Symposium on Trends in Research on Hormones, Reproduction and Animal Productivity, University of Delhi.
16. Mondal, S. and Rai, U. (1998). National Symposium on Trends in Research on Hormones, Reproduction and Animal Productivity, University of Delhi.
17. Nirmal, B. K. and Rai, U. (1998). International Symposium of Asia and Oceania Society for Comparative Endocrinology, South Korea.
18. Mondal, S. and Rai, U. (1998). International Symposium of Asia and Oceania Society for Comparative Endocrinology, South Korea.
19. Hareramadas, B. and Rai, U. (1999). 18th National Symposium on Reprod. Biol. And Comp. Endocrinol, Madras Christian College, Chennai.
20. Rai, U. and Mondal, S. (1999). 18th National Symposium on Reprod. Biol. And Comp. Endocrinol, Dept. of Zoology, Madras Christian College, Chennai.
21. Mondal, S. and Rai, U. (1999). 18th National Symposium on Reprod. Biol. And Comp. Endocrinol, Madras Christian College, Chennai.
22. Rai, U. and Mondal, S. (2000). 4th Congress of the Asia and Oceania Society for Comparative Endocrinology, Taipei, Taiwan, pp 23
23. Mondal, S. and Rai, U. (2000). Effect of growth hormone and prolactin on phagocytic activity of wall lizard's splenic macrophages. 4th Congress of the Asia and Oceania Society for Comparative Endocrinology, Taipei, Taiwan, pp 36
24. Nirmal, B. K. and Rai, U. (2000). 4th Congress of the Asia and Oceania Society for Comparative Endocrinology, Taipei, Taiwan, pp 41
25. Hareramadas, B. and Rai, U. (2000). 4th Congress of the Asia and Oceania Society for Comparative Endocrinology, Taipei, Taiwan, pp 82
26. Mondal, S. and Rai, U , (2000). 69th Annual meeting of the society of Biological Chemists, Calcutta.
27. Rai, U. and Mondal, S. (2002). XX National Symposium on Reproductive physiology and Comparative Endocrinology, Bharathidasan University, Tiruchirappalli.
28. Khan, U. W. and Rai, U. (2002). XX National Symposium on Reproductive physiology and Comparative Endocrinology, Bharathidasan University, Tiruchirappalli.
29. Hareramadas, B. and Rai, U. (2002). XX National Symposium on Reproductive Physiology and Comparative Endocrinology, Bharathidasan University, Tiruchirappalli.
30. Rai, U. (2002). National Colloquium on Catfish Physiology, B.H.U., Varanasi.
31. Khan, U. W. and Rai, U. (2002). National Colloquium on Catfish Physiology, B.H.U.
32. Hareramadas, B. and Rai, U. (2002). National Colloquium on Catfish Physiology, Banaras Hindu University, Varanasi.
33. Roy, B. and Rai, U. (2002). National Colloquium on Catfish Physiology, B.H.U.
34. Roy, B., Mondal, S. and Rai, U. (2003). XXI SRBCE, Dept. Zoology, B.H.U., Varanasi.

35. Khan, U. W. and Rai, U. (2003). National symp. on current trends in comp. Endocrinology: Impact of Molecular Biology and Biotechnology, Nagpur University.
36. Roy, B. and Rai, U. (2003). National symposium on current trends in Comp. Endocrinology: Impact of Molecular Biology and Biotechnology, Nagpur University.
37. Hareramadas, B. and Rai, U. (2005). National Symposium on Comp. Endocrinol. and Reproductive Physiology: Retrospect and Prospect, University of Delhi, pp 50
38. Roy, B. and Rai, U. (2005). 15th International Congress of Comp. Endocrinology, Boston.
39. Khan, U. W. and Rai, U. (2005). 15th Int. Congress of Comp. Endocrinology, Boston.
40. Rai, U. and Hareramadas, B. (2005). 15th Congress of Comp. Endocrinology, Boston.
41. Singh, R. and Rai, U. (2005). 15th Int. Congress of Comp. Endocrinology, Boston.
42. R. Singh and Rai, U. (2006). 5th Int. congress of AOSCE, Bangkok.
43. Rai, U. (2007). National Symposium on an update of Reproductive Endocrinology: Novel and Applied Strategies, B.H.U., pp 15
44. Roy, B. and Rai, U. (2007). National Symposium on an update of Reproductive Endocrinology: Novel and Applied Strategies, B.H.U., pp 27
45. Khan, U. W. and Rai, U. (2007). National Symposium on an update ofReproductive Endocrinology: Novel and Applied Strategies, B.H.U., pp 35
46. Singh, R. and Rai, U. (2007). National Symposium on an update of Reproductive Endocrinology: Novel and Applied Strategies, B.H.U., pp 45
47. Kumar, S. and Rai, U. (2007). National Symposium on an update of Reproductive Endocrinology: Novel and Applied Strategies, B.H.U., pp 53
48. Singh, R. and Rai, U. (2008) International Structural Neuroscience Conference on Peptide. Nagpur University, Nagpur, pp 43
49. Rai, U. and Khan, U.W. (2008). International Conference on Molecular and Clinical Aspects of Gonadal and Non-gonadal Actions of Gonadotropins. AIIMS, New Delhi.
50. Singh, R. and Rai, U. (2008). International Conference on Fish Diseases and Fish Immunology, Iceland, pp. 30.
51. Rai, U. and Roy, B. (2008). XX National Symposium on Chronobiology, School of Life Sciences, Pt. Ravishankar Shukla University, Raipur, pp. 9.
52. Rai, U. (2009). International Conference on Novel Updates in Reproductive Biology and Comparative Endocrinology and The 27th annual Meeting of the Society for Reproductive Biology and Comparative Endocrinology (SRBCE-XXVII), pp. 19.
53. Rai, U. and Roy, B. (2009). Symposium on Functional Biodiversity and Ecophysiology of Animals, Dept. Zoology, BHU, Varanasi; pp. 87.
54. Pandey, M. and Rai, U. (2013). International Conference on Comparative Endocrinology and Physiology, RTM Nagpur University, Nagpur.
55. Priyam, M., Ghorai, SM. and Rai, U. (2015). Indian Subcontinent Region Decision Sciences Institute Meet, Murcia, Spain.
56. Basak, R., Roy, A. and Rai, U. (2015). National Symposium on Comparative Endocrinology and Reproductive Biology, Department of Zoology, Visva Bharti, Santiniketan, India, pp 41

57. Tripathy, M. and Rai, U. (2015). National Symposium on Comparative Endocrinology and Reproductive Biology, Department of Zoology, VisvaBharti, Santiniketan, India, pp.56
58. Priyam, M., Ghorai, SM. and Rai, U. (2015). National Symposium on Comparative Endocrinology and Reproductive Biology, Department of Zoology, Visva-Bharti, Santiniketan, India, pp.54
59. 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.55
60. Priyam, M., Ghorai, SM. and Rai, U. (2015). International Symposium on Comparative Endocrinology and Integrative Physiology, University of Kerala, Karivattom, Thiruvananthpuram, India, pp.22
61. Tripathy, M. and Rai, U. (2015). International Symposium on Comparative Endocrinology and Integrative Physiology, University of Kerala, Karivattom, Thiruvananthpuram, India , pp.23
62. 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
63. Sarkar, H., Rai, U. and Majumdar, SS. (2016). Gordon Research Conference on meiosis, New London, NH, USA, pp.28
64. 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
65. Kumari, B, Bakshi, A, Dotania K. and Rai, U. (2017). International Symposium on Recent Advances in Comparative Endocrinology, Madras Christian College, Chennai, India, pp. 70
66. Tripathy, M. and Rai, U. (2017). International Symposium on RecentAdvances in Comparative Endocrinology, Madras Christian College, Chennai, India, pp 43
67. Bakshi, A and Rai, U. (2017). International Symposium on Recent Advances in Comparative Endocrinology, Madras Christian College, Chennai, India, pp 34
68. Chuphal, B, Roy, B and Rai, U (2019). International Conference on Comparative Endocrinology and Physiology (ICCEP), RTM Nagpur University, Nagpur, India, pp 107
69. Dotania, K, Tripathy, M and Rai, U (2019). International Conference on Comparative Endocrinology and Physiology (ICCEP), RTM Nagpur University, Nagpur, India pp 108
70. Basak, R. and Rai, U (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 91
71. Tripathy, M., and Rai, U. (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 60
72. Bakshi, A and Rai, U (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 27
73. Chuphal, B., Roy, B., and Rai, U (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 37
74. Dotania, K., Tripathy, M., and Rai, U (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 52

75. Chauhan, V., Kumar, S., and Rai, U. (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 111
76. Priyanka, Roy, B., and Rai, U. (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 86
77. Banerjee, A., Tripathy, M., and Rai, U (2021) International Colloquium on Regulatory Mechanisms and Development, Department of Zoology, University of Delhi, pp 29