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EDUCATION

- 2016 ICAR-Indian Veterinary Research Institute
PhD in Veterinary Physiology
(*Minor subjects: Animal Nutrition, Veterinary Gynaecology & Obstetrics*)
- 2004 West Bengal University of Animal and Fishery Sciences
Master of Veterinary Science (M.V.Sc.) in Veterinary Physiology
(*Minor subject: Veterinary Biochemistry*)
- 2002 West Bengal University of Animal and Fishery Sciences
Bachelor of Veterinary Sciences & Animal Husbandry (B.V.Sc. & A.H.)
(*Subjects recommended by Indian Council of Agricultural Research for bachelor degree in Veterinary Sciences & Animal Husbandry*)

ACADEMIC DISTINCTION

- 2024-2025 Visiting Scientist at The Department of Biomedical Engineering, Texas A&M University, USA, as an *International Fellow of Indian Council of Medical Research*, Govt. of India.
- 2019 First prize in *Innovative Idea Competition* organized by Department of Scientific and Industrial Research, Govt. of India.
- 2017 *International Travel Support Grant* from the Department of Science and Technology, Govt. of India to deliver a lecture at the Anniversary Commemorative Event of Nichi-In Centre for Regenerative Medicine, held at National Center for Global Health and Medicine, Tokyo, Japan.
- 2005 *Young Scientist Award* of the Society of Animal Physiologist of India for Master's dissertation.
- 2002 – 2004 *University Merit Scholarship* during master's study at West Bengal University of Animal and Fishery Sciences.
- 1997 – 2002 *National scholarship* during bachelor's study at West Bengal University of Animal and Fishery Sciences.

PROFESSIONAL EXPERIENCES

Research Experience:

2026 – ongoing	<i>Overseas Collaborator</i> of the Department of Biomedical Engineering, Texas A&M University, USA, under the research project on ‘Nanomaterial-based therapeutic delivery’ with Material Transfer Agreement.
2026 – ongoing	<i>Co-Principal Investigator</i> of multi-institutional research project on the ‘Identification of potential novel antimicrobial peptides from adult mesenchymal stem cells in caprine and exploring their antibacterial effect on multidrug-resistant microbes’ funded by the ICAR-Indian Veterinary Research Institute, Izatnagar, India.
2025 – ongoing	<i>Overseas Collaborator</i> of the Department of Biomedical Engineering, Texas A&M University, USA, under the research project on ‘Designing of superhydrophobic nanoengineered Hemostatic Gauze for rapid blood clotting’ with Material Transfer Agreement.
2024 – 2025	<i>Collaborator</i> of research project on ‘Nascent protein-coated biomaterials elicit optimal bone regeneration’ at the Department of Biomedical Engineering, Texas A&M University, USA, as Visiting Scientist.
2021 – 2024	<i>Co-Principal Investigator</i> of multi-institutional research project on the ‘Expression analysis of antimicrobial peptides in canine mesenchymal stem cells (MSC)’ funded by the ICAR-Indian Veterinary Research Institute, Izatnagar, India.
2019 – 2023	<i>Principal Investigator</i> of Research & Development project on the ‘Generation of induced Pluripotent Stem Cells (iPSCs) from cattle fetal fibroblasts for prospective therapeutic applications’ funded by the Department of Science & Technology and Biotechnology, Govt. of West Bengal, India.
2016 – 2017	<i>Co-Principal Investigator</i> of research project on the ‘Study of physio-biochemical profile and the effect on heat synchronization of indigenous cow reared traditionally in West Bengal’ funded by the Animal Resources Development Department, Govt. of West Bengal, India.
2008 – 2013	<i>Co-Principal Investigator</i> of research project on the ‘Development of a model for sustainable backyard poultry farming in West Bengal’ funded by the Ministry of Agriculture, Govt. of India.

Teaching Experience:

- 2007 – Till date Teaching courses of Veterinary Council of India for the Bachelor's degree curriculum in Veterinary Sciences and Animal Husbandry.
- 2007 – Till date Teaching courses of Indian Council of Agricultural Research for the Master's and PhD degree curriculum in Veterinary Physiology.

Student Guidance:

1. *Member of student's research advisory committee* for the PhD dissertation on 'Study of expression profile of antimicrobial peptides of canine adipose tissue-derived mesenchymal stem cells'. (Swaraj Biswas, 2023-2026).
2. *Supervisor of student's research advisory committee* for the PhD dissertation on 'Elucidation of genomic organization and editing of Gonadotropin-inhibitory hormone (GnIH) gene using CRISPR-Cas9 nuclease in Zebrafish animal model'. (Nirupama Dalai, 2022- 2025).
3. *Supervisor of student's research advisory committee* for the PhD dissertation on 'Identification of antimicrobial peptides synthesized by canine bone marrow derived mesenchymal stem cells'. (Camelia Manna, 2019- 2023).
4. *Member of student's research advisory committee* for the master's dissertation on 'Application and evaluation of mesenchymal stem cells on wound healing in rat'. (Kumara Dattha Mahesh A, 2021-2023).
5. *Supervisor of student's research advisory committee* for the master's dissertation on 'Isolation and characterization of canine umbilical cord tissue derived mesenchymal stem cells'. (Mophe B. Phom, 2019-2022).
6. *Member of student's research advisory committee* for the master's dissertation on 'Alterations in the physio-biochemical, endocrine and in vitro activity of immune effector cells in Ghungroo sow during the lactation cycle'. (Bidisha Kalita, 2019-2022).
7. *Member of student's research advisory committee* for the PhD dissertation on 'Expression profile of RFamide-related peptide-3 (RFRP-3) during different stages of reproductive cycles in rat'. (Smruti Smita Mohapatra, 2017-2021).
8. *Supervisor of student's research advisory committee* for the master's dissertation on 'Isolation and characterization of bovine mesenchymal stem cells'. (Parishma Debbarma, 2017-2019).

9. *Member of student's research advisory committee* for the PhD dissertation on 'Adaptive changes of physio biochemical, endocrine and electrolytic profile of black Bengal goats (*Capra hircus*) in coastal areas of Sundarban'. (Tripti Sharma Buragohain, 2015-2018).
10. *Member of student's research advisory committee* for the PhD dissertation on 'Physical and morphological changes in spermatozoa of Black Bengal buck during cryopreservation'. (Bhaskar Samanta, 2009-2012).
11. *Member of student's research advisory committee* for the master's dissertation on 'Studies on growth of RIR birds reared in backyard with special reference to some physio-biochemical profiles and micronutrients at different agroclimatic zones of West Bengal'. (Suraj Jyoti Gogoi, 2010-2012).
12. *Supervisor of student's research advisory committee* for the master's dissertation on 'Role of micro elements in different developmental stages of ovarian follicle in Black Bengal goat (*Capra hircus*)'. (Nirupama Dalai, 2009-2011).
13. *Member of student's research advisory committee* for the master's dissertation on 'Studies on certain micro-nutrient and biochemical profile in relation to thyroid hormone during estrous in heat-induced indigenous repeat breeding cattle'. (Gauri Sankar Chutia, 2006-2008).
14. *Member of student's research advisory committee* for the master's dissertation on 'Studies on status of progesterone and luteinizing hormone in heat-induced repeat breeding indigenous cattle and its influence on some haemato-biochemical profile'. (Satish Kumar, 2006-2008).

PUBLICATIONS

Research articles (Selected):

1. Mahesh A, K. D., Namasudra, M., Manna, C., Pradhan, S., Hansda, R. N., Bag, S., Mondal, S., Das, K. (2026). Bovine umbilical cord tissue-derived MSCs and its conditioned medium promote the healing of excisional wound in rats. *Regenerative Medicine*, 21(6–7), 393–404. <https://doi.org/10.1080/17460751.2026.2719471>.
2. Manna, C., Das, K., Biswas, S., Mukherjee, J., Banerjee, D., Bandyopadhyay, S., Naskar, S., Dandapat, P., Dutt, T., & Bag, S. (2026). De novo transcriptome analysis of primed canine umbilical cord derived mesenchymal stem cells uncovers a collection of antimicrobial peptides. *International Journal of Peptide Research and Therapeutics*, 32(2). <https://doi.org/10.1007/s10989-026-10811-9>.

3. Manna, C., Das, K., Banerjee, D., Mukherjee, J., Jas, R., Bag, S., & Dutt, T. (2025). Abundance of antimicrobial peptides in mesenchymal stem cells and tissues: variations among species. *International Journal of Peptide Research and Therapeutics*, 31(4). <https://doi.org/10.1007/s10989-025-10731-0>.
4. Manna, C., Das, K., Mandal, D., Banerjee, D., Mukherjee, J., Ganguly, I., Naskar, S., & Bag, S. (2023). Canine umbilical cord tissue derived mesenchymal stem cells naturally express mRNAs of some antimicrobial peptides. *Veterinary Research Communications*, 47(4), 2229–2233. <https://doi.org/10.1007/s11259-023-10098-x>.
5. Kumar, K., Das, K., Kumar, A., Singh, P., P, M. A., Dutt, T., & Bag, S. (2023). Supplementation of retinoic acid alone in MSC culture medium induced germ cell-like cell differentiation. *Journal of Animal Reproduction and Biotechnology*, 38(2), 54–61. <https://doi.org/10.12750/jarb.38.2.54>.
6. Mondal, T., Konda, P., Das, K., Kumar, K., & Bag, S. (2022). Evaluation of cytocompatibility as assessed by genomic stability of canine induced pluripotent stem cells propagated on carbon nanotube substrates. *Indian Journal of Animal Research*, 56, 649-654. <https://doi.org/10.18805/ijar.b-4853>.
7. Mondal, T., Das, K., Singh, P., Natarajan, M., Manna, B., Ghosh, A., Singh, P., Saha, S. K., Dhama, K., Dutt, T., & Bag, S. (2021). Thin films of functionalized carbon nanotubes support long-term maintenance and cardio-neuronal differentiation of canine induced pluripotent stem cells. *Nanomedicine Nanotechnology Biology and Medicine*, 40, 102487. <https://doi.org/10.1016/j.nano.2021.102487>.
8. Natarajan, M., Singh, P., Mondal, T., Kumar, K., Das, K., Dutt, T., & Bag, S. (2021). In vitro propagation and cardiac differentiation of canine induced pluripotent stem cells on carbon nanotube substrates. *Tissue and Cell*, 71, 101571. <https://doi.org/10.1016/j.tice.2021.101571>.
9. Mili, B., Das, K., P, M. A., Kumar, K., Saxena, A. C., & Bag, S. (2021). Transdifferentiation of canine mesenchymal stem cells into neuron-like cells by induction with β -mercaptoethanol. *The Indian Journal of Animal Sciences*, 91(7). <https://doi.org/10.56093/ijans.v91i7.115900>.
10. Debbarma, P., Mondal, T., Manna, C., Kumar, K., Mukherjee, J., Das, B. C., Bag, S., & Das, K. (2020). Post-calving umbilical cord tissue offcut: A potential source for the isolation of bovine mesenchymal stem cells. *Veterinary World*, 13(12), 2772–2779. <https://doi.org/10.14202/vetworld.2020.2772-2779>.
11. Singh, P., Mondal, T., Kumar, K., Das, K., Mahalakshmi, N., Madhusoodan, A. P., & Bag, S. (2019). Expression of cardiac specific cell marker in ex vivo differentiated canine iPSC. *Indian Journal of Animal Research*, 54: 553-557. <https://doi.org/10.18805/ijar.b-3829>.

12. Madhusoodan, A., Das, K., Mili, B., Kumar, K., Kumar, A., Saxena, A., Singh, P., Dutt, T., & Bag, S. (2019). In vitro proliferation and differentiation of canine bone marrow derived mesenchymal stem cells over hydroxyl functionalized CNT substrates. *Biotechnology Reports*, 24, e00387. <https://doi.org/10.1016/j.btre.2019.e00387>.
13. Mili, B., Das, K., Kumar, A., Saxena, A. C., Singh, P., Ghosh, S., & Bag, S. (2017). Preparation of NGF encapsulated chitosan nanoparticles and its evaluation on neuronal differentiation potentiality of canine mesenchymal stem cells. *Journal of Materials Science Materials in Medicine*, 29(1), 4. <https://doi.org/10.1007/s10856-017-6008-2>.
14. Das, K., Madhusoodan, A., Mili, B., Kumar, A., Saxena, A. C., Kumar, K., Sarkar, M., Singh, P., Shrivastava, S., & Bag, S. (2017). Functionalized carbon nanotubes as suitable scaffold materials for proliferation and differentiation of canine mesenchymal stem cells. *International Journal of Nanomedicine*, Volume 12, 3235–3252. <https://doi.org/10.2147/ijn.s122945>.
15. Das, K., Mili, B., AP, M., Saxena, A. C., Kumar, A., Singh, P., Verma, M. R., Sarkar, M., & Bag, S. (2017). Proliferation of canine bone marrow derived mesenchymal stem cells on different nanomaterial based thin film scaffolds. *Tissue and Cell*, 49(2), 270–274. <https://doi.org/10.1016/j.tice.2017.02.002>.
16. Mahapatra, P. S., Singh, R., Kumar, K., Sahoo, N. R., Agarwal, P., Mili, B., Das, K., Sarkar, M., Bhanja, S. K., Das, B. C., Dhara, S. K., & Bag, S. (2016). Valproic acid assisted reprogramming of fibroblasts for generation of pluripotent stem cells in buffalo (*Bubalus bubalis*). *The International Journal of Developmental Biology*, 61(1–2), 81–88. <https://doi.org/10.1387/ijdb.160006sb>.
17. Kumar, K., Agarwal, P., Das, K., Mili, B., Madhusoodan, A., Kumar, A., & Bag, S. (2016). Isolation and characterization of mesenchymal stem cells from caprine umbilical cord tissue matrix. *Tissue and Cell*, 48(6), 653–658. <https://doi.org/10.1016/j.tice.2016.06.004>.

Book: Co-author of the book ‘*Techniques in Veterinary Physiology*’ published by West Bengal Veterinary Council, Kolkata; ISBN 978-81-929561-0-7. The book is a stand-alone manual comprises of the practical aspect in basic diagnostic techniques for the students and veterinarians.

PROFESSIONAL ACTIVITIES

1. Indian Science Congress Association (*Life member*)
2. Society of Animal Physiologist of India (*Life member*)
3. Indian Society of Sheep and Goat Production and Utilization (*Life member*)
4. Editorial board member of *Archives on Veterinary Science and Research*

PROFESSIONAL SERVICES

2007 – till date	<i>Member of the Board of Studies</i> of the Department of Veterinary Physiology, West Bengal University of Animal and Fishery Sciences, Kolkata.
2007 – till date	<i>Member of the master's and doctoral student admission committee</i> of the Department of Veterinary Physiology, West Bengal University of Animal and Fishery Sciences, Kolkata.
2025	<i>Member of the organizing committee</i> of '9 th Convention of the Society of Veterinary Biochemists & Biotechnologists of India' held at the West Bengal University of Animal and Fishery Sciences, Kolkata.
2020	<i>Member of the organizing committee</i> of National Workshop on 'Climate smart livestock production in India' held at the West Bengal University of Animal and Fishery Sciences, Kolkata.
2019	<i>Member of the scientific committee</i> of the International Conference on Animal Nutrition held at West Bengal University of Animal and Fishery Sciences, Kolkata.
2019	<i>Member of the scientific committee</i> of the 19 th Indian Veterinary Congress & XXVI Annual conference of Indian Association for the Advancement of Veterinary Research held at Kolkata.
2018	<i>Member of the scientific committee</i> of the 8 th conference of Indian Meat Science Association held at Kolkata.
2016	<i>Coordinator</i> of Institute level quiz contest under the National Veterinary Physiology Quiz of the Society of Animal Physiologist of India.
2009 – 2011	<i>Head of the Department of Veterinary Physiology</i> , Faculty of Veterinary & Animal Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata.

CONFERENCE LECTURES & TRAINING PARTICIPATION

- 2026 Awarded for Best Presentation in a technical session of the National Symposium on 'Advancing animal health and production through biochemical and biotechnological interventions' organized by the Society of Veterinary Biochemists & Biotechnologists of India' held at the West Bengal University of Animal and Fishery Sciences, Kolkata.
- 2020 Participation in the Massive Open Online Course (MOOC) on '*Designing e-learning content*' organized by ICAR-National Academy of Agricultural Research Management, Hyderabad, India.
- 2020 Participation in the Indian Council of Agricultural Research sponsored short term course on '*Neuroendocrine regulations of livestock production: prospect and retrospect*' conducted at the Centre of Advanced Faculty Training in Veterinary Physiology, ICAR-Indian Veterinary Research Institute, Izatnagar.
- 2019 Paper presentation and Rapporteur of a scientific session of 19th Indian Veterinary Congress & XXVI Annual conference of Indian Association for the Advancement of Veterinary Research on '*Innovative progress in animal health and production for safe and secured food under one health perspective*' held at Kolkata, India.
- 2018 Invited lecture in the session '*Nano for Medicine*' and a session chairperson at the 3rd International Conference on Nanomaterials: Synthesis, Characterization and Applications (ICN 2018) held at Mahatma Gandhi University, Kerala, India.
- 2018 Participated in the Wellcome Trust-UK / DBT-India Alliance organized '*Science Communication Workshop*' held at Indian National Science Academy, New Delhi.
- 2017 Paper presentation in the Anniversary Commemorative Event of Nichi-In Centre for Regenerative Medicine, NCRM NICHE 2017 held at National Center for Global Health and Medicine, Tokyo, Japan.
- 2017 Participated in the Massive Open Online Course (MOOC) on '*Teaching Management*' organized by ICAR-National Academy of Agricultural Research Management, India.
- 2017 Participated in the Agriculture Skill Council of India (ASCI) conducted '*Master Training Programme*' held at West Bengal University of Animal and Fishery Sciences, Kolkata, India.
- 2016 Lead paper presentation (Co-author) on '*Application of nanotechnology in stem cell based regenerative medicine*' presented in the Annual conference of Society of Animal Physiologist of India held at College of Veterinary Sciences & A.H., Mhow, India.

- 2015 Participation in the Indian Council of Agricultural Research sponsored short term course on '*Nano-biology and Regenerative Therapies in Animal Health and Production*' conducted at the Centre of Advanced Faculty Training in Veterinary Physiology, ICAR-Indian Veterinary Research Institute, Izatnagar.
- 2015 Participation in the Indian Council of Agricultural Research sponsored short term course on '*Hands on Training on Upstream Physiological Techniques*' conducted at the Centre of Advanced Faculty Training in Veterinary Physiology, ICAR-Indian Veterinary Research Institute, Izatnagar.
- 2015 Indo – US symposium on '*Regenerative Medicine: from Bedside to Bench*' organized by All India Institute of Medical Sciences (AIIMS), New Delhi.
- 2013 Participation in the University Grant Commission, Govt. of India sponsored '*Orientation Programme for the University Teachers*' organized by Jadavpur University, Kolkata.
- 2011 Participation in the Indian Council of Agricultural Research sponsored short term national training programme on '*Recent Techniques in Proteome Analysis*' conducted at the National Dairy Research Institute, Karnal, India.
- 2010 Paper presentation in the International Conference on '*Physiological Capacity Building in Livestock under Changing Climate Scenario*' organized by the Society of Animal Physiologist of India held at ICAR-Indian Veterinary Research Institute, Izatnagar, India.
- 2008 Participation in the Indian Council of Agricultural Research sponsored short term course on '*Recent Development in Animal Production and Reproduction*' conducted at the Centre of Advanced Studies in Veterinary Physiology, ICAR-Indian Veterinary Research Institute, Izatnagar
- 2007 Paper presentation in the National symposium on '*Animal Resources Development through Advanced Physiological, Nuclear, Genetic and Biotechnological Interventions*' and XVI Annual Conference of Society of Animal Physiologist of India held at Assam Agricultural University, India.
- 2005 Paper presentation in the National symposium on '*Recent Advances in Cryopreservation of Livestock Germplasm*' and XIV Annual Conference of Society of Animal Physiologist of India held at Indira Gandhi Agricultural University, India.
- 2004 Participated in the *Laboratory Animal Supervisors' Training Course* organized by the National Centre for Laboratory Animal Sciences, National Institute of Nutrition, Hyderabad, India.