

**Subhashis Pal, M.Sc.**

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Senior Research Fellow, Division of Endocrinology

CSIR- Central Drug Research Institute

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**Hobby:** Photography, Trekking, writing travel blogs.

#### EXECUTIVE SUMMARY

Experienced in metabolic bone disease assessment and targeted therapy development for bone regeneration. Six years of experience in drug screening and worked extensively in drug development program in CSIR-Central drug Research Institute, Lucknow. Experienced in cell culture, histology, molecular biology and animal handling. Also, have one year of teaching experience. Published 11 original research articles and experienced in data analysis and scientific paper writing. Publications in Biomaterials, Bone, Toxicology and Applied Pharmacology, Journal of Nutritional Biochemistry. Presented work in national and international conferences. Winner of ECTS East-Meets-West Research Award, 2018.

#### SKILLS AND TECHNIQUES

- 1. Micro computed tomography:** Experienced in micro CT analysis of bone microarchitecture and 3d model development of bones.
- 2. Sea-horse flux analyzer:** Experienced in cellular glycolysis and mitochondrial respiration analysis by flux analyzer.
- 3. Echo-MRI:** Experienced in body composition analysis of animals using MRI.
- 4. Cellular Biology:** MC3T3E1, MC3T3L1, CHO, HEK-293, UMR, HFOB, primary calvarial osteoblast culture of rat and mouse, chondrocyte culture, rat and mouse mesenchymal stem cell isolation and culture.
- 5. Microscopy:** confocal, fluorescence and light microscopy. Experienced in osteo-quant microscopic analysis for bone histomorphometry and calcein-tetracycline mediated MAR-BFR analysis.
- 6. Histology and histomorphometry:** immunohistochemistry, immunocytochemistry, hematoxylin and eosin staining, goldner's trichrome bone staining, complete skeletal staining to assess congenital bone defect, alcian blue, alizarine red staining. Have expertise in tissue processing, wax block preparation for soft tissue and methyl-meth acrylate (MMA) block preparation for hard tissue like bone.
- 7. Molecular Biology:** RNA extraction, qPCR analysis, western blot, ELISA, enzymatic assays.
- 8. Animal handling:** Experienced in rat, mouse, rabbit, hamster handling, and transgenic animal handling. Experienced in oral, intraperitoneal, intramuscular, intravenous, subcutaneous dosing of all the above mentioned animals. Also have experience and expertise in ovariectomy, orchidectomy, nephrectomy, fracture model development, arthritis model development, secondary osteoporosis model development, post-menopausal osteoporosis model development.

#### EDUCATION/ TRAINING

<b>PH.D. (ENDOCRINOLOGY)</b>	<b>2013 TO ONGOING</b>
Central Drug Research Institute (Thesis submitted)	
<b>M.Sc. (HUMAN PHYSIOLOGY)</b>	<b>2009 TO 2011</b>
Rajabazar Science College, University of Calcutta, India	
<b>B.Sc. (PHYSIOLOGY [H], ZOOLOGY, CHEMISTRY)</b>	<b>2006 TO 2009</b>
Surendranath College, University of Calcutta, India	

## PROFESSIONAL OVERVIEW

CSIR-CENTRAL DRUG RESEARCH INSTITUTE, LUCKNOW

JANUARY 2015 TO ONGOING

Senior Research Fellow

CSIR-CENTRAL DRUG RESEARCH INSTITUTE, LUCKNOW

JANUARY 2013 TO DECEMBER 2014

Junior Research Fellow

CSIR-CENTRAL DRUG RESEARCH INSTITUTE, LUCKNOW

JUNE 2012 TO DECEMBER 2012

Project JRF

RAMMOHAN COLLEGE, UNIVERSITY OF CALCUTTA

JUNE 2011 TO MAY 2012

Guest Lecturer

## PROFESSIONAL ACHIEVEMENTS

### AWARDS AND HONORS

- ECTS East-Meets-West Research Award **2018**
- CSIR-NET qualified (RANK 56) **2011**

### PATENTS

- Naibedyia Chattopadhyay, **Subhashis Pal**, Sudhir Kumar, Ramakrishna Eppalapally, Padam Kumar, Sapana, Jiaur Rahaman Gayen, Riyazuddin Mohammed, Sabyasachi Sanyal, Anagha Gurjar, Prabhat Ranjan Mishra, Naresh Mittapelly, Kamal Ram Arya, Brijesh Kumar, Srikanta Rath, Arun Kumar Trivedi, Rakesh Maurya. *BIOACTIVE EXTRACT, FRACTION AND FORMULATION OF CASSIA OCCIDENTALIS FOR BONE REGENERATION AND THE PREVENTION OR TREATMENT OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS AND MUSCULAR ATROPHY (patent filed).*

## PUBLICATIONS

### ORIGINAL RESEARCH ARTICLES

- **Pal S**, Khan K, Pal China S, Mittal M, Porwal K, Shrivastava R, Taneja I, Hossain Z, Mandalapu D, Gayen J, Wahajuddin M, Sharma V, Trivedi A, Sanyal S, Bhadauria S, Godbole M, Gupta S, Chattopadhyay N. Theophylline, a methylxanthine drug induces osteopenia and alters calciotropic hormones, and prophylactic vitamin D treatment protects against these changes in rats. *Toxicol Appl Pharmacol.* 2016 Mar 15;295:12-25. (PMID 26851681)
- **Pal S\***, Tripathi JK\*, Awasthi B, Kumar A, Tandon A, Mitra K, Chattopadhyay N, Ghosh JK. Variants of self-assembling peptide, KLD-12 that show both rapid fracture healing and antimicrobial properties. *Biomaterials.* 2015 Jul; 56:92-103. (PMID 25934283) (**\*Contributed equally**)
- Porwal K\*, **Pal S\***, Dev K, China SP, Kumar Y, Singh C, Barbhuyan T, Sinha N, Sanyal S, Trivedi AK, Maurya R, Chattopadhyay N. Guava fruit extract and its triterpene constituents have osteoanabolic effect: Stimulation of osteoblast differentiation by activation of mitochondrial respiration via the Wnt/ $\beta$ -catenin signaling. *J Nutr Biochem.* 2017 Jun; 44:22-34. (PMID 28343085) (**\*Contributed equally**)
- China SP\*, **Pal S\***, Chattopadhyay S, Porwal K, Mittal M, Sanyal S, Chattopadhyay N. The wakefulness promoting drug Modafinil causes adenosine receptor-mediated upregulation of receptor activator of nuclear factor  $\kappa$ B ligand in osteoblasts: Negative impact of the drug on peak bone accrual in rats. *Toxicol Appl Pharmacol.* 2018 Apr 9;348:22-31 (**\*Contributed equally**)

- China SP, **Pal S**, Chattopadhyay S, Porwal K, Kushwaha S, Bhattacharyya S, Mittal M, Gurjar AA, Barbhuyan T, Singh AK, Trivedi AK, Gayen JR, Sanyal S, Chattopadhyay N. Globular adiponectin reverses osteo-sarcopenia and altered body composition in ovariectomized rats. *Bone*. 2017 Dec;105:75-86. (PMID 28811200)
- Khan K, **Pal S**, Yadav M, Maurya R, Trivedi AK, Sanyal S, Chattopadhyay N. Prunetin signals via G-protein-coupled receptor, GPR30 (GPER1): Stimulation of adenylyl cyclase and cAMP-mediated activation of MAPK signaling induces Runx2 expression in osteoblasts to promote bone regeneration. *J Nutr Biochem*. 2015 Dec;26(12):1491-501. (PMID 26345541)
- Mittal M, **Pal S**, Shyamsundar pal, Porwal K, Dev K, Shrivastava R, Rama raju S, Rashid M, Trivedi AK, Sanyal S, Wahajuddin M, Bhaduria S, Maurya R, Chattopadhyay N, Pharmacological activation of aldehyde dehydrogenase 2 promotes osteoblast differentiation via bone morphogenetic protein-2 and induces bone anabolic effect. *Toxicology and Applied Pharmacology* Feb 2017 1;316:63-73. (PMID 28017615).
- Dar. H, **Pal S**, Shukla P, Mishra P, Tomar G, Chattopadhyay N, Srivastava R. *Bacillus clausii* inhibits bone loss by skewing Treg-Th17 cell equilibrium in postmenopausal osteoporotic mice. *Nutrition*, 20 March, 2018, doi.org/10.1016/j.nut.2018.02.013 (Article in press).
- Mittal M, Khan K, **Pal S**, Porwal K, Shyamsundar , Barbhuyan TK, Bhagel KS, Rawat T, Sanyal S, Bhaduria S, Sharma VL, Chattopadhyay N. The Thiocarbamate Disulphide Drug, Disulfiram Induces Osteopenia in Rats by Inhibition of Osteoblast Function Due to Suppression of Acetaldehyde Dehydrogenase Activity. *Toxicol Sci* 2014 May;139(1):257-70 (PMID 24496638).
- Kaur S, Garimella M, Shiroor D, Mhaske S, Joshi S, Singh K, **Pal S**, Mittal M, Krishnan H, Chattopadhyay N, Ulemale A and Wani M. IL-3 decreases cartilage degeneration by down regulating matrix metalloproteinases and reduces joint destruction in osteoarthritis mice. *J Immunol* 2016 Jun 15;196(12):5024-35. (PMID 27183574).
- Chakravarti B, Akhtar T, Rai B, Yadav M, Akhtar Siddiqui J, Dhar Dwivedi SK, Thakur R, Singh AK, Singh AK, Kumar H, Khan K, **Pal S**, Rath SK, Lal J, Konwar R, Trivedi AK, Datta D, Mishra DP, Godbole MM, Sanyal S, Chattopadhyay N, Kumar A. Thioaryl naphthylmethanone oxime ether analogs as novel anticancer agents. *J Med Chem*. 2014 Oct 9; 57(19):8010-25 (PMID 25198997).

#### ARTICLES IN THE SCIENTIFIC MEETINGS

- LP4, a lactoferrin-derived small peptide reverses osteopenia via BMP2-OPG dependent pathway. **Pal S**, Sayeed M, Kumar A, Harioudh M, Mitra K, Ghosh J, Chattopadhyay N. Conference: European calcified tissue society congress, May 2018, Valencia, Spain (**Presenting author**).
- Skeletal restoration by Liraglutide in ovariectomized rats by an osteoanabolic mode: a comparative study with PTH and Alendronate. **Pal S**, China SP, Sanyal S, Chattopadhyay N. Conference: European calcified tissue society congress, May 2017, Salzburg, Austria (**Presenting author**).
- Liraglutide restores trabecular bones in ovariectomized rats by osteoanabolic mode. **Pal S**, Sanyal S, Chattopadhyay N. Conference: Indian Society for Bone & Mineral Research (ISBMR), Mumbai, September, 2016 (**Presenting author**)
- Theophylline is the most potent among methylxanthine group of drugs in causing osteoblast cytotoxicity and induces osteopenia in rats. **Pal S**, Khan K, Mittal M, China SP, Porwal K, Sanyal S, Chattopadhyay N. Conference: 2nd International meet on advanced studies on cell signaling network (CeSiN 2014), Kolkata, December 2014 (**Presenting author**)
- Interleukin 3 Decreases Matrix Metalloproteinases – mediated Cartilage Degradation and Reduces Joint Destruction in Osteoarthritic Mice. Kaur S, Garimella M, Shiroor D, Mhaske S, Joshi S, Singh K, **Pal S**, Mittal M, Krishnan H, Chattopadhyay N, Ulemale A and Wani M. *Osteoarthritis and Cartilage*, April 2017 volume 25, Supplement 1, Pages S297–S298 (doi.org/10.1016/j.joca.2017.02.501)

#### REVIEW ARTICLES

- Bhattacharyya S, **Pal S**, Chattopadhyay N. Targeted inhibition of sclerostin for post-menopausal osteoporosis therapy: A critical assessment of the mechanism of action. *Eur J Pharmacol* 2018 May 5;826:39-47. (PMID 29476877).