Details of Research Experience as <u>Principal Investigator</u> during the last 10 years

Title of study	From	To	funding Agency	Grant ID	Grant Amount	Status: Completed/ Ongoing	Project Summary indicating significant scientific contribution in case of completed project OR Background, objectives, Methods, Results in case of ongoing projects	No. of publications/ patents/ copyrights)
To identify COVID perturbed genes and immune-repertoire network in diabetes and obesity associated severe infections	2021	2024	**ICMR**	13th clinical Research Group meeting, ICMR COVID clinical research group (CRG)		ongoing		
To study the ultra and molecular changes in bone of	022	2025	**ICMR DHR**	Gia/2019/000111/PRCGIA	1.5 crore	ongoing		

T2DM and strategy to overcome fragility bone quality and quantity, mechanical properties, remodeling indices as well as genomic data in T2DM								
Evaluation of Polycomb repressive complex 2 target genes as potential epigenetic regulators of sporadic primary hyperparathyroidism	Feb 2021	Jan 2024	**ICMR, New Delhi**	**2020-3486/20**	37 lakhs	Ongoing		
Development of Nano-enabled Teriparatide-Loaded Pharmaceutical Product for Osteoporosis: An approach to reduce	Sept 2019	August 2022	**ICMR, New Delhi**	**35/1/2019-Nano/BMS**	49 Lakh	Ongoing	In this project we attempt to introduce novel drug delievery system in the form of intramuscular sustained release depot or implant gel	Ongoing

the dose frequency with better patient compliance therapeutic efficacy							formulation by making use of lipid based nanocarriers which will help to reduce the dose and dosage frequency which eventually decrease in overall cost of therapy thus increase the patient compliance.	
Peneterance of susceptibility and protective genes in familial clustering of Type 1 diabetes and its co association with celiac disease.	August 2019	July 2021	**ICMR, New Delhi** **(Task Force Project)**		70 lakhs	Ongoing	Current study is planned to study the allele polymorphism of HLA class I and class II loci in families affected with T1D and CD with a putative target to delineate susceptible and protective genotypes for familial clustering of these diseases and their co-occurence in two geographically and ethnically different	Ongoing

							regions of India.	
Identification of Potential Epigenetic Biomarkers for Detection and Diagnosis of Primary Hyperparathyroidism	July, 2018	June 2021	**DST-SERB, New Delhi**		37 lakhs	Ongoing	In this study the altered expression oftranscription factors (GCM2, GATA3 and PAX1) with epigenetic modifications such asDNA methylation in promoter regions of genes and histone methylation especiallyH3K9me3 and H3K27me3 affect their binding to CASR promoter region that decrease its expression. Treatment withinhibitors of DNA or histone methylation could reverse these alterations and wouldnormalize the expression of these genes in parathyroid culture or cell line.	Ongoing project

Expression profiling of Mitogen activated protein Kinase Signalling molecules in patients with sporadic primary hyperparathyroidism	April 2015	March 2017	**Endocrine Society of India (ESI)**		4 lakh	Completed	Our study showed that ERK pathway is highly dysregulated MAPK pathway in sporadic Parathyroid tumors. We also showed that in downstream of ERK pathway cell cycle regualtors are highly dysregulated which might lead to higher cell proliferation during parathyroid tumorigenesis.	One Publication
To study the methylation status of CDKN2A, CDKN2B and RASSF1A in patients with primary hyperparathyroidism	April 2014	March 2016	**Intramural (PGIMER)**		2.8 Lakh	Completed	Promoter Hypermethylation in responsible of down expression of CDKN2A, CDKN2B and RASSF1A in sporadic primary hyperparathyroidism.	One Publication
Identification of differentially expressed proteins in parathyroid tumors and their clinical	October 2012	Sept. 2015	**ICMR, New Delhi**		20 lakhs	Completed	Comparative proteomics revealed that a total of 206 proteins (74	Two publications

correlation with the disease ".							upregulated and 132 downregulated) were differentially expressed in parathyroid adenoma. Proteins belonged to a diverse protein family such as enzymes, transcription factors, cell signalling, cell adhesion, cytoskeleton proteins, receptors, and calcium-binding proteins. The differentially expressed proteins were found to be associated with MAPK, PLC, PI signalling pathways, and with chromatin organization.	
Expression of vitamin D receptor and Calcium Sensing Receptor in patients with Primary Hyperparathyroidism	Oct 2010	Sept. 2013	**ICMR, New Delhi**		18 lakhs	Completed	Our study showed the reduced expression of Calcium sensing receptor and vitamin D Receptor and increased expression of cyclin D1.	Two publications

and its correlation with clinical outcome.							We also showed that the reduced expression of VDR and CASR is not due to hypermethylation in their promoter region.	

Educational and Training Activities at a National Level in India

As the current President of the Endocrine society of India (ESI), Professor Bhadada is immensely involved in the expanding the educational and training activities of ESI for fellows and graduate students in Endocrinology. He has initiated national level endocrinology quiz for MD medicine residents and ESI excellence award (AV Gandhi Award) for PhD scholars pursuing research in Endocrinology.

At a national level, Professor Bhadada has been actively engaged in helping establish new endocrine fellowship (DM) training programs and endocrine research laboratories at the newly established medical schools in Rishikesh and Bhopal.

He is an Executive member of the Indian Society for Bone and Mineral Research (ISBMR). As a lead member of the ISBMR task force, he helped formulate the guidelines for the diagnosis and management of osteoporosis in adults.

He is the founder and current secretary of the social support group named “ADITI” (Association of Diabetes in Tricity) which helps underprivileged children and adolescents with youth onset diabetes as well as provide them with periodic vocational training.

Professor Bhadada is involved in various task forces of the Indian Council of Medical Research (ICMR, the "NIH" or the national funding agency of India) to generate national database for common endocrine disorders. He runs three national online registries for endocrine disorders viz., primary hyperparathyroidism, osteoporosis and rare metabolic bone disorders to generate national database for these disorders.

He also mentors research scholars of Indian institute of technology, Ropar and Institute of Microbiological Technology, Chandigarh and Punjab University. These are institutes of national importance in the vicinity of Chandigarh.