Major Research Area of the faculty of Biochemistry department: -

Sr. No.	Name of Teacher	Designation	Research Description
1	**Shantanu Sengupta** **(Distinguished Visiting Faculty)**	Chief Scientist CSIR-IGIB Sukhdev Vihar Mathura Road Delhi-110020	i) To identify prediagnostic markers for cardiovascular disease using genetic, epigenetic and proteomic approaches. ii) Understand the role of thiols like homocysteine and cysteine and micronutrient vitamin B12 and folate in complex disorders using model systems We have integrated nutrition, genetic, epigenetic, biochemical & proteomic approaches and developed novel methodologies to clinically establish relevance of new markers in cardiovascular disease biology. While in the western world, Coronary Artery Disease (CAD) is linked to high-calorie diet and sedentary lifestyle, the high incidence of such diseases in India, even amongst low income groups led us to investigate diverse aspects related to CAD. We hypotheiszed that low vitamin B12 levels presumably due to the adherance of a strict vegetarian diet, leads to elevated levels of the thiol amino acids homocysteine and cysteine, which are independent risk factors for CAD.
2	**Prof. Deepak Sharma F.N.A.Sc (India)** **(Distinguished Visiting Faculty)**	Dept. of School of Life Sciences JNU, New Delhi	Research specialization (major scientific field of interest) Neurobiology, (Brain Ageing, epilepsy and development. Mechanism of antiageing and antiepileptic affects of pharmacological and herbal products in the light of Electrophysiological,biochemical, histological and behavioral parameters.)
3	**Dr Vijay Kumar**	Associate Professor	Cellular mechanisms of metal induced neurotoxicity Oxidative stress seems to be the major initiating factor in the pathology of many neurodegenerative disorders. The brain is more vulnerable to oxidative stress than other organs, as concomitant low activity and

			capacity of antioxidative protection systems allow for increased exposure of target molecules to ROS. Oxidative damage accumulates more in mitochondria than rest of the cells because electrons continually leak from the respiratory chain to form damaging ROS. Mitochondrial impairment has been implicated in various neurodegenerative diseases. There is increasing evidence for mitochondrial involvement in neurodegenerative diseases including Alzheimer's and Parkinson's diseases. These toxic consequences of ETC dysfunction may sustain further mitochondrial damage, including oxidation of mitochondrial DNA, proteins, and lipids, and opening of the mitochondrial permeability transition pore, an event associated with cell degeneration and death. The understanding of key pathways and molecular mechanisms of mitochondrial dysfunction will help in identification of such proteins for revealing the molecular mechanisms associated with neurodegenerative diseases.
4	**Dr Nar Singh Chauhan**	Associate Professor	Research Theme: - System Microbiology Dr. Nar Singh Chauhan focuses on characterizing diverse microbiomes to understand their community structures, physiological functions, survival strategies under abiotic stress, colonization factors, and host-microbial interactions. He has investigated the association between the human microbiome and the onset of human diseases. His work also emphasizes the role of beneficial plant-associated microbes in promoting plant growth, enhancing stress tolerance, and improving soil health. By integrating functional genomics and metagenomics, Dr. Chauhan's contributions to microbiome science offer innovative strategies for climate-resilient agriculture and sustainable crop production. Dr. Chauhan's work also delves into molecular microbiology and nanotechnology,

			contributing to advancements in these interdisciplinary fields. Profile Link:Singh Chauhan, Nar Singh - Author details - Scopus
5	**Dr. Ritu Pasrija's**	Associate Professor	**Dr. Ritu Pasrija's** research focuses on understanding the biology of fungal infections in humans and plants and combating fungal resistance. She investigates how the biosynthesis of membrane lipids and their disruption can sensitize yeast cells to antifungal agents, providing insights into potential therapeutic strategies. She is also interested in the role of mitochondria and their interaction with other cell organelles (membrane contact sites) in influencing antifungal drug resistance, thus contributing to a deeper understanding of the mechanisms underlying antifungal drug resistance. Her research aims to develop more effective treatments for fungal infections by targeting the underlying mechanisms of drug resistance. She is actively collaborating with many research laboratories in India and abroad and has jointly published her work in internationally recognized research articles in the field of microbiology and biotic stress in plants including *Journal of Cell Science*, *Archive of Microbiology*, *International Microbiology*, *Plant Cell Reports* and *Acta Physiologiae Plantarum* etc.
6	**Dr Rajesh Dabur**	Associate Professor	Skeletal muscle atrophy denotes the degeneration or reduction in the volume of skeletal muscle tissue attributable to disuse, neurological disorders, inadequate nutrition, the aging process (sarcopenia), chronic illnesses, and hormonal dysregulation. The equilibrium of autophagic processes is of paramount importance, but the ubiquitin-proteasome pathway has been reported to play a pivotal role in the mechanism of muscle atrophy. Both systems require ubiquitinated proteins for degradation. However, a significant constraint of the ubiquitin-proteasome system is its inability to degrade intact proteins or proteins with complex

			structural configurations. Consequently, calpains are introduced as key players in the cleaving of the structural proteins located within the myofiber or cytoskeleton, which are subsequently subjected to further degradation by the ubiquitin-proteasome system. Understanding of the interdependency of these proteolytic systems may facilitate the treatment or prevention of muscle wasting associated with a multitude of conditions. Hence, the field of targeted medicine for skeletal muscle atrophy is progressing through a variety of promising therapeutic approaches, encompassing the inhibition of pathways such as myostatin, as well as the modulation of autophagy, inflammatory responses, and gene therapy. Nonetheless, these therapeutic modalities remain at diverse stages of investigation and clinical evaluation. Within our research laboratory, we are endeavoring to elucidate the interactions among the proteolytic systems and to engineer drug delivery vehicles targeted at skeletal muscle to mitigate the effects of muscle atrophy resulting from various pathological conditions.
7	**Dr. Sandeep Singh**	Associate Professor	Nanobiotechnology is nano-scale studies on living systems. The area being pursued by Dr. Sandeep Singh is nano-scale studies using plant materials with two approaches. First one is use of economically important plants for preparing metallic nanoparticles for potential use in biological applications. Here, a number of different nanoparticles have been prepared and explored for potential applications. These include nanoparticles of Zn, Ag, Mn, Si, Ce, Cu and Fe from many different medicinal plants. In this approach, one Ph.D. has been completed and another is on final stages. This is apart from a number of dissertations submitted in past few years. Second is preparation of nanoscale materials for studying their effects on plant growth and metabolism. Most feasible materials are again metallic nanoparticles but nanoscale

			fertilizers are another good possibility. One Ph.D. has been registered in this approach apart from few M.Sc. dissertations in the past. Components of nanoscale nutrients include silica, Fe, ZnO, titanium dioxide, cerium oxide, aluminium oxide, gold nanorods, ZnCdSe/ZnS core-shell, InP/ZnS core-shell, and Mn/ZnSe quantum dots. Important properties of such nanomaterials include size, content, concentration, and chemical properties. Apart from the type of crop, these nanomaterials are significant if used as nanofertilizers for plant growth. The release of nutrients into the soil is caused by reaction of nanoparticle (NP) suspensions containing the nanofertilizers react with water