

AREAS OF EXPERTISE OF FACULTY MEMBERS

NAME	DESIGNATION	AREA
P. RAMARAO	PROFESSOR & DIRECTOR	1. Regulatory toxicology 2. Preclinical evaluation of NCEs 3. ADME of NCEs
SARANJIT SINGH	PROFESSOR & DEAN	1. Stability testing and storage 2. Stress testing and stability-indicating method development 3. Identification and structure elucidation of degradation products/impurities 4. Development of degradation product/impurity standards 5. Study of drug metabolism and development of metabolite standards Technical Services: 6. LC, LC-MS-TOF and LC-NMR analyses 7. Software prediction of toxicity of degradation products and impurities 8. Supply of test standards of degradation products/impurities
K. K. BHUTANI	PROFESSOR	1. Isolation & characterization of active/bioactive constituents from natural resources 2. Herbal drug standardization 3. Herbal and traditional medicine/nutraceutical drug development 4. Natural products based drug discovery and

		development 5. Analytical profile
U. C. BANERJEE	PROFESSOR	<ol style="list-style-type: none"> 1. Biochemical engineering 2. Fermentation technology 3. Environmental engineering 4. Bioprocess design and biotransformation
ASIT K. CHAKRABORTI	PROFESSOR	<ol style="list-style-type: none"> 1. Synthesis of small organic molecules (hetero- and carbo-cyclic) for biological evaluation for target-based generation of new leads for various diseases 2. Solid/solution phase library synthesis of small organic molecules 3. Chiral synthesis 4. Structural elucidation of small organic molecules by spectral methods 5. Novel and greener synthetic routes of APIs (small organic molecules) of high commercial value
K. P. R. KARTHA	PROFESSOR	<ol style="list-style-type: none"> 1. Isolation, purification and structural characterization of carbohydrates and related molecules and their chemical modification 2. Synthetic carbohydrate chemistry: includes areas such as synthesis of carbohydrate derivatives, synthesis of oligosaccharides (chemicals & enzymatic methods), syntheses of glycopeptides and other glycoconjugates, synthesis of antitubercular, antimalarial and antidiabetic agents, etc. 3. Modification of polysaccharides for industrial applications

C. S. DEY

PROFESSOR

1. Target Based:

Insulin Signal Transduction:

(1) Insulin receptor (IR) expression and activity (2) Insulin receptor substrates (IRS-1/2) expression and activity (3) AKT/PKB kinase expression and activity (4) PI 3-kinase activity (5) AS-160 expression and activity (6) GSK3 β expression and activity (7) AMP kinase expression and activity (8) Isoform specific Protein Kinase C expression and activity (9) Mitogen activated protein kinases (MAPK: ERK-1/-2, p38, JNK-1/-2) expression and activity (10) Phosphatases like SHIP, PTP1B, PTEN (11) Glucose uptake assay.

2. Therapeutic screens:

Diabetes, Insulin resistance and obesity:

A. (1) Insulin receptor (2) Insulin Receptor Substrate-1/-2 (3) AKT/PKB (4) PI 3-Kinase (5) AS-160 (6) GSK3 β (7) AMP kinase (8) Protein Kinase C (9) Phosphatases like SHIP, PTP1B, PTEN (10) Glucose uptake in (a) insulin sensitive and (b) insulin resistant cells (c) L6E9 skeletal muscle cells (d) 3T3 adipocytes and also in (e) Neuro2A cells (relevant ones).

B. Measurement of plasma triglyceride, insulin, glucose and TNF α .

Anti-inflammatory:

(1) GSK3 β (2) AMP kinase (3) Protein Kinase C (4) AKT (5) JNK (6) p38 MAPK (7) TNF α .

Anti-cell proliferation and/or anti-apoptotic

activity:

(1) MTT assay (2) ELK-1 expression and activity (3) Caspase activity (4) PARP inhibition (5) cytochrome C release.

Neuronal activity:

(1) Tau (2) AMP Kinase (3) AKT1 (4) PKC (5) JNK2 (6) IRS-1/-2 (7) GSK3 β (8) Glucose uptake assay

3. Cell Based Assays:

(1) C2C12 skeletal muscle cells (2) Insulin resistant C2C12 cells (3) L6E9 skeletal muscle cells (4) 3T3 L1 adipocytes (5) Neuro2A neuronal cells. (all in proliferated and differentiated cells)

4. Enzyme assays:

(1) AKT/PKB kinase (2) PI 3-kinase (3) GSK3 β (4) AMP kinase (5) Isoform specific Protein Kinase C (6) Mitogen activated protein kinases (MAPK: ERK-1/-2, p38, JNK-1/-2) (7) SHIP phosphatase (8) PTP1B phosphatase (9) PTEN phosphatase (10) Creatine kinase activity (11) Acetylcholine esterase.

5. siRNA mediated gene silencing:

Platform technology is available to silence translation of suitable gene(s) of interest to test functionality and/or screen new chemical entity based on above mentioned or similar assays. Technological platform is in place to develop cell line, antibody and/or siRNA based custom assays based on the customer's need.

P. P. SINGH	PROFESSOR	Testing of anti-TB compounds/anti bacterial, anti material compounds, anti trechomonal compounds, anti-trechomonal compounds, imunomodulators, antifungal agents
P. V. BHARATAM	PROFESSOR	<ol style="list-style-type: none"> 1. Computer Aided Modeling of Drug Molecules: Electronic structure prediction, molecular electro static surface prediction, predicting the complementarity between drugs and receptors; Substrates and Enzymes, etc. 2. Computer Aided Design of New Leads: Using 2D QSAR, 3D QSAR, pharmacophore mapping, Molecular docking, virtual screening 3. Computer Aided Lead Optimization: Using molecular field analysis, de novo design, Induced fit analysis, molecular dynamic simulations 3. Computer Aided Prediction of Toxicology: Using toxicological descriptors, QSTR, toxicophore mapping 4. Computer Aided Design of Nanoparticles: Especially the design of dendrimeric drug delivery systems. 5. Computer Aided Analysis of Drug Disposition: In terms of oxidation using CYPs, Molecular docking in the active site of CYPs
ASHWANI K. VIG	HEAD, TDC	<ol style="list-style-type: none"> 1. Advisory consultancy: (a) Upgradation and future products selection. (b) Regulatory requirements. (c) Audit, implementation & training on GMP. (d) Management advisor for manpower requirements and upgradation of

		<p>skills of employees (e) Designing of facilities for API & Dosage from meeting the US FDA/WHO/ Schedule M. (f) Auditing and implementation in pollution control techniques. (g) Auditing and training on safety aspects in API industries</p> <p>2. Research Consultancy: (a) Process development on improvement of technology w.r.t. productivity, cost and quality in API. (b) Scale up techniques demonstration for API production. (c) New product development</p> <p>3. Technical Services: (a) Trouble shooting in scale up activities. (b) Scale up techniques demonstration for API, herbal & dosage form production</p>
PRAMIL TIWARI	PROFESSOR	<p>1. Preparation of reviews/reports on the use of drugs/medicines in various healthcare settings.</p> <p>2. Conducting studies on prescribing/faculty indicators as per standard protocols.</p>
RAHUL JAIN	PROFESSOR	<p>1. Drug Discovery</p> <p>2. Medicinal Chemistry</p> <p>3. Synthetic Organic Chemistry</p>
ARVIND K. BANSAL	PROFESSOR	<p>1. Preformulation profiling</p> <p>2. Selection of optimal salt forms</p> <p>3. Solid state characterization of pharmaceuticals</p> <p>4. Generation, characterization and 'stabilization' of amorphous form</p> <p>5. Formulation development of conventional and novel drug delivery systems</p> <p>6. Characterization of innovator products for</p>

		accelerated development of generic formulations
KULBHUSHAN TIKOO	ASSOC. PROFESSOR	<ol style="list-style-type: none"> 1. Toxicity studies like acute, sub-chronic, chronic cytotoxicity, genotoxicity and carcinogenicity 2. Toxicokinetics 3. Toxicogenomic screening
SHYAM SUNDER SHARMA	ASSOC. PROFESSOR	<ol style="list-style-type: none"> 1. Pharmacological screening models for cerebral ischemia, COPD, diabetes and its complications, epilepsy, gastric ulcer and emesis model, hypertension, Leishmaniasis, memory impairment, pain and inflammation, Parkinson's disease, sleep time/arousal study 2. Non-GLP safety pharmacology studies for CNS, cardiovascular, respiratory and gastrointestinal safety
ANAND SHARMA	ASSOC. PROFESSOR	Marketing, International Marketing and Strategic Management
SANJAY JACHAK	ASSOC. PROFESSOR	<ol style="list-style-type: none"> 1. Anti-inflammatory drug development based on natural products from plants/botanical drugs: Screening of extracts/phytochemicals for COX-2/COX-1 inhibitory activity, TNF-α, IL-6 and IL-1β inhibitory activity 2. Isolation and characterization of marker constituents for the purpose of standardization of herbal drugs and herbal formulations 3. Development of herbal formulations preferably solid oral dosage forms like capsules and tablets: formulations based on polyherbals or 3-4 herbal drugs. Standardization of herbal

		<p>extracts for pre-formulation studies, optimization of formulation parameters for capsules and tablets containing herbal drug extracts as active pharmaceutical ingredient</p> <p>4. Determination of heavy metals such as As, Hg, Pb and Cd in herbal drugs/formulations by atomic absorption spectroscopy (AAS)</p>
NILANJAN ROY	ASSOC. PROFESSOR	<ol style="list-style-type: none"> 1. Generation of databases for target discovery 2. Identification of potential drug targets for communicable disease using comparative genomics and database mining; special emphasis on African sleeping sickness, Chagas disease and Leishmaniasis 3. Identification of potential drug targets for life-style disease using genomics and proteomics; special emphasis on ischemic stroke and aging 4. Use of whole genome microarray gene expression profile to natural and synthetic compounds for calorie restriction-mimetic activity 5. Cloning and expression of therapeutic and industrially important proteins in a variety of hosts 6. Development of enzyme inhibition assay for screening compounds 7. Protein modeling and virtual screening of small molecules for hit and leads generation 8. Anti bacterial (gram +ve and -ve), anti fungal and anti clinical isolate screening of small

		molecules
INDER PAL SINGH	ASSOC. PROFESSOR	<ol style="list-style-type: none"> 1. Natural Products isolation and characterization 2. Supplying purified natural products on demand 3. Synthesis of bioactive natural products and their analogs 4. Standardization and analysis of herbal drugs (chemoprofiling by HPLC)
PRABHA GARG	ASSOC. PROFESSOR	<p>Data mining and pattern recognition:</p> <ol style="list-style-type: none"> 1. Application of machine learning and statistical methods to identify the pattern in biological data and chemical data 2. Relational database development 3. Software Development
NEERAJ KUMAR	ASST. PROFESSOR	<p>Biodegradable polymers in drug delivery and tissue engineering</p> <ol style="list-style-type: none"> 1. Synthesis, characterization and modification of Biodegradable Polymers for specific carriers in drug delivery (polyanhydrides, polyesters, their copolymers and block-copolymers, PEG based copolymers of the same) 2. Formulation of controlled drug release systems based on hydrogel, liquid polymers, particulate system like micro- and nano-polymeric parenteral formulation and their <i>in vitro</i> and <i>in vivo</i> evaluation. 3. Depot forming drug delivery systems for long term applications 4. Biodegradable polymeric scaffolds for

		biomedical application which include drug delivery, growth factor delivery and solid support for the cells in tissue engineering application
PARIKSHIT BANSAL	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Management of intellectual property of an industry 2. Leveraging IPRs to enhance business profits 3. Patent filing and management 4. In-Licensing of technology 5. Out-licensing of technology 6. IPR related training for in-house R&D staff 7. Troubleshooting relating to IPRs
C. GOPI MOHAN	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Application and Development of existing/new computational and informatics tools/methods for <i>in silico</i> drug discovery and design 2. Structural bioinformatics to understand the protein interaction with small molecules. Homology modelling, comparative modelling of micromolecules and insight into its function 3. Computational approaches for small molecule modeling and design 4. Database creation of therapeutically important targets and its inhibitors 5. Setting up of bioinformatics and computational drug discovery laboratory (expert view)
SUNIL GUPTA	ASST. PROFESSOR	Sales, Distribution and Product Management
M. E. SOBHIA	ASST. PROFESSOR	Lead identification and optimization of therapeutic targets using Computer Aided Molecular Design (CADD) strategies

GOPABANDHU JENA	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Genotoxicity Testing 2. Carcinogenicity Testing 3. Good Laboratory Practice (GLP)
A. S. BHATIA	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Generation of randomization schedules 2. Sample size estimation 3. Analysis of BA/BE Studies (from time concentration profiles to bioequivalence conclusions) 4. Clinical/Medical research data analysis 5. Writing the statistical section of a clinical research protocol 6. Computing through SAS (SAS Inc, CARY) 7. SAS STAT Mulivariate Proc, e.g. MIXED, Reg, ANOVA, GLM; factor; discrim, logistic; GLIMMIX etc. 8. Conducting training programme in the area of SAS Programming Language
IPSITA ROY	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Downstream processing of proteins 2. Aggregation and stabilization of misfolded proteins
ANIL K. ANGRISH	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Corporate Restructuring 2. Hedging and futures 3. Costing in R & D 4. Venture capital and Pharma 5. Costing and Clinical Trials 6. Value Added Tax and Pharma 7. Corporate refocusing 8. Portfolio Analysis and Pharma 9. Transfer Pricing 10. Project Management

VIPIN NAIR	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Organic Synthesis Synthesis of second generation steroidal and non-steroidal androgen receptor binding molecules for the treatment of Prostate Cancer 2. Organometallics Functionalization of heterocyclic ring systems by dicyclopentadienyl zirconium complexes and development of new synthetic methodologies.
ABHAY H. PANDE	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Mechanism of action of membrane-binding enzymes 2. Identification and characterization of antimicrobial peptides
SANKAR K. GUCHHAIT	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Design of molecules as DNA intercalators and inhibitors of topoisomerase II 2. Synthesis of poly-heterocycles 3. Process chemistry; greener synthesis of small organic molecules
SANYOG JAIN	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Targeted drug delivery using Nano-colloidal drug carriers e.g. vesicular carriers (liposomes, niosomes etc.) and particulate carriers (polymeric and solid lipid nanoparticles). 2. Vaccine delivery through non-parenteral (oral and topical) routes. 3. Non-viral vectors for gene delivery 4. Radiolabelling and pharmacoscintigraphic evaluation of drug delivery systems.
CHAAYA IYENGAR	ASST. PROFESSOR	<ol style="list-style-type: none"> 1. Multifunctional proteins and their role in cell

		signalling, iron metabolism 2. Host –Pathogen interaction with relevance to <i>M.tuberculosis</i> .
R. SIVAKUMAR	ASST. PROFESSOR	Molecular self-assembly enables fabrication of unique supramolecular structures and advanced nanomaterials. Biodegradable biological building blocks like peptides and lipids will be exploited to produce micelles, vesicles (liposomes), hydrogels etc., for drug delivery and tissue engineering application.